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# Detrital zircon ages and geochemistry of sedimentary rocks in basement Mesozoic terranes and their cover rocks in New Caledonia, and provenances at the Eastern Gondwanaland margin.

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Geochemical and Sr-Nd isotope data for Mesozoic greywackes of New Caledonia terranes, indicate a fore-arc tectonic environment at the Eastern Gondwanaland margin, but they support only minor continental influences. Detrital zircon U-Pb age

patterns for the greywackes similarly reflect an active-margin tectonic environment of Late Triassic, Late Jurassic, and in particular mid-Cretaceous, depocentres which comprise much contemporaneous volcanic detritus, but also include minor sediment inputs from early Paleozoic-Precambrian continental clastic rocks. The contemporary volcanic sources are probably now hidden within a former hinterland to New Caledonia, such as Loyalty and Norfolk Ridges, Lord Howe Rise or Marion Plateau. The older, continental sediment sources were probably in northeasternmost Queensland, and beyond the northern extremity of the New England Orogen. Such sediments could have been supplied on long rivers, and submarine long-shore current systems outboard of the orogen. Alternatively, the depocentres could have been consolidated close to the contemporary Gondwanaland margin and then tectonically transported, as suspect terranes, southwards in Early Cretaceous times to their present New Caledonia position.

**KEY WORDS: New Caledonia, Gondwanaland, Mesozoic, volcaniclastic sedimentary rocks, geochronology, detrital zircon, geochemistry, strontium isotopes, neodymium isotopes.**

## INTRODUCTION

Situated at the Pacific edge of the Mesozoic Australasian continent crust, New Caledonia and New Zealand provide two comparable sectors of the former, late Paleozoic-Mesozoic Gondwanaland continental margin (Fig.1 inset). New Zealand and New Caledonia are part of a large, but mostly submerged, continental crustal block, ‘Zealandia’. This extends from the Chatham Rise and Campbell Plateau (southwest Pacific Ocean), through New Zealand, the Challenger Plateau and Lord Howe Rise, to

New Caledonia. It has been extensively studied New Zealand where the Zealandia basement comprises Paleozoic and Mesozoic sedimentary rocks, active-margin volcanic arcs, and associated plutonic complexes. These are divided into an early Paleozoic, Western Province, clearly related to the Lachlan Fold Belt of southeast Australia, and an Eastern Province, which comprises six late Paleozoic-Mesozoic elongate, tectonostratigraphic terranes. Situated between Western and Eastern Provinces, a Median Batholith, of Permian-Cretaceous plutonic rocks (Bishop et al. 1985, Mortimer et al. 1999), may be correlated with the more extensive Carboniferous-Jurassic igneous complexes within the New England Fold Belt of northeast Australia,

The Eastern Province terranes of New Zealand comprise an eastern group (Torlesse, Waipapa and Caples) of Permian to Cretaceous, greywacke-dominated turbiditic sequences deposited in an accretionary prism environment (Bishop et al. 1985). The easternmost, Torlesse Terrane is dominated by relatively quartzose greywacke sediments derived from continental sources which included plutonic and metamorphic rocks (MacKinnon 1985), whilst the Waipapa and Caples Terranes (Sporli 1978, Turnbull, 1979) have more acid-intermediate volcaniclastic sediment inputs, and resemble those of the New Caledonia Central Terrane. The remaining, western, terrane group (Dun Mountain-Maitai, Murihiku, Brook Street), has mainly Permian, Triassic and Jurassic, redeposited volcaniclastic greywacke-dominated successions (Ballance & Campbell 1993, Landis et al. 1999), but in a more shallow-water, probable forearc setting. The Brook Street terrane includes substantial volcanic centres and some minor limestones (probably shallow-water). The Dun Mountain-Maitai terrane contains the major Dun Mountain Ophiolite Belt (Coombs et al. 1976), and also has some limestones

(calc-turbidites). In contrast, the Murihiku Terrane is dominated by volcaniclastic sediments with no limestones, and only rare volcanic horizons. It has excellent biostratigraphic subdivision (Ballance & Campbell 1993), whose faunas closely resemble those of the Teremba Terrane of New Caledonia (Campbell et al. 1985). Extensive references and details of biostratigraphy, geochemistry and geochronology of the Eastern Province terranes that are relevant to possible correlations with their New Caledonia counterparts are given in Mackinnon (1985), Roser & Korsch (1988, 1999), Adams et al. (2007). The relative position of the terranes with respect to the Gondwanaland continental margin, suggests that several, especially the Torlesse composite terrane, are suspect terranes i.e. tectonically displaced from elsewhere along the Gondwanaland margin. Original sedimentary depocentres have been suggested in the New Zealand-West Antarctic region (Cawood et al. 1999, Wandres et al. 2004a,b). Alternatively, original depocentres in the northeastern Australian sector have been suggested (Ireland 1992, Pickard et al 2000, Adams et al. 2007), where there are superior matches of Eastern Province detrital zircon age patterns with appropriate sediment sources.

Despite their similarities in age, tectonic setting, sedimentary petrography and biostratigraphy, the exact relationships between New Zealand and New Caledonia terranes remain unclear. The disposition of New Caledonia terranes with respect to the Gondwana continental margin suggests that a suspect terrane scenario is also possible, similar to that described above for the Eastern Province of New Zealand. Thus to investigate their connection further, we present here new geochemical and detrital zircon age data for greywackes from three pre-Late Cretaceous terranes in New

Caledonia, and compare their sediment provenances with those from terranes of similar age and tectonic association in New Zealand.

## NEW CALEDONIA: GEOLOGICAL OUTLINE

Two major terrane groups are distributed along the length of New Caledonia (Fig.1): an older, Late Permian to Early Cretaceous group of three subparallel, elongate terranes on the west coast (*Teremba*) and in the central mountain chain (*Koh-Central,* and *Boghen*); and a younger Late Cretaceous to Oligocene group, overlying the latter, that formed in response to break-up, drift, and subsequent collision of, an island arc (Aitchison et al, 1995). The pre-Late Cretaceous terranes were formed during a period of accretion, and show the closest biostratigraphic correspondences with Eastern Province terranes of New Zealand.

The three terranes that form the central mountains of New Caledonia are as follows:

(1) Koh-Central Terrane: a disrupted, Early Permian ophiolite suite occurs locally along the centre of the island, comprising gabbro, dolerite, rare plagiogranite, IAT and boninite pillow basalt, and undated chert directly overlying the pillow basalts (the Koh ophiolite of Meffre et al. 1996). The Koh ophiolite rocks are closely associated with a thick deep-water succession of volcano-sedimentary rocks: black shale, volcaniclastic turbidite (greywacke), radiolarian-bearing siltstone and chert. These sequences are regarded as a single terrane (Meffre et al. 1996; Aitchison et al., 1998). The black shales are several hundred metres thick, whilst greywackes are generally associated with 20-50% argillite, giving this terrane a distal and deep-water character. The

greywackes are exclusively composed of volcanic lithic (andesite and basalt) and mineral clasts (feldspar, quartz, amphibole, etc.), and plutonic clasts are generally absent, except for one locality (late Early Cretaceous). Middle Triassic (Anisian), and Late Jurassic faunas are correlated with those of the New Zealand Murihiku Terrane (Campbell et al., 1985; Meffre, 1995). Recently, a fossiliferous succession at Pouembout, formerly considered Late Jurassic, is now considered Early Cretaceous (H.J. Campbell (pers. comm.).

(2) Teremba (formerly Teremba-Moindou) Terrane: a succession of very low-grade (zeolite facies), Late Permian to mid-Jurassic, shallow-water, volcaniclastic (calc-alkaline, island arc-derived, andesitic) sedimentary rocks and volcanics (andesites, dacites and rhyolites). The sedimentary rocks are typically medium grain greywackes with only minor (<10%) intercalated argillite, some shallow water volcaniclastic conglomerate and rare black shale, a few tens metres thick. The mineral composition of greywackes is closely similar to that of Central Terrane and similarly lack plutonic clasts. This terrane also contains abundant faunas resembling those of the Murihiku Terrane of New Zealand (Grant-Mackie et al., 1977; Paris 1981, Campbell, 1984, Ballance & Campbell, 1993).

(3) Boghen Terrane: (the *ante-Permien* of Paris, 1981), an accretionary complex comprising schistose unfossiliferous, volcano-sedimentary rocks (pillow basalts, chert, black shale, sandstone, tuffs, turbiditic greywackes, and mafic melange), at a metamorphic grade (lower greenschist to blueschist facies) that is notably higher than the adjacent terranes. Late Jurassic metamorphic ages

(ca. 150 Ma, whole-rock K-Ar) of the blueschists and metabasalt (Blake et al., 1977) suggest a minimum mid-Jurassic age for metamorphism, and Early Jurassic detrital zircon ages (Cluzel & Meffre, 2002) set a maximum depositional age for the original sediments. However, zircon U-Pb ages of this present work infer a much younger maximum depositional age at ca. 135 Ma (Early Cretaceous). This discrepancy may arise from limitations of the K-Ar whole-rock dating method used (Blake et al. 1977), where presence of excess Ar is possible, and thus the Late Jurassic metamorphic age is rejected here.

Since Triassic to Early Cretaceous shallow-water volcaniclastic sediments occur to the west, and deeper-water sediments (with the same origin) to the east, and volcanic rocks and shallow intrusions are absent in the Central Terrane, Meffre (1995) and Cluzel & Meffre (2002) have suggested that the Teremba and Central Terranes are respectively the onshore and offshore parts of the same fore-arc basin. This view is also supported by a westwards-increasing metamorphic gradient in the HP-LT Boghen terrane (Guérangé et al., 1975; Paris, 1981), thus implying westwards-dipping Mesozoic subduction.

Unconformably overlying the three above-mentioned terranes, there is a prominent Late Cretaceous (Coniacian to Maastrichtian), volcanosedimentary unit (classically referred to as *Formation à Charbon*) composed of marine shallow water sandstone, coal-bearing siltstone, tuffs and volcanic rocks. Sandstones of

this unit contain detrital zircon populations which have a dominant (c. 70%) component at 90-140 Ma, and a minor (c. 25%) component at 170-240 Ma (Aitchison et al., 1998). From probable correlative (Late Cretaceous) sandstones at Dumbéa River, Aronson & Tilton (1971) obtained discordant U-Pb zircon data that suggested dominant Late Cretaceous, and accessory Precambrian (>1000 Ma) age components. The occurrence of unconformable Late Cretaceous sediments upon terranes whose greywackes contain reworked Early Cretaceous zircons suggest that the pre-Late Cretaceous terranes were amalgamated in early Late Cretaceous time.

## TECHNICAL METHODS

Samples were initially collected for geochemical and isotopic analysis of both sedimentary rocks, and volcanic horizons in the three New Caledonia terranes. The analytical procedures relating to this study are described in the Appendix 1.

A small group of representative sandstone samples from the three basement terranes, and the Cretaceous cover sequences, were also collected for detrital zircon studies, preferably from localities, or general areas where there was reasonable biostratigraphic control. Details of detrital zircon preparation procedures, LAM-ICPMS dating techniques, and U-Pb data treatment are listed in Appendix 1.

## GEOCHEMISTRY OF GREYWACKES AND VOLCANIC ROCKS

Geochemical analyses of 16 volcanic rocks from Teremba Terrane and 21 greywacke samples from Teremba and Central Terranes are used here to constrain their origins. Permian volcanic rocks of the Teremba Terrane are mainly represented by ash fall deposits and/or pyroclastic flows (surge deposits) with occasional massive rhyolite and andesite, whereas Mesozoic volcanics (mainly Triassic) are dacitic to rhyolitic with many hypabyssal intrusions and only a few subaerial volcanic rocks and rare pillow lavas. In the Central terrane, the only volcanic rocks are scarce, massive, island-arc basalts (Meffre, 1995). Consistent with field observations, the major element compositions range from basalt-andesite to rhyolite (Table 1b). However, the trace element patterns allow tholeiitic and calc-alkaline suites to be distinguished. REE patterns (Pearce, 1982, not presented) for tholeiites are generally flat and slightly depleted in LREE, but, in contrast, calc-alkaline rocks are typically enriched in LREE (La to Sm), with the rest of the pattern similar to that of tholeiites. On a REE/trace element expanded spider-diagram (Sun & McDonough, 1989) (Fig. 2), all these rocks are enriched in LILE and typically display a prominent negative Nb-Ta anomaly, of which tholeiites (island-arc tholeiites) have the lowest incompatible element content.

Except for the occurrence of biogenic carbonate in some samples, that result in relatively low $SiO_2$ and high CaO contents (Table 1a), the greywackes, that are almost exclusively composed of volcanic lithic and mineral clasts, logically display geochemical features that are strikingly similar to those of the volcanic rocks. However, on average, the volcanic rocks sampled here are probably more mafic than the bulk of the sediment sources of the greywackes. A few of them display almost flat REE patterns, whereas the rest are enriched in LREE to various degrees. However, the bulk

REE content is more variable in the volcaniclastic sediments than in volcanic rocks, a possible consequence of limited dilution by weathering products and pelagic sediments. REE/trace elements patterns are closely similar to that of volcanic rocks (Fig. 2) and similarly indicate a volcanic-arc origin. Owing to the clastic mineral composition and similar geochemical features, greywackes and volcanic rocks appear to be derived from a similar magmatic source. Considering the westward coarsening and absence of erosion features within Mesozoic series, the greywackes are most likely derived from the erosion of volcanic rocks and coeval plutonic or shallow intrusive rocks which are now located to the west of present-day New Caledonia, e.g. in the Lord Howe Rise (Cluzel & Meffre, 2002).

## ND-SR ISOTOPE GEOCHEMISTRY OF GREYWACKES

12 greywacke samples were selected for isotope analysis in order to identify their source rocks. In order to remove the biogenic carbonate which is obvious in some greywackes, all analysed samples have been leached with cold acetic acid. Most of them plot within a very narrow range of variation (Fig. 3) with positive εNd ($+0.9 < \varepsilon Nd < +3$) and low εSr ($-4 < \varepsilon Sr < +25$) values, that are typical of magmatic rocks derived from an undepleted mantle source with no evidence of contamination by sediment or continental crust rocks. Two samples display slightly negative εNd values ($-6.7 < \varepsilon Nd < -2.8$) whereas εSr remains only slightly positive ($+9.5 < \varepsilon Sr < +25$), implying a very limited contamination by a lower continental crust component. Only one sample displays a positive εSr (+212) together with a high Th content (13.8 ppm) consistent with the

involvement of a terrigenous (sedimentary) component, either by contamination of the mantle source, or more probably by mixing of the volcaniclastic component with a small amount of terrigenous argillite. It is worth noting that such differences in isotope ratios are not accompanied by noticeable geochemical changes (see Fig 2).

In summary, the Mesozoic greywackes are derived from a volcanic-arc source with almost no contamination by continental crust or pelagic sediment. As already pointed out by Meffre (1995), the original material (andesite, dacite and/or rhyolite) is similar to that of most intra-oceanic volcanic arcs; therefore, Permian-Mesozoic volcanic-arc magmas may have been erupted through an oceanic lithosphere or a thinned/intermediate continental crust rather than in a "normal" continental active margin. If this is the case, then any older zircons (pre-Permian) must be recycled either from older sediments derived from continental sources, or entrained as xenoliths within deep primary sources of unknown location. Thus, it appears likely that, as proposed by Cluzel & Meffre (2002), Central and Teremba terrane sediments accumulated in a fore arc region, partly upon a trapped oceanic crust element now represented by the Koh ophiolite (Fig. 1).

## DETRITAL ZIRCON GEOCHRONOLOGY

Detrital zircon U-Pb age data for greywackes from nine localities (Table 3) in three New Caledonia terranes are presented in three forms.

Firstly, in Figs. 4-1 to 4-9, all $^{206}Pb/^{238}$ zircon ages are treated with equal weight as combined probability density/histogram diagrams for each sample. These diagrams show individual points of detail well, but taken together, the nine diagrams are difficult

to compare visually. Thus, secondly, a summary table (Table 4) lists only those ages that form statistically significant components on the probability density plots of Fig. 4 (see also Appendix 2), and these are then displayed in Fig. 5, taking into consideration their proportional contribution to the total zircon set. Thirdly, in Tables 5A, and 6A, *all* ages of the New Caledonia age datasets are used, by displaying the percentage of the zircon ages that fall within selected geological periods. In these diagrams, the data are compared with published datasets from New Zealand Eastern Province terranes (Table 5B) and selected northeastern Australian terranes (Table 6B) (Adams et al. 2007, Korsch et al. 2008 in press).

### Formation á Charbon

Sandstone at locality (*1*), correlative with *Formation à Charbon* nearby, has dominant Cretaceous (>80%), and a minor, Triassic-Jurassic (12%) zircon groups, but few (5%) Precambrian zircon ages (Fig. 4-1, Fig. 5, and Table 5A). The small, youngest zircon age component, 85±2 Ma, is in agreement with the estimated Coniacian-Santonian age, but this is overwhelmed (>70%) by several mid- and Early Cretaceous subcomponents, 95±1, 102±4,110±2, 119±2 and 130±2 Ma. These latter clearly reflect reworking of a long-lived active Cretaceous igneous province, relatively isolated from older, 'continental' inputs. Whilst the youngest zircons are probably derived from contemporaneous, dacite-rhyolite volcanic sources, c.85 Ma, it is probable that the older dominant group at 100-120 Ma reflects erosion not only of older parts of the igneous province but also reworking of detrital zircons from underlying Albian greywackes,

such as those at locality (*2*) (see below). The latter might also contribute the few inherited, Precambrian zircons.

### Central Terrane

Central Terrane greywackes at localites (*2*) and (*3*) have quite dissimilar detrital zircon age patterns.

The locality (2) was originally mapped as a Late Jurassic succession within the terrane, but arising from the new Cretaceous zircon age data below, a closer search yielded Early Cretaceous fossils (H. Campbell pers. comm.). Its zircon age pattern is similar to that of Formation á Charbon at locality (*1*), with dominant Cretaceous (>80%), and minor (11%) Precambrian, groups (Fig. 4-1, Fig. 5, and Table 5A). Within the Cretaceous group, the youngest statistically significant age component, 108±2 Ma, is the major one, and provides a maximum Albian age for deposition, supporting the new fossil age assignment.

In contrast, the Late Jurassic locality (*3*) has far fewer (28%) contemporary zircons (a single statistically significant component is 162±3 Ma), and a dramatically increased early Paleozoic-Precambrian proportion (>70%), with age components at 513±5, 539±6, 557±5, and 592±5 Ma.

### Boghen Terrane

The zircon age pattern for the Boghen terrane greywacke (*4*) is similar to the Late Jurassic, Central (*11*), and Late Triassic Teremba (*6*) Terrane samples, having low (<25%) proportions of contemporary zircons, and high proportions (>40%) of inherited,

early Paleozoic-Precambrian zircons (Table 5A). Significant older zircon component ages are Cambrian-late Neoproterozoic, 505±4, 563±6, and 584±5 Ma, similar to those in Central (*3*) and Teremba (*5, 6, 8*) Terrane samples. At this locality, the greywacke depositional age is uncertain, but the youngest zircon age group, at 170±2 Ma (which is just statistically significant), suggests a Middle Jurassic maximum. However, three younger individual ages, 137±2, 141±2 and 149±2 Ma reduce this to Early Cretaceous-Late Jurassic.

### Teremba Terrane

The Teremba Terrane samples from localities (*5*)-(*8*) have their youngest zircon ages close to their estimated Middle-Late Triassic depositional ages (Figs. 4-5 to 4-8, and Table 5A), and with the exception of locality (*8*), these form statistically significant age components. They thus probably reflect contemporary volcanic-arc sources. This would be particularly true of greywacke at locality (*7*), which unlike the remainder of the terrane samples, has an extremely high proportion (96%) of Triassic zircons, with the youngest age component, comprising 33% of the total, at 225±2 Ma (Late Triassic, Norian). An age discrepancy is apparent in the sample from locality (6). This is mapped within an area of Middle Triassic rocks (237-245 Ma), although four zircon ages c. 215 Ma (Fig. 5) are clearly younger than this, and suggest that the sample is from a horizon no older than Late Triassic (Norian). With the exception of locality (7), the remaining Teremba Terrane samples have major proportions (>50%) of early Palaeozoic and Precambrian zircons and several statistically significant age components falling in the latest Neoproterozoic, c. 550-590 Ma (Fig. 5).

## DISCUSSION

None of the New Caledonia terranes have sandstones with detrital zircon age patterns sufficiently distinctive to discriminate one terrane from another (Fig. 5). Rather, all the zircon patterns fall between two extremes: those dominated by contemporary, volcanic (Fig. 5: *2, 7*) sources, and those by inherited, continental (Fig. 5: *4, 8*) sources. In this sense, it could be argued that all the terranes had broadly similar depocentres, capable of providing both substantial contemporary volcaniclastic detritus, from island-arc centres (perhaps local) and terrigenous clastic material from an old hinterland of continental character (perhaps more distant). However, the sandstones dominated by contemporary volcanic inputs are more typically Cretaceous, whilst those dominated by inherited inputs are all pre-Cretaceous. This may indicate that New Caledonia became more isolated from direct continental zircon sources in the late Early Cretaceous, probably at a time of extension, before major rifting created Tasman Sea ocean floor at c. 85 Ma (Santonian). Alternatively, the contemporary Cretaceous volcanism may have been so dominant as to completely overwhelm any continuing continental zircon inputs. The zircon sources of the contemporary volcanic and older inherited continental components are thus discussed separately below.

### Contemporary zircon sources for sediments in the New Caledonia region

Those youngest zircon age components in the Central and Teremba terrane greywacke samples that overlap estimated depositional ages, probably originate in contemporary volcanic centres and, given the first-cycle immature nature of the sediments, are

probably of local origin. Substantial volcanic centres of appropriate age and composition are absent in New Caledonia, and one must speculate that these are now either entirely eroded away or hidden elsewhere in a hinterland (in Cretaceous times) of the Norfolk or Loyalty Ridges and/or northern Lord Howe Rise. Early Triassic diorites and granodiorites, perhaps connected to volcanic centres, do occur on the Dampier Ridge, and southern Norfolk Ridge (McDougall et al. 1994, Mortimer et al. 1998), but pre-Cretaceous rocks are not known from either the Loyalty Ridge or northern Lord Howe Rise. None of these regions appears to have Late Triassic-Jurassic rocks, of appropriate extent or composition, to provide zircon sources for New Caledonia sediments. For the Late Jurassic-Early Cretaceous sediments, the acidic volcanic centres of Whitsunday Islands, Queensland, which might extend north and south along the northern Lord Howe Rise and Marion Plateau, would provide far more suitable zircon sources. In addition, mid-Cretaceous rhyolites are known from the southern Lord Howe Rise (McDougall and Van der Lingen 1994). To provide zircons for the New Caledonia terrane depocentres from adequate sediment sources, we must therefore speculate that offshore island-arc volcanic centres of Late Triassic to Early Cretaceous age, which are now hidden, once existed along the northern Lord Howe Rise and Marion Plateau. In addition these centres might have formed an intermittent barrier to rivers originating in eastern Gondwanaland which supplied the older, continental zircons.

### Inherited continental zircon components

It is notable that the older (>250 Ma), zircons in the New Caledonia sediments are overwhelmingly (>90%) early Paleozoic and Precambrian (mostly 500-700 Ma). In

particular, there are few individual zircons in the Middle Permian-Early Triassic, 245-270 Ma (Figs. 4, 5) age range, and none constitute statistically significant age components. This is surprising, because voluminous plutonic (and volcanic) complexes of this age (and also Early Permian-Late Carboniferous) are extensive within the New England Orogen, along 2000 kilometres of the northeastern, present-day, margin of Australia (Veevers 2000). This fold-belt would be have been undergoing uplift and erosion at this time, sufficiently to supply marine depocentres at the Gondwana continental margin at a latitude similar to present-day New Caledonia. This is indeed the case for Permian-Triassic volcaniclastic sedimentary rocks of the Gympie Terrane of southeast Queensland (Table 4), now situated between the main plutonic/volcanic arcs of the New England Orogen and New Caledonia in its present position (Korsch et al., 2008 *in press*). In addition, the petrological, geochemical, mineralogical, faunal and particularly detrital mineral evidence (Pickard et al. 2000, Adams & Kelley 1998, Adams et al. 2007), indicate that the depocentres of several New Zealand Permian-Jurassic, Eastern Province tectonostratigraphic terranes developed at these latitudes (Fig. 6). Their sedimentary rocks always contain substantial proportions of Early Triassic-Late Permian zircons and micas, c. 245-270 Ma. Depocentres such as those of the Gympie Terrane of Australia and the Eastern Province terranes of New Zealand, would thus explain the absence of Late Permian-Early Triassic zircons in New Caledonia rocks, by providing an effective sediment trap inshore of New Caledonia. There is the additional possibility that present-day Zealandia continental fragments such as the Lord Howe Rise, Marion Plateau, and Queensland Plateau might have existed then, and were elevated, to provide an additional barrier.

However, the early Paleozoic and Precambrian zircon components in New Caledonia sediments clearly indicate major access to older continental sources. The same is true of Late Paleozoic (probable Carboniferous) terrane metasediments of the Shoalwater and Wandilla terranes in eastern Queensland (Table 6, Korsch et al., 2008 *in press*). In contrast, pre-Carboniferous zircons are rare in the Permian-Triassic rocks of the Gympie Terrane (Table 6). It is possible that Early Paleozoic and Precambrian zircons might have originated locally in basement rocks now hidden under Cenozoic cover on the northern Lord Howe Rise, Marion and Queensland Plateaux, but in the absence of any evidence, this is purely speculative. It is perhaps more realistic to look to more distant, interior sources along the Gondwana margin, where early Paleozoic (470-550 Ma) zircons could clearly originate from Early Ordovician granitoids and Cambro-Ordovician rhyolites of the Mt Windsor Volcanics in the Charters Towers Province (Veevers 2000). However, the origin of the Precambrian zircons is more problematical; for the major part, they could be recycled from Paleozoic metasediments (Cambrian-Carboniferous) in the Charters Towers, Broken River and Hodgkinson Provinces of northeastern Queensland. In addition, there are also potential primary igneous sources, mostly late Paleoproterozoic and early Mesoproterozoic metavolcanics and gneisses (1500-1800Ma), in the Georgetown, Coen and Yambo Precambrian inliers of the same region (Blewett et al. 1998). However, no primary igneous sources for the late Mesoproterozoic-early Neoproterozoic (950-1150 Ma) zircons are known.

## Comparison of New Caledonia and New Zealand terranes

Similar to the New Caledonia sandstones, Eastern Province terrane metasediments of New Zealand share the same division between contemporary (probably volcanic) and inherited (probably continental) zircon sources. Like New Caledonia, there is difficulty in locating extensive volcanic sources of appropriate composition. The inherited zircon inputs are quite different in their proportions, and this feature suggests that the two regions occupied different positions at the eastern Australian Gondwanaland margin in Permian to Cretaceous times. Although now distant, New Zealand depocentres were then much closer to the New England Orogen, whilst New Caledonia, now adjacent, was formerly remote from it.

## TRIASSIC-JURASSIC COMPARISONS

Triassic-Jurassic, Teremba Terrane rocks have tectonic associations and faunal assemblages similar to the New Zealand Murihiku Terrane (Campbell 1984, Ballance & Campbell 1993). However, in the latter, the major to dominant (40-80%) zircon age components are close to the depositional age, characteristic of an active volcanic margin setting. In the Teremba Terrane however, these youngest zircon groups are usually diminished (<25%) and there is instead a substantial component (usually >50%) of inherited early Paleozoic-Precambrian zircons. This latter feature is quite unlike any Permian, Triassic or Jurassic examples from the Murihiku Terrane (Table 5B, MATI4, PIOX5, HURW4 respectively). The proportion of early Paleozoic-Precambrian to Triassic-Permian zircons in the Teremba Terrane samples is particularly high, ratio >2.0 (Table 5A), and cannot be matched in any New Zealand terranes, where the ratio is always <1.0. The closest comparisons are in the New Zealand Torlesse Terrane, where

Triassic samples (Table 5B, RBW1 to PUD1) are the most zircon-rich, carry the highest inherited zircon component (>40%), and the ratio is c. 0.7, e.g. Table 5B, NGQ2. A sole exception to this behaviour occurs in the Akatarawa microterrane (a 1 $km^2$ enclave within the Torlesse Terrane) at a Late Permian locality (Table 5B, TAKA10), where the zircon pattern (with ratio, c. 2.0) resembles that from the Late Triassic, Teremba locality (5). Significantly, the microfaunas in this microterrane are considered of Tethyan type (Hada et al. 1995) i.e. of more northerly, lower-latitude origin than that of surrounding Torlesse rocks. (An attempt to pursue this comparison further was unsuccessful, as several Teremba terrane samples of similar Late Permian age were found to be exceptionally zircon-poor and unfavourable for detrital zircon study).

Like the New Caledonia examples, volcanic sources for contemporary zircon inputs into Triassic or Jurassic depocentres of the New Zealand Eastern Province terranes are rarely seen, and where present they are often very minor. This is surprising, as the coarse, first-cycle, immature nature of the sediments suggests short transport from local sources. For this reason, the terranes are considered 'suspect, i.e far-travelled, and tectonically transported from sediment depocentres formerly much closer to the Australian (or Antarctic) Gondwanaland margin.

## CRETACEOUS COMPARISONS

New Caledonia Cretaceous sedimentary successions have two potential points of comparison with New Zealand: (1) Early Cretaceous rocks form a major part of the Torlesse composite Terrane, as basement accretionary complexes (e.g. Pahau terrane) in eastern North Island and northeastern South Island, and (2) Late Cretaceous successions

are locally present at the base of widespread Cretaceous-Cenozoic cover rocks throughout New Zealand, and also within the Northland, Mt. Camel, and East Cape allochthons of the North Island (Fig. 6, Table 5B) (Suggate 1978). Similar to New Caledonia counterparts, the Cretaceous Torlesse greywackes (Table 5B, Pahau Terrane section) all carry significant proportions (>30%) of early Paleozoic and Precambrian zircons, but in contrast, carry an important additional component (>30%) of Triassic-Permian zircons (a distinctive feature of all Eastern Province terrane rocks) that weakens the comparison. This latter problem does not arise in Cretaceous rocks from the Northland, Mt. Camel, and East Cape allochthons (Table 5B, allochthon section), since they have fewer (<10%) Triassic-Permian zircons, but in turn, their much-diminished proportion (<5%) of early Paleozoic and Precambrian zircons also weakens any comparison too. Unlike New Caledonia there is better evidence for contemporary magmatism in late Early and Late Cretaceous time. Volcanic centres are widespread in the South Island, with major centres that include acid-intermediate magmatism at Mt Somers, Mt Mandamus and in the Clarence/Awatere river valleys, and minor horizons occur in Otago and north Westland (Suggate 1978), and offshore on the southern Lord Howe Rise (McDougall & Van der Lingen 1974). Major Mesozoic granitoid complexes of the Separation Point Batholith of Nelson (and its counterpart in Fiordland) and the Paparoa Suite of north Westland (Muir et al. 1994, 1996) almost certainly supplied contemporary volcanic centres, now uplifted and removed. On this basis, the comparison of New Zealand with New Caledonia during the Cretaceous is poor. Whilst having major volcanic/plutonic late Early and Late Cretaceous zircon sources nearby, the New Zealand sediments maintained access to older continental zircon sources, (1)

by recycling of older zircons from underlying Permian-Triassic and early Paleozoic basement rocks within the New Zealand region, and (2) perhaps more distantly, from primary igneous sources in the southernmost part of the New England Orogen. In contrast the New Caledonia Cretaceous sediments evaded sources within the New England Orogen, yet maintained some access to older zircon sources. The latter might have been recycled from late Early Cretaceous sedimentary rocks (cf. sample NCAL10 of the Central terrane) within New Caledonia, but now largely hidden or eroded away. Prior to 85 Ma (oldest seafloor in the Tasman Sea), during the initiation of rifting in mid-Cretaceous times, the development of the extensive Whitsunday Islands (eastern Queensland) silicic volcanic province, would have provided an important zircon source. This had the additional benefit of proximity to the early Paleozoic and Precambrian provinces of northeastern Queenland. However, it must be recognised that this scenario is much weakened if one accepts a continuation, as suggested by Mortimer et al. (2008), of the New England Orogen beyond of its northernmost onshore occurrence on to the Queensland Plateau. Sediments derived from this sources in this region would then surely contain the Late Permian-Early Triassic zircon components so characteristic of the New England Orogen, but which are mostly absent in New Caledonia.

### New Caledonia terranes at the eastern Australia Gondwana margin

The Late Permian-Late Cretaceous terranes in New Caledonia and New Zealand have a similar tectonic setting in an accretionary prism environment. Terrane sediments in both areas show varying combinations of contemporary, redeposited volcaniclastic and inherited, continental clastic sediment inputs. However their geographic positions

relative to the Gondwanaland foreland must be quite different, with older Paleozoic-Precambrian zircon sources more apparent in the New Caledonia terranes, at the expense of the Late Permian-Early Triassic sources which dominate the New Zealand terranes. In New Caledonia, whilst the persistent contemporary volcaniclastic sediment sources are probably local, the older zircons sources are almost certainly outside the immediate New Caledonia region. The nearest available plutonic and metamorphic complexes of early Paleozoic-Precambrian age are in northeasternmost Queensland, at a point where the Australian Precambrian craton comes closest to the Pacific margin of Gondwanaland. However, it should be noted that the available age data for the northernmost Queensland Precambrian basement rocks Blewett et al. 1998), are dominantly early Mesoproterozoic, 1500-1600 Ma, rather than the younger Precambrian, 900-1100 Ma, ages more commonly seen in the New Caledonia detrital zircon sets. In this scenario, there is a requirement for long sediment transport, up to 2000 kilometres, via a river/delta/submarine canyon system, from sources that includes Cambrian-Ordovician rocks, such as those of the Broken River Province, and Neo- and Mesoproterozoic rocks, such as those in several adjacent Precambrian inliers. In the Triassic-Jurassic, any such river system must direct such sediments from these sources quite far offshore and then transport it by longshore currents into the New Caledonia region, to avoid capture of zircon sources from the northern New England Orogen (Fig. 6). This latter requirement is especially difficult, as there can be no sediment input into such longshore currents along the 500 kilomtere sector of the northeast margin of the orogen. However, Leitch et al. (2003) have suggested a similar scenario for derivation of late Paleozoic, Shoalwater and Wandilla terrane sediments in eastern Queensland

from older continental sources in northeastern Queensland. The continental sediment supply must diminish substantially in Cretaceous times, either as a consequence of gradual erosion of the source areas, or the intervention of a sediment trap or barrier e.g. initiation of rift basins or volcanic arcs offshore.

Alternatively, the sediment transport may have been relatively short (c. 200km), into depocentres at the immediate Gondwana margin of northeasternmost Queensland (Fig.6). In Early Cretaceous times, such depocentres would have been be consolidated and tectonically transported southwards, as suspect terranes, by dextral strike-slip, margin-parallel displacement, outboard of the New England Orogen, and into the New Caledonia region. The Triassic-Jurassic terranes transported in this way would gradually approach a hinterland to New Caledonia, comprising local Cretaceous volcanic arcs e.g. Whitsunday Islands, Maryborough Basin, and hence become dominated by their contemporary volcaniclastic sediment inputs. Pickard et al. (2000) and Adams et al. (2007) have suggested this kind of scenario for transport the Late Palezoic–Mesozoic, Torlesse composite terrane of New Zealand from eastern Australia. However, like the New Zealand example, this scenario encounters anomalies, because the relative original positions of the New Caledonia sediment depocentres at the Gondwanaland margin would been the opposite of their final relative terrane positions in New Caledonia. The Boghen terrane, whose sediment depocentre had most ‘continental’ (inherited) zircons, would now be outboard of the Teremba Terrane, whose sediment depocentre was more local, and had the least ‘continental’ influence.

## SUMMARY OF CONCLUSIONS

Geochemical and Sr-Nd isotopic characteristics of Mesozoic greywackes in the Teremba and Central Terranes of New Caledonia indicate a uniform offshore, probable subduction-related tectonic environment, with minor continental sediment contribution.

Detrital zircon U-Pb age patterns for sandstones of the Formation á Charbon, and greywackes of the Central and Teremba Terranes indicate local offshore depocentres in an active margin tectonic environment, with substantial contemporaneous volcaniclastic sediment supplies in Late Triassic, Late Jurassic and particularly mid-Cretaceous times. In the Teremba Terrane, an older, inherited zircon component from continental sources is usually (but not always) important, most commonly Precambrian and Cambrian in age. In contrast, the Boghen terrane sandstones have much diminished contemporary (Late Jurassic) zircon contributions, and a major contribution (>50%) of Early Paleozoic and Precambrian zircons. In all terranes there are few late Paleozoic-early Mesozoic zircons, especially in the age range Late Permian to Early Triassic, which latter feature would thus probably exclude sediment sources from along the adjacent Gondwana margin in the northern New England Orogen. It is concluded that the primary contemporary zircon sources must lie hidden, or are now eroded, somewhere in the New Caledonia hinterland, on the Loyalty and Norfolk Ridges, or northern Lord Howe Rise and Dampier Ridge, or Marion and Queensland Plateaux. A degree of local zircon reworking, from Triassic into Jurassic, and Jurassic into Cretaceous sediments is possible. The continent-derived zircons probably have primary, and/or reworked detrital sources in Paleozoic and Precambrian rocks of northeast Queensland. Here there are several Proterozoic igneous/metamorphic inliers and Paleozoic sedimentary

successions of the Charters Towers, Broken River and Hodgkinson Provinces, which are close to the Gondwana margin and beyond the northernmost extremity of the New England Orogen. The sediment supplied from these areas must have been transported southwards by longshore currents, outboard of the orogen, to depocentres in New Caledonia. Alternatively, the depocentres themselves may have originated closer to source at the contemporary Gondwana margin, and then transported tectonically southwards, as suspect terranes in Early Cretaceous times, to their present New Caledonia position. This latter scenario resembles that suggested for New Zealand Permian-Cretaceous sediment depocentres that developed close the Gondwana margin of northeastern Australia.

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**FIGURE CAPTIONS:**

**Figure 1a:** Geological map of New Caledonia basement terranes and U-Pb geochronology sampling localities.

**Figure 1b:** New Caledonia in the Southwest Pacific region in Cretaceous times.

**Figure 2a:** Expanded REE-trace elements spider-diagram normalised to the average MORB for selected New Caledonia terrane greywackes (normalising values are from Sun & McDonough, 1989). Labelled patterns refer to sediments which have slightly negative εNd (see Fig. 3 and Table 2)

**Figure 2b:** Expanded REE-trace elements spider-diagram normalised to the average MORB for selected Teremba terrane volcanic rocks (normalising values are from Sun & McDonough, 1989)

**Figure 3:** Sr-Nd evolution diagram for selected New Caledonia terrane greywackes showing remarkably constant isotopic ratios through time and the quasi-absence of contamination. Arrows with interrogation marks refer to either the array resulting from magma contamination by pelagic sediments (moderately negative εNd, high εSr); or, alternatively contamination by lower continental crust (negative εNd, slightly positive εSr).

**Figure 4:** Combined histogram and probability density diagrams of detrital zircon age data from nine greywackes from New Caledonia terranes, Statistically significant age components (expressed in millions of years) are shown in bold italics. Ages >600 Ma are stacked at right side. Ages < 1000 Ma are $^{238}U/^{206}Pb$ data, ages > 1000 Ma are $^{207}Pb/^{206}Pb$ data.

**Figure 5:** A summary of detrital zircon $^{238}U/^{206}Pb$ age component data from the cumulative probability diagrams (Fig. 4) of nine greywackes from New Caledonia terranes. These component age data are stacked from top to bottom in ascending biostratigraphic age order (where known), or estimated maximum and minimum stratigraphic ages derived respectively from youngest detrital zircon age components, and metamorphic ages. The height of each databox indicates the component's proportion of total (see % scale bar at right) and the width is the component age error (at 95% confidence limits. The dot-dash line is the stratigraphic age limit - all zircon data should be older than this.

**Figure 6:** Configuration of Eastern Gondwanaland during the Mesozoic (modified from Gaina et al. 1998; Sutherland 1999; and Hall 200), showing possible position of sources of New Caledonia terrane sediments, suggested depocentres, and their final destinations for terrane assembly. Black arrows show generally local transport of sediments derived from contemporary volcanic arc sources. Light grey

arrows show more distant transport of older, continent-derived sediments from the Gondwana margin. Two scenarios are suggested: in Fig. 6A, the continent derived-sediments are supplied to on long-shore river systems to depocentres in New Caledonia and in Fig. 6B, the continent-derived sediments are supplied to more local depocentres at the Gondwana margin, which are then tectonically transported in Early Cretaceous times, as suspect terranes, to a final destination in New Caledonia. The positions of equivalent New Zealand depocentres and terranes are taken from Adams et al. (2007).

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**Table 1a:** Major and trace element data for New Caledonia Teremba and Central terrane greywackes.

**Table 1b:** Major and trace element data for New Caledonia Teremba volcanic rocks

**Table 2:** Sr-Nd isotopic data for New Caledonia Teremba and Central terrane greywackes.

**Table 3:** Sample list for U-Pb zircon geochronology

**Table 4:** Summary of statistically significant age components in detrital zircon age patterns in New Caledonia terrane metasediments (see Fig. 4).

**Table 5:** New Caledonia detrital zircon ages (5A) summarised in geological periods, and compared with correlative New Zealand data (5B).

**Table 6:** New Caledonia detrital zircon ages summarised in geological periods (6A), and compared with correlative Australian data (6B).

## Appendix I: Technical details

### GEOCHEMICAL AND ISOTOPIC ANALYSES

Whole rock geochemical analysis of representative volcanic rocks and greywacke samples are by ICP-AES for major elements and ICP-MS for REE and other trace elements (Table 1) at the Service d'Analyse des Roches et des Minéraux of Vandeuvre (Centre National de la Recherche Scientifique, France), using the methods of

Govindaraju and Mevelle (1987). To avoid pollution by biogenic carbonate without affecting other mineral phases, all the greywackes samples have been leached with acetic acid prior to isotope analysis. Nd and Sr isotopic analyses (Table 2) were determined at the Clermont–Ferrand isotope laboratory by thermal ionization mass spectroscopy (TIMS) using a VG54E instrument in dynamic double collection mode and corrected for mass fractionation by normalization to $^{86}Sr/^{88}Sr = 0.1194$ and $^{146}Nd/^{144}Nd = 0.7219$. The Sr–Nd sample decomposition and chemical separation procedures are those of Pin and Santos Zalduegui (1997). Sr and Nd isotopic ratios were corrected for radiogenic decay according to their assumed stratigraphic age. The concentrations of Sm, Nd, Rb and Sr are given in µg/g, and the precision of $^{147}Sm/^{144}Nd$ and $^{87}Rb/^{86}Sr$ measurements are 0.2% and 2%, respectively, at the 95% confidence level. The $^{143}Nd/^{144}Nd$ ratio measured for the La Jolla isotopic standard during the period of analysis gave a mean value of 0.511849 (SD = 8 x $10^{-6}$, $n = 70$). The $\varepsilon Nd_i$ is the initial $^{143}Nd/^{144}Nd$ expressed as a fractional deviation in parts per $10^4$ from the contemporaneous value of a chondritic (bulk earth) reservoir with present-day $^{143}Nd/^{144}Nd = 0.512638$ and $^{147}Sm/^{144}Nd = 0.1966$ (Jacobsen & Wasserburg 1980). $^{87}Sr/^{86}Sr$ ratios were normalized to $^{86}Sr/^{88}Sr = 0.1194$, with an uncertainty equal to or better than ±0.00004 (two standard errors on the mean). The $^{87}Sr/^{86}Sr$ ratio measured for the National Institute of Standards and Technology, Standard Reference Material (NIST – SRM) 987 during the period of analysis gave a mean value of 0.71023 (SD = 2.7 x $10^{-5}$, $n = 29$).

## DETRITAL ZIRCON DATING

Detrital zircon dating was done at the ARC Key Centre for Geochemical Evolution and Metallogeny of Continents (GEMOC), Macquarie University, Sydney, Australia. Eight samples for detrital zircon studies were chosen from representative collections taken at stratigraphic horizons where coarse-medium greywacke and sandstone predominate, and preferably with established biostratigraphic age control (Table 3). Since these localities are in lower metamorphic grades (typically zeolite to lower pumpellyite-actinolite mineral facies), they are essentially unfoliated rocks and free of metamorphic zircon.

To minimise sample handling for zircon recovery, a 1 kg sample was collected at the field outcrop as 5 mm-size gravel, removing all weathered rinds, blemishes, inclusions and joint faces. This enabled direct crushing in a tungsten carbide swingmill 2-3 times, for 5-10 seconds, sieving at each stage through a single, 250 micron mesh sieve. The sieved material was washed and decanted several times in water, to remove mud-size fractions, thus retaining a 200-300 g sample in a ~30-250 micron size range, which was then dried. A heavy mineral concentrate was obtained from a 100 g portion in sodium polytungstate liquid, adjusted to a specific gravity of 2.95-2.98, from which about 500 zircon grains were then hand-picked as randomly as possible, i.e. taking all grains within a 1 mm microscope stage field of view. Of these, 50-100 grains were mounted in resin to be polished for LA-ICPMS (laser-ablation inductively-coupled plasma-source mass spectrometry) analysis.

Analytical protocols relating to ablation procedures, mass spectrometric analysis and data treatment are discussed in detail in Jackson et al. (2004). These authors' preferred procedures were followed in this work, using a Merchantek pulsed Nd-YAG laser, frequency-quintupled to operate at 213 nm, and an Agilent 7500S ICPMS instrument.

In all cases, the ablated spot size was in the range 30-40 microns, with the ablation time about 60 seconds, preceded by 60 seconds background measurement, and followed by 60-120 seconds washout. Groups of 10-12 zircon sample grain analyses were preceded and followed by duplicate analyses of firstly, the in-house zircon standard GJ-1, and secondly, by 1-2 analyses each of the international zircon standards, MT-1 and 91500. The GLITTER data interpretation software package (www.els.mq.edu.au/GEMOC/) enabled analysis of U, Pb and Th absolute count rates, and all relevant isotopic ratios, during the run cycle, and the elimination of unstable beam intervals, and rejection of data where zircon core regions were inadvertently encountered.

Using the laser spot size of 30-40 microns enabled age measurements to be made adjacent to crystal margins, rather than cores, and preferably, close to crystal terminations (as defined by two crystal edges). Isotopic data were continually monitored during ablation to check that zircon cores were not being intersected. Efficient use of the instrument time dictated that strongly unimodal patterns were investigated only to analysis totals of N=33-50, bimodal patterns to N=50-70, and strongly polymodal patterns to N=100 (N.B. throughout this work 'N' and 'n' refer to dataset totals and subgroups respectively). This allowed significant age groups (n) comprising >5% of the total to be revealed by three or more analyses (Andersen 2005).

Full $^{207}Pb/^{206}Pb$, $^{206}Pb/^{238}U$, $^{207}Pb/^{235}U$, and $^{208}Pb/^{232}Th$ age data (and 1 standard errors) are listed in the Appendix Table 1. All ages used here are $^{206}Pb/^{238}U$ zircon ages where <1000 Ma, and $^{207}Pb/^{206}Pb$ ages where >1000 Ma. A small minority of the analyses have common Pb corrections (using protocols of Andersen 2002). The age datasets are

shown in Fig. 4 as combined probability density/histogram diagrams (using a common X-axis format, 0-600 Ma, with ages >600 Ma stacked at right).

Age groupings in probability density plots of the zircon age sets (Fig. 4) were determined by visual inspection and using deconvolution (and weighted average) algorithms in the ISOPLOT-Ex (version 3.0) software (kindly provided by K. Ludwig, United States Geological Survey). The treatment of these age datasets was constrained by two conservative criteria imposed to reveal only statistically significant age groups viz. those with n>3 concordant $^{206}Pb/^{238}U$ v. $^{207}Pb/^{235}U$ ages, *and* which comprise >4% of the total population (N). This was relaxed to n≥3 for datasets with N<30. Following Andersen (2005), the age groups are discussed using five categories: 'dominant' >80%, 'large' 50-79%, 'major' 20-49%, 'minor' 5-19%, and 'accessory' <5%, of the total. A summary of the statistically significant component ages and errors, their number (n) and proportion (as %) of the total (N), is given in Table 4.

Detrital zircon age data for other previously-published and unpublished studies are collated in Tables 5 and 6, and presented with the present New Caledonia datasets. In these tables, *all* zircon age data are divided into selected geological periods. The New Zealand timescale used here is that of Cooper (2005).

**Suggested Running Title:** New Caledonia terranes.

*Version: NCAL08text March 2009*

*(6771 words)*

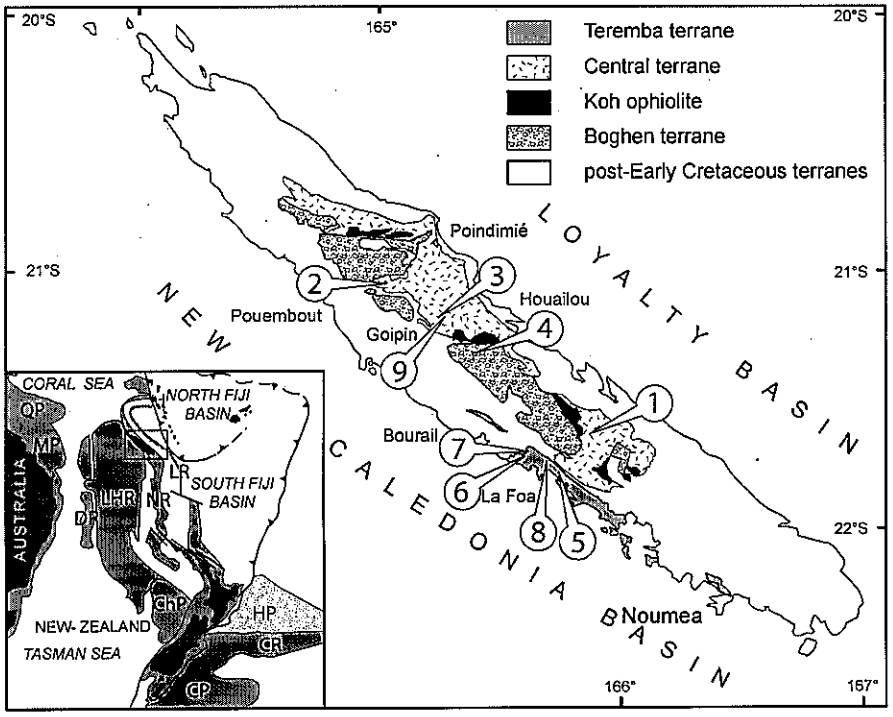

20°S
165°
20°S
21°S
21°S
22°S
166°
167°
Teremba terrane
Central terrane
Koh ophiolite
Boghen terrane
post-Early Cretaceous terranes
Poindimié
Houailou
Pouembout
Goipin
Bourail
La Foa
Noumea
1
2
3
4
5
6
7
8
9
NEW CALEDONIA BASIN
LOYALTY BASIN
CORAL SEA
NORTH FIJI BASIN
SOUTH FIJI BASIN
AUSTRALIA
QP
MP
LR
UHR
NR
DP
ChP
HP
CR
CP
NEW- ZEALAND
TASMAN SEA

Fig 1

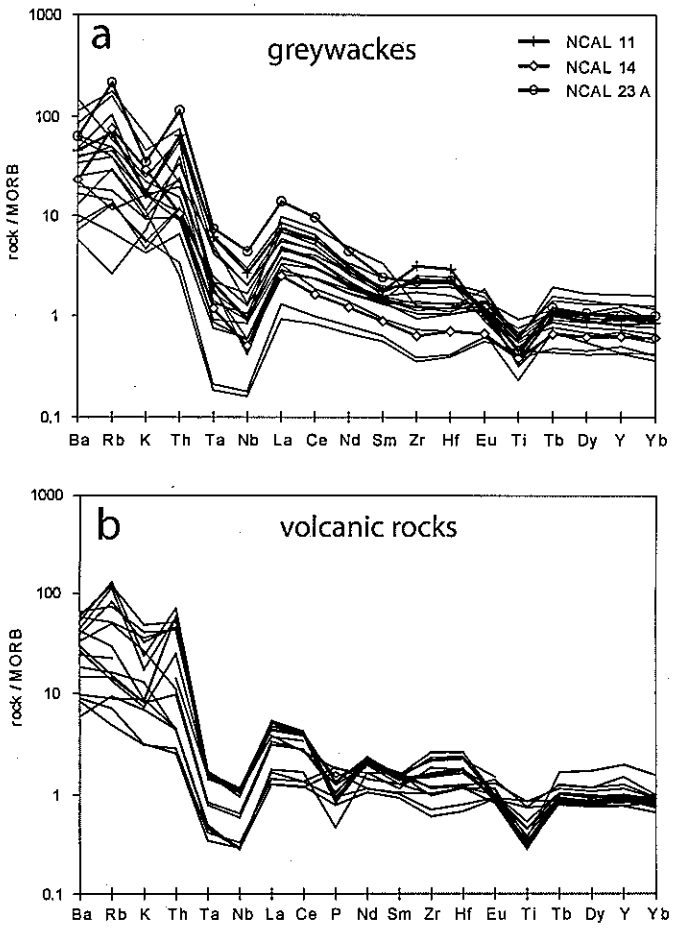
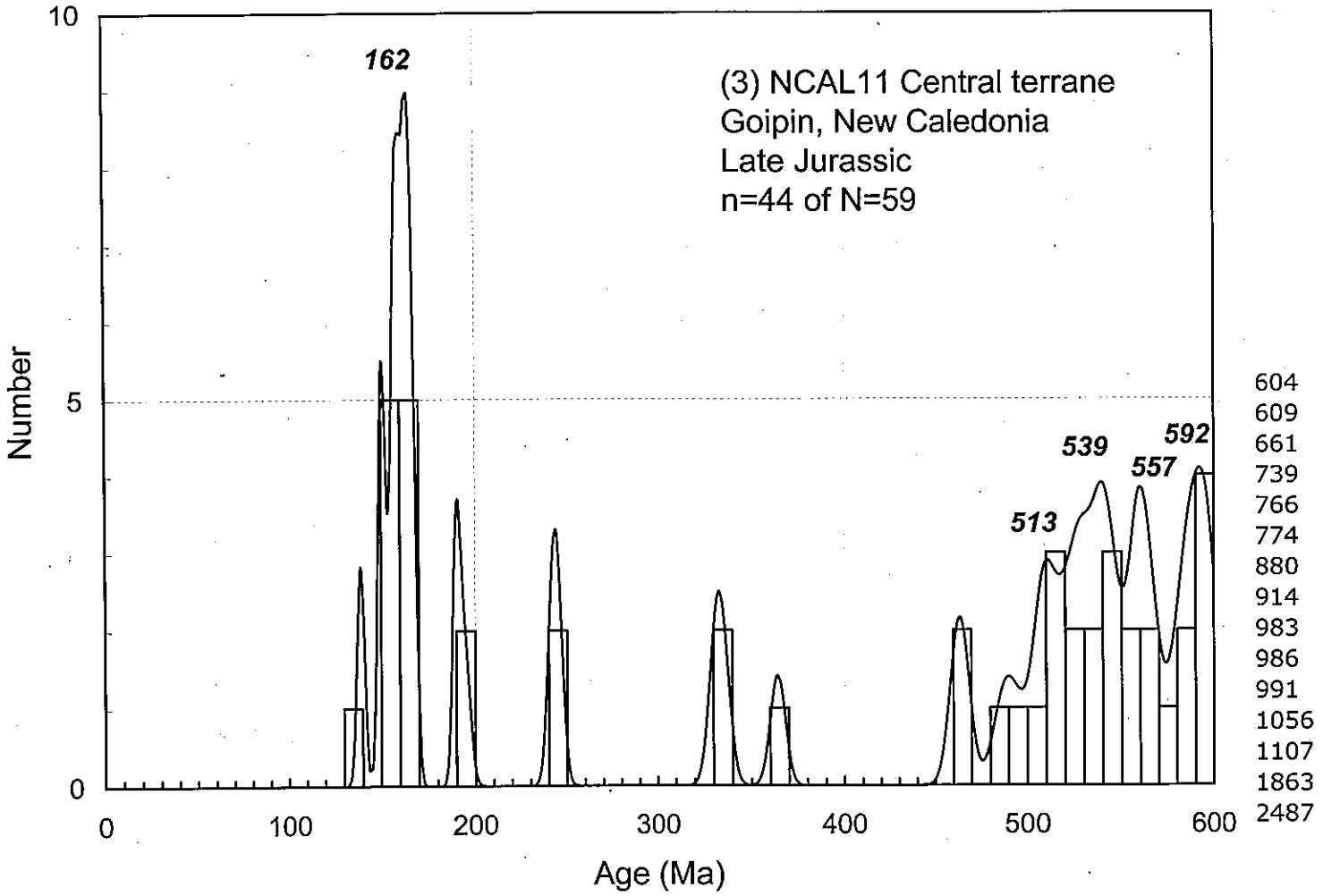
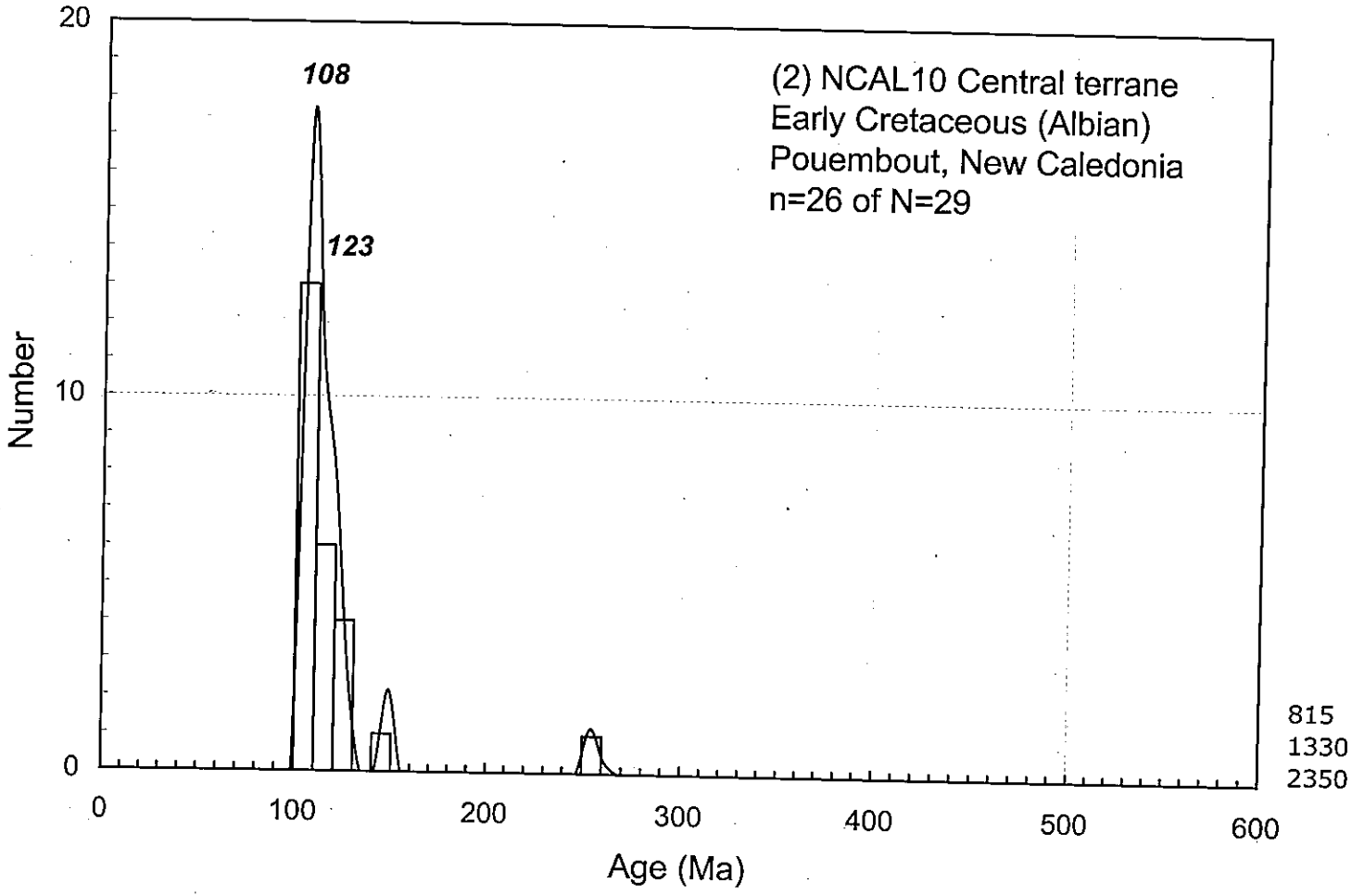
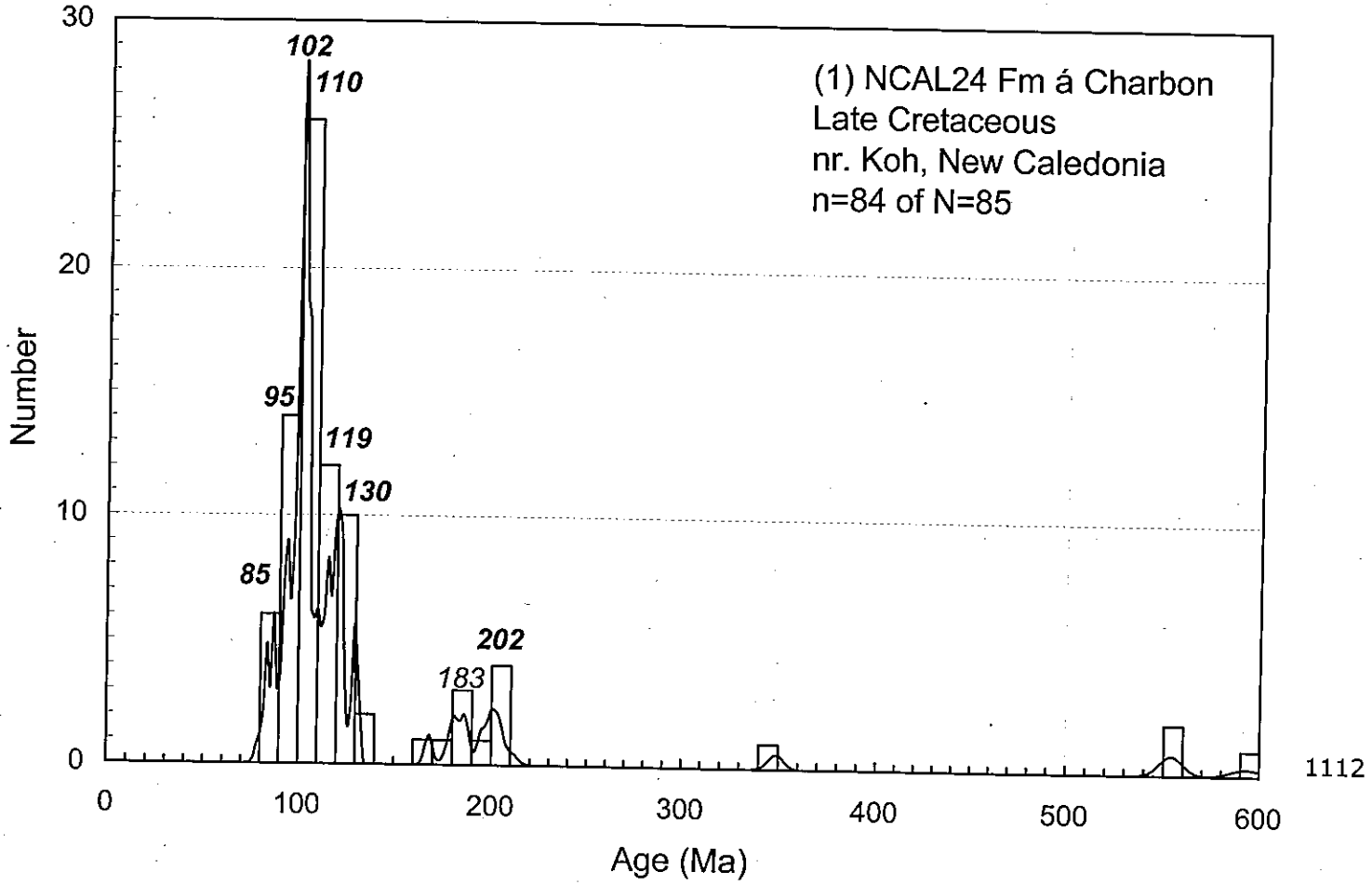

a
greywackes
NCAL 11
NCAL 14
NCAL 23 A
rock / MORB
1000
100
10
1
0,1
Ba Rb K Th Ta Nb La Ce Nd Sm Zr Hf Eu Ti Tb Dy Y Yb
b
volcanic rocks
rock / MORB
1000
100
10
1
0.1
Ba Rb K Th Ta Nb La Ce P Nd Sm Zr Hf Eu Ti Tb Dy Y Yb

Fig 2


(3) NCAL11 Central terrane
Goipin, New Caledonia
Late Jurassic
n=44 of N=59
162
513
539
557
592
Number
Age (Ma)
0
5
10
0
100
200
300
400
500
600
604
609
661
739
766
774
880
914
983
986
991
1056
1107
1863
2487


20
10
0
Number
108
123
(2) NCAL10 Central terrane
Early Cretaceous (Albian)
Pouembout, New Caledonia
n=26 of N=29
815
1330
2350
0
100
200
300
400
500
600
Age (Ma)


(1) NCAL24 Fm á Charbon
Late Cretaceous
nr. Koh, New Caledonia
n=84 of N=85
Number
Age (Ma)
102
110
95
119
130
85
202
183
1112
0
10
20
30
0
100
200
300
400
500
600

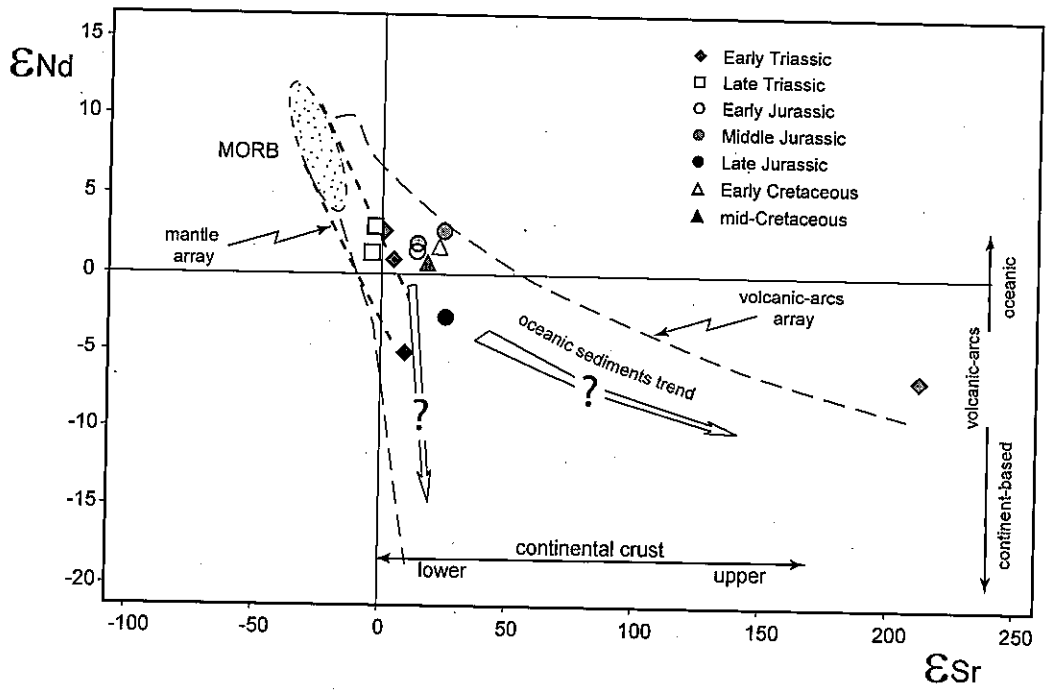

εNd
15
10
5
0
-5
-10
-15
-20
-100
-50
0
50
100
150
200
250
εSr
Early Triassic
Late Triassic
Early Jurassic
Middle Jurassic
Late Jurassic
Early Cretaceous
mid-Cretaceous
MORB
mantle array
volcanic-arcs array
oceanic sediments trend
?
?
continental crust
lower
upper
oceanic
volcanic-arcs
continent-based

Fig 3

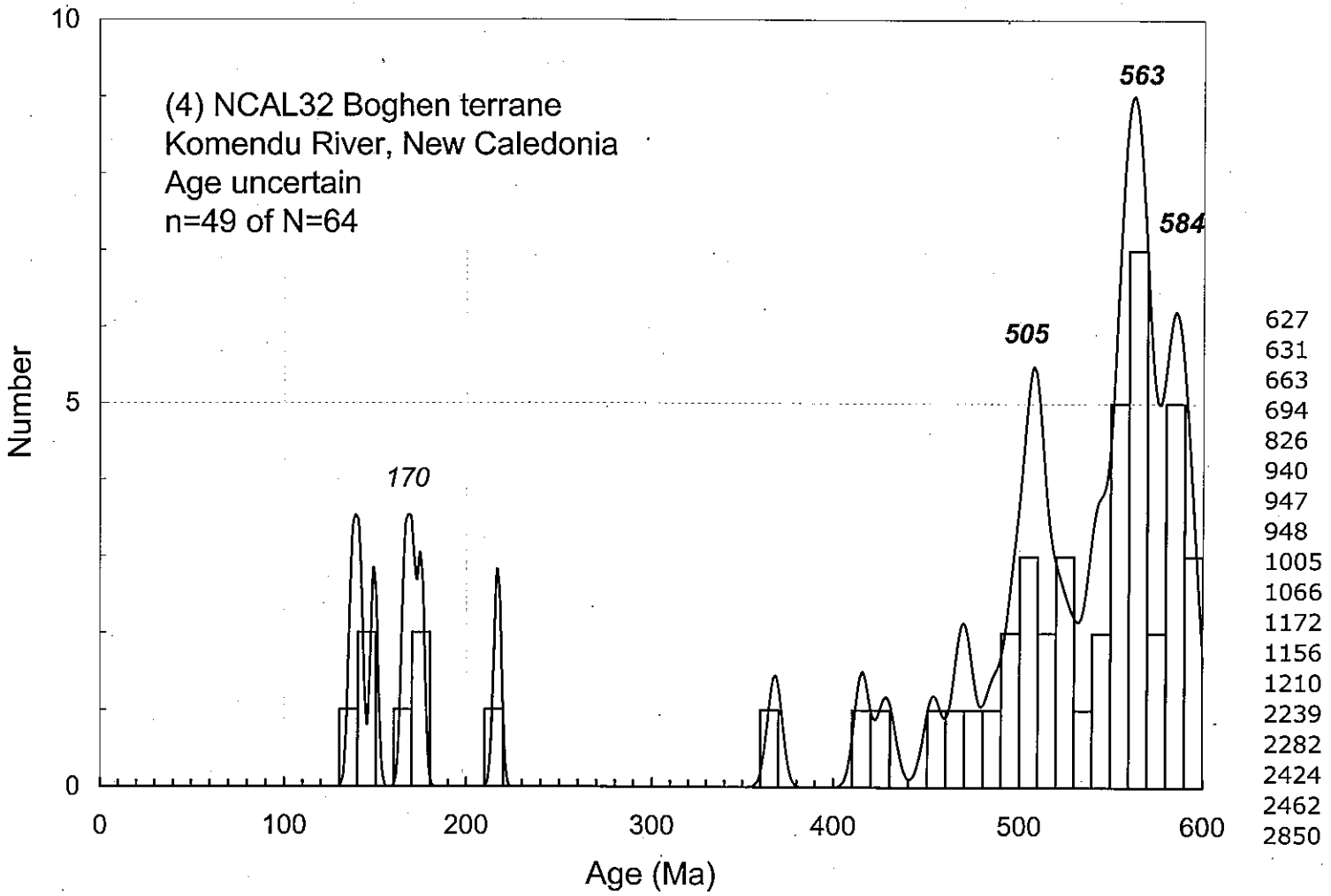

(4) NCAL32 Boghen terrane
Komendu River, New Caledonia
Age uncertain
n=49 of N=64
563
584
505
170
Number
10
5
0
0
100
200
300
400
500
600
Age (Ma)
627
631
663
694
826
940
947
948
1005
1066
1172
1156
1210
2239
2282
2424
2462
2850

TABLE 4: NEW CALEDONIA MESOZOIC TERRANE SEDIMENTARY ROCKS:
SUMMARY OF DETRITAL ZIRCON U-PB AGE COMPONENTS

| *Locality No./ zircon component* | *Detrital zircon age component (Ma)* | ± 2e | *% of total zircon pop.* | *zircon set total, N* |
|---|---|---|---|---|
| ***FORMATION Á CHARBON'*** | | | | |
| *(1) NCAL24 (R23485), sandstone; highway outcrop above Koh village, Late Cretaceous; Lat.21°33'48"S, Long.165°49'57"E* | | | | |
| aa | 85 | ± 2 | 6 | 85 |
| a | 95 | ± 1 | 9 | |
| b | 102 | ± 4 | 33 | |
| c | 110 | ± 2 | 7 | |
| d | 119 | ± 2 | 18 | |
| e | 130 | ± 2 | 5 | |
| f | 183 | ± 4 | 5 | |
| g | 202 | ± 3 | 5 | |
| ***CENTRAL TERRANE*** | | | | |
| *(2) NCAL10 (R23470), greywacke, Pouembout River, streambank outcrop, previously mapped as Late Jurassic; Lat.21°06'41"S, Lon* | | | | |
| a | 108 | ± 2 | 57 | 28 |
| b | 123 | ± 4 | 18 | |
| *(3) NCAL11 (R23471), greywacke; Goipin River, streambank o/c, Late Jurassic; Lat.21°33'48"S, Long.165°49'57"E* | | | | |
| a | 162 | ± 3 | 14 | 59 |
| b | 513 | ± 5 | 7 | |
| cc | 539 | ± 6 | 7 | |
| c | 557 | ± 5 | 7 | |
| d | 592 | ± 5 | 8 | |
| *(9) GHP1 (R24477), sandstone; Goipin River valley; Late Jurassic; Lat.21°13'23"S Long.161°16'11"E* | | | | |
| a | 153 | 2 | 10 | 40 |
| b | 585 | 7 | 10 | 40 |
| ***BOGHEN TERRANE*** | | | | |
| *(4) NCAL32 (R24096), carbonaceous sandstone; Komendu River, streambank o/c, age uncertain; Lat.21°19'26"S, Long.165°24'40"E* | | | | |
| a | 170 | ± 2 | 4 | 67 |
| b | 505 | ± 4 | 10 | |
| c | 563 | ± 6 | 16 | |
| d | 584 | ± 5 | 7 | |
| ***TEREMBA TERRANE*** | | | | |
| *(5) NCAL15 (R23475), volcaniclastic sandstone; highway near La Foa, roadside outcrop, Middle-Late Triassic; Lat.21°41'31"S, Long.165°44'50"E* | | | | |
| a | 227 | ± 4 | 15 | 47 |

Table 3: New Caledonia Permian-Cretaceous basement terranes, greywacke and sandstone sample data

| *Locality* | *GNS R No.* | *Field No.* | *Rock type* | *Age* | *Terrane* | *Location* | *Latitude/Longitude* |
|---|---|---|---|---|---|---|---|
| *(1)* | 23485 | NCAL24 | coarse sandstone | mid-Late Cretaceous | *Fm á Charbon* | near Koh village | 21°33'48"S165°49'57"E |
| *(2)* | 23470 | NCAL10 | coarse greywacke | Albian (mapped as Late Jurassic) | Central | Pouembout River | 21°06'41"S165°01'25"E |
| *(3)* | 23471 | NCAL11 | coarse greywacke | Late Jurassic | Central | Goipin River | 21°13'00"S165°14'00"E |
| *(4)* | 24096 | NCAL32 | carbonaceous sandstone | *uncertain* | Boghen | Komendu River | 21°19'26"S165°24'40"E |
| *(5)* | 23475 | NCAL15 | volcaniclastic sandstone | Middle-Late Triassic | Teremba | near La Foa | 21°41'31"S165°44'50"E |
| *(6)* | 24300 | TRB20 | medium sandstone | Middle Triassic (Anisian) | Teremba | Col de Boghen, old RT1 | 21°40'45"S165°39'09"E |
| *(7)* | 24301 | TRB21 | coarse sandstone | Middle (Ladinian)-Late Triassic (Norian) | Teremba | Moméa village | 21°40'11"S165°38'54"E |
| *(8)* | 24302 | TRB23 | coarse sandstone | Late Triassic (Norian-Rhaetian) | Teremba | La Foa, watertank | 21°43'21"S165°50'17"E |
| *(9)* | 24477 | GHP2 | coarse sandstone | Late Jurassic | Central | Goipin (track to Aoupine) | 21°13'23"S165°16'11"E |

**Table 2:** Sr-Nd isotopic data for New Caledonia Teremba and Central terrane greywackes

| sample | t in Ma | ($^{143}Nd/^{144}Nd$) rock today | ($^{147}Sm/^{144}Nd$) rock today | ($^{143}Nd/^{144}Nd$) rock at t | CHUR at t | **ε Nd (t)** | ($^{87}Sr/^{86}Sr$) rock today | ($^{87}Rb/^{86}Sr$) rock today | ($^{87}Sr/^{86}Sr$) rock at t | CHUR at t | **ε Sr (t)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Chain and Teremba graywackes** | | | | | | | | | | | |
| NCAL 2 | 170 | 0.512800 | 0.2536 | 0.512518 | 0.512419 | **1.93** | 0.70570 | 0.1694 | 0.70529 | 0.70430 | **14.1** |
| NCAL 9 | 105 | 0512685 | 0.2107 | 0.512540 | 0.512503 | **0.73** | 0.70603 | 0.2584 | 0.70565 | 0.70438 | **18.1** |
| NCAL 10 | 140 | 0.512766 | 0.2371 | 0.512549 | 0.512458 | **1.77** | 0.70601 | 0.0374 | 0.70595 | 0.70438 | **22.4** |
| NCAL 11 | 150 | 0.512513 | 0.2142 | 0.512303 | 0.512445 | **-2.78** | 0.70642 | 0.1388 | 0.70612 | 0.70432 | **25.5** |
| NCAL 12 | 215 | 0.512926 | 0.2924 | 0.512515 | 0.512361 | **2.99** | 0.70429 | 0.0783 | 0.70405 | 0.70425 | **-2.8** |
| NCAL 13 | 255 | 0.512765 | 0.2448 | 0.512356 | 0.512310 | **0.90** | 0.70472 | 0.0546 | 0.70453 | 0.70420 | **4.6** |
| NCAL 14 | 250 | 0.512482 | 0.2620 | 0.512054 | 0.512316 | **-5.12** | 0.70624 | 0.3832 | 0.70487 | 0.70421 | **9.5** |
| NCAL 16 | 225 | 0.512800 | 0.2601 | 0.512417 | 0.512348 | **1.34** | 0.70411 | 0.0492 | 0.70395 | 0.70424 | **-4.0** |
| NCAL 19 | 165 | 0.512858 | 0.2709 | 0.512566 | 0.512426 | **2.74** | 0.70620 | 0.0709 | 0.70604 | 0.70431 | **24.6** |
| NCAL 20 | 185 | 0.512765 | 0.2409 | 0.512473 | 0.512400 | **1.43** | 0.70531 | 0.0201 | 0.70526 | 0.70428 | **13.8** |
| NCAL 23 | 240 | 0.512295 | 0.1974 | 0.512984 | 0.512329 | **-6.73** | 0.72493 | 1.6896 | 0.71916 | 0.70422 | **212.2** |
| NCAL 25 | 240 | 0.512855 | 0.2464 | 0.512468 | 0.512329 | **2.71** | 0.70439 | 0.0345 | 0.70427 | 0.70422 | **0.8** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sr** | 201.1 | 149.8 | 514.4 | 184 | 145.4 | 730 | 462 | 442 | 241.9 | 244.4 | 27.08 | 173.5 | 91.47 | 49.8 | 144 |
| **Ta** | 0.212 | 0.216 | 0.203 | 0.188 | 0.209 | 0.206 | 0.046 | 0.055 | 0.111 | 0.104 | 0.060 | 0.198 | 0.061 | 0.066 | 0.226 |
| **Tb** | 0.640 | 0.576 | 0.677 | 0.611 | 0.634 | 0.631 | 0.529 | 0.588 | 0.778 | 0.856 | 1.122 | 0.550 | 0.708 | 0.592 | 0.694 |
| **Th** | 6.166 | 5.102 | 7.067 | 5.507 | 5.314 | 7.113 | 0.309 | 0.343 | 1.332 | 1.170 | 0.537 | 2.962 | 0.519 | 0.529 | 8.471 |
| **Tm** | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | 0.739 | 0.357 | 0.423 | 0.417 | 0.402 |
| **Y** | 26.96 | 24.05 | 27.72 | 25.67 | 26.45 | 25.74 | 21.62 | 24.97 | 32.44 | 35.51 | 55.79 | 21.67 | 26.45 | 23.23 | 28.51 |
| **Yb** | 2.447 | 2.334 | 2.630 | 2.413 | 2.530 | 2.487 | 2.025 | 2.264 | 2.835 | 2.932 | 4.795 | 2.534 | 2.948 | 2.912 | 2.766 |
| **Zr** | 121.8 | 121.2 | 163.8 | 113.8 | 110.5 | 115.5 | 45.1 | 52.48 | 88.7 | 85.9 | 73.3 | 138.0 | 75.7 | 76.66 | 193.8 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yb | 3.842 | 2.327 | 1.642 | 2.601 | 2.746 | 1.761 | 1.839 | 2.006 | 2.703 | 3.069 | 3.034 | 4.769 | 1.282 | 2.550 |
| Zr | 153.8 | 162.1 | 88.89 | 230 | 68.72 | 53.58 | 46.64 | 101.4 | 96.24 | 170.8 | 160 | 91.68 | 125.5 | 183.2 |

**Table 1b:** Major and trace element data for New Caledonia Teremba terrane volcanic rocks.

| sample | TRB4-1 Teremba | TRB4-2 Teremba | TRB3-1 Teremba | TRB1 Teremba | TRB5-1 Teremba | TRB2-3 Teremba | TRB2-1 Teremba | TRB2-2 Teremba | TRB5-21 Teremba | TRB5-22 Teremba | 991 Teremba | 1063b Teremba | 985a Teremba | 985b Teremba | LaF4 Teremba |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Major elements % | | | | | | | | | | | | | | | |
| $SiO_2$ | 71.38 | 74.73 | 71.48 | 63.57 | 67.96 | 70.64 | 51.25 | 48.46 | 58.80 | 56.56 | 77.56 | 73.89 | 73.90 | 74.00 | 67.60 |
| $TiO_2$ | 0.43 | 0.39 | 0.42 | 0.59 | 0.50 | 0.41 | 0.94 | 1.09 | 1.08 | 0.96 | 0.51 | 0.59 | 0.62 | 0.59 | 0.59 |
| $Al_2O_3$ | 12.90 | 11.17 | 13.85 | 16.90 | 14.50 | 15.13 | 19.61 | 21.04 | 15.57 | 16.76 | 11.75 | 12.93 | 13.53 | 12.99 | 15.95 |
| FeO | 3.37 | 2.71 | 3.29 | 4.67 | 3.83 | 3.39 | 9.47 | 10.49 | 8.75 | 9.90 | 1.29 | 4.03 | 2.73 | 2.78 | 3.29 |
| MnO | 0.08 | 0.06 | 0.06 | 0.07 | 0.04 | 0.06 | 0.18 | 0.18 | 0.23 | 0.17 | 0.01 | 0.05 | 0.02 | 0.05 | 0.08 |
| MgO | 1.01 | 0.79 | 1.41 | 1.61 | 1.28 | 1.45 | 3.95 | 3.80 | 2.27 | 3.69 | 0.16 | 0.14 | 0.51 | 0.38 | 0.80 |
| CaO | 2.45 | 1.73 | 5.27 | 4.15 | 1.90 | 5.42 | 9.15 | 8.85 | 4.00 | 4.74 | 0.08 | 1.76 | 0.37 | 0.73 | 1.20 |
| $Na_2O$ | 4.79 | 5.34 | 3.42 | 5.90 | 7.29 | 2.75 | 5.07 | 5.70 | 7.25 | 6.48 | 5.40 | 5.24 | 5.97 | 6.61 | 5.59 |
| $K_2O$ | 3.47 | 2.94 | 0.62 | 2.35 | 2.58 | 0.59 | 0.23 | 0.23 | 1.90 | 0.58 | 0.63 | 0.53 | 0.94 | 0.49 | 3.39 |
| $P_2O_5$ | 0.10 | 0.11 | 0.12 | 0.17 | 0.10 | 0.11 | 0.09 | 0.11 | 0.15 | 0.12 | 0.04 | 0.16 | 0.16 | 0.14 | 0.12 |
| LOI | | | | | | | | | | | 1.09 | 0.75 | 1.51 | 1.16 | 1.87 |
| Total | 98.52 | 98.52 | 98.52 | 98.52 | 98.52 | 98.52 | 98.52 | 98.52 | 98.52 | 98.52 | 98.52 | 100.06 | 100.25 | 99.91 | 100.47 |
| Trace elements ppm | | | | | | | | | | | | | | | |
| Ba | 372 | 410 | 264 | 247 | 365 | 187 | 56 | 52 | 209 | 92 | 61 | 167 | 114 | 37 | 330 |
| Ce | 30.06 | 29.22 | 31.840 | 28.60 | 28.88 | 31.272 | 9.15 | 10.17 | 20.69 | 20.98 | 12.54 | 19.96 | 10.11 | 8.885 | 30.96 |
| Cr | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | 7.100 | 33.54 | 6.510 | 10.62 | 20.18 |
| Dy | 3.959 | 3.631 | 4.207 | 3.840 | 3.969 | 3.909 | 3.445 | 3.767 | 4.964 | 5.403 | 7.858 | 3.587 | 4.557 | 4.013 | 4.393 |
| Er | 2.489 | 2.292 | 2.618 | 2.435 | 2.528 | 2.465 | 2.117 | 2.322 | 3.028 | 3.258 | 4.994 | 2.271 | 2.796 | 2.614 | 2.664 |
| Eu | 0.935 | 0.876 | 0.963 | 0.964 | 0.955 | 0.944 | 0.930 | 0.955 | 1.329 | 1.441 | 1.198 | 1.151 | 1.035 | 0.841 | 1.020 |
| Ga | 4.104 | 3.710 | 4.288 | 3.769 | 3.991 | 3.889 | 3.068 | 3.350 | 4.593 | 5.071 | 11.150 | 11.33 | 13.41 | 13.03 | 13.76 |
| Gd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | 6.022 | 3.230 | 4.028 | 3.353 | 4.276 |
| Ge | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | 0.939 | 1.604 | 1.218 | 2.071 | 1.289 |
| Hf | 3.762 | 3.707 | 4.652 | 3.359 | 3.373 | 3.605 | 1.398 | 1.639 | 2.591 | 2.512 | 2.401 | 3.628 | 2.435 | 2.420 | 5.380 |
| Ho | 0.855 | 0.788 | 0.905 | 0.834 | 0.864 | 0.843 | 0.747 | 0.819 | 1.079 | 1.172 | 1.686 | 0.751 | 0.946 | 0.853 | 0.912 |
| La | 11.79 | 10.86 | 13.31 | 10.80 | 11.10 | 13.10 | 3.203 | 3.583 | 8.363 | 7.772 | 4.473 | 9.555 | 4.169 | 3.208 | 12.92 |
| Lu | 0.387 | 0.362 | 0.411 | 0.374 | 0.392 | 0.388 | 0.314 | 0.358 | 0.430 | 0.437 | 0.762 | 0.414 | 0.463 | 0.460 | 0.425 |
| Nb | 2.708 | 2.743 | 2.649 | 2.593 | 2.718 | 2.713 | 0.679 | 0.779 | 1.505 | 1.379 | 0.661 | 2.435 | 0.689 | 0.663 | 2.546 |
| Nd | 15.78 | 14.32 | 17.29 | 15.18 | 15.45 | 16.83 | 7.759 | 8.473 | 14.30 | 15.67 | 12.18 | 11.99 | 10.50 | 8.423 | 17.15 |
| Pr | 3.793 | 3.500 | 4.198 | 3.575 | 3.644 | 4.074 | 1.506 | 1.671 | 3.019 | 3.191 | 2.274 | 2.687 | 2.036 | 1.608 | 4.119 |
| Rb | 68.08 | 41.42 | 16.48 | 46.28 | 28.74 | 8.552 | 3.973 | 2.718 | 27.666 | 8.021 | 4.978 | 7.480 | 9.036 | 5.243 | 73.02 |
| Sm | 3.742 | 3.372 | 4.006 | 3.621 | 3.717 | 3.846 | 2.447 | 2.669 | 3.955 | 4.365 | 4.197 | 3.042 | 3.360 | 2.770 | 4.137 |

**Table 1a:** Major and trace element data for New Caledonia Teremba and Central terrane greywackes.

| sample | NCAL 2 Central | NCAL 9 Central | NCAL 10 Central | NCAL 11 Central | NCAL 12 Teremba | NCAL 13 Teremba | NCAL 14 Teremba | NCAL 16 Teremba | NCAL 19 Teremba | NCAL 20 Teremba | NCAL 23a Central | NCAL 25 Teremba | NCAL 24 F.Charbon | LaF3 Teremba |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Major elements % | | | | | | | | | | | | | | |
| $SiO_2$ | 54.36 | 63.25 | 50.53 | 67.11 | 57.07 | 52.04 | 47.94 | 38.15 | 56.04 | 62.56 | 59.71 | 46.94 | 67.41 | 65.33 |
| $TiO_2$ | 1.07 | 0.77 | 1.04 | 0.64 | 0.97 | 0.40 | 0.66 | 0.93 | 1.07 | 0.59 | 0.78 | 1.00 | 0.55 | 2.39 |
| $Al_2O_3$ | 18.09 | 15.23 | 17.09 | 13.30 | 16.03 | 7.55 | 11.64 | 12.56 | 15.37 | 14.62 | 18.55 | 14.80 | 12.93 | 0.62 |
| $Fe_2O_3$ | 10.12 | 5.41 | 7.74 | 7.05 | 8.39 | 2.95 | 8.57 | 7.65 | 8.24 | 2.85 | 7.22 | 5.52 | 5.39 | 16.13 |
| MnO | 0.16 | 0.08 | 0.12 | 0.08 | 0.11 | 0.19 | 0.17 | 0.35 | 0.19 | 0.04 | 0.03 | 0.28 | 0.04 | 4.71 |
| MgO | 3.09 | 2.16 | 3.75 | 1.35 | 3.32 | 1.45 | 2.00 | 2.62 | 3.39 | 1.79 | 1.82 | 1.29 | 1.64 | 0.11 |
| CaO | 2.38 | 2.07 | 6.01 | 1.49 | 3.13 | 16.79 | 10.99 | 19.12 | 4.27 | 2.98 | 0.52 | 12.80 | 1.65 | 1.55 |
| $Na_2O$ | 5.05 | 2.77 | 5.00 | 3.43 | 5.11 | 2.60 | 1.41 | 3.14 | 4.65 | 2.56 | 1.43 | 5.09 | 2.11 | 3.70 |
| $K_2O$ | 0.81 | 3.31 | 1.16 | 1.23 | 1.17 | 0.39 | 2.12 | 0.70 | 1.59 | 1.77 | 2.53 | 0.33 | 4.81 | 4.33 |
| $P_2O_5$ | 0.23 | 0.22 | 0.27 | 0.18 | 0.24 | 0.08 | 0.13 | 0.42 | 0.27 | 0.13 | 0.21 | 0.34 | 0.05 | 0.12 |
| LOI | 4.52 | 3.35 | 6.43 | 3.20 | 3.36 | 14.69 | 13.01 | 13.97 | 5.04 | 9.25 | 6.27 | 11.61 | 3.20 | 1.55 |
| Total | 99.9 | 98.6 | 99.1 | 99.1 | 98.9 | 99.1 | 98.6 | 99.6 | 100.1 | 99.1 | 99.1 | 100 | 99.8 | 100.5 |
| Trace elements ppm | | | | | | | | | | | | | | |
| Ba | 377 | 530 | 254 | 288 | 215 | 53 | 145 | 159 | 243 | 943 | 399 | 105 | 712 | 303 |
| Ce | 41.66 | 47.42 | 26.7 | 43.39 | 17.39 | 13.85 | 12.15 | 22.62 | 22.59 | 34.34 | 71.76 | 55.68 | 38.26 | 27.85 |
| Cr | 19.56 | 30.01 | 33.19 | 28.34 | 21.23 | 18.3 | 18.7 | 38.43 | 19.22 | 5.492 | 61.72 | 36.75 | 76.66 | 17.17 |
| Dy | 6.393 | 3.96 | 3.085 | 4.056 | 4.568 | 2.85 | 2.799 | 3.486 | 4.555 | 4.313 | 4.823 | 7.518 | 2.454 | 3.868 |
| Er | 3.693 | 2.226 | 1.709 | 2.451 | 2.743 | 1.71 | 1.727 | 2.021 | 2.737 | 2.688 | 2.903 | 4.502 | 1.248 | 2.390 |
| Eu | 1.726 | 1.131 | 1.242 | 1.016 | 1.19 | 0.679 | 0.673 | 1.067 | 1.381 | 1.25 | 1.221 | 1.865 | 1.224 | 1.057 |
| Ga | 21.85 | 20.21 | 20.58 | 15.54 | 17.91 | 9.671 | 14.34 | 17.17 | 19.1 | 15.09 | 25.61 | 14.8 | 14.05 | 17.16 |
| Gd | 6.615 | 4.351 | 3.43 | 4.261 | 4.397 | 2.871 | 2.629 | 3.735 | 4.558 | 4.241 | 5.111 | 8.671 | 3.133 | 3.863 |
| Ge | 1.585 | 1.35 | 1.402 | 1.265 | 1.204 | 1.506 | 1.335 | 1.185 | 1.578 | 0.842 | 1.815 | 0.727 | 1.413 | 1.126 |
| Hf | 4.286 | 4.327 | 2.429 | 5.93 | 2.096 | 1.447 | 1.435 | 2.625 | 2.726 | 4.619 | 4.576 | 2.409 | 3.243 | 4.889 |
| Ho | 1.261 | 0.77 | 0.597 | 0.809 | 0.938 | 0.586 | 0.573 | 0.689 | 0.922 | 0.877 | 0.971 | 1.525 | 0.459 | 0.825 |
| La | 17.12 | 21.21 | 11.48 | 18.5 | 7.017 | 8.019 | 6.162 | 9.574 | 9.205 | 13.66 | 34.68 | 24.32 | 17.09 | 12.14 |
| Lu | 0.608 | 0.375 | 0.255 | 0.418 | 0.431 | 0.28 | 0.295 | 0.321 | 0.429 | 0.504 | 0.47 | 0.779 | 0.194 | 0.405 |
| Nb | 4.665 | 6.859 | 2.908 | 6.174 | 0.961 | 1.365 | 1.166 | 2.058 | 2.24 | 4.665 | 10.15 | 2.194 | 3.071 | 2.105 |
| Nd | 24.34 | 23.01 | 15.06 | 21.9 | 12.23 | 10.02 | 8.816 | 13.8 | 15.02 | 18.48 | 31.82 | 34.87 | 20.33 | 15.99 |
| Pr | 5.416 | 5.718 | 3.423 | 5.346 | 2.493 | 2.258 | 1.948 | 3.089 | 3.214 | 4.435 | 8.407 | 7.52 | 5.047 | 3.663 |
| Rb | 21.95 | 89.68 | 25.24 | 38.43 | 21.85 | 7.432 | 42.07 | 16.05 | 27.86 | 32.95 | 121.5 | 7.903 | 98.57 | 57.53 |
| Sm | 6.172 | 4.848 | 3.571 | 4.691 | 3.576 | 2.453 | 2.31 | 3.589 | 4.069 | 4.451 | 6.282 | 8.593 | 4.113 | 3.810 |
| Sr | 129.6 | 347 | 675 | 276.8 | 278.9 | 136.1 | 109.8 | 326.1 | 393 | 1640 | 71.91 | 229.4 | 105.2 | 268.0 |
| Ta | 0.55 | 0.83 | 0.32 | 0.804 | 0.254 | 0.238 | 0.155 | 0.267 | 0.221 | 0.598 | 0.977 | 0.283 | 0.667 | 0.185 |
| Tb | 1.034 | 0.656 | 0.51 | 0.668 | 0.714 | 0.454 | 0.438 | 0.575 | 0.728 | 0.697 | 0.805 | 1.277 | 0.462 | 0.608 |
| Th | 4.02 | 8.972 | 2.321 | 7.805 | 1.29 | 1.446 | 1.249 | 2.889 | 1.813 | 7.161 | 13.81 | 1.401 | 2.594 | 6.649 |
| Tm | 0.551 | 0.336 | 0.243 | 0.377 | 0.398 | 0.259 | 0.261 | 0.297 | 0.405 | 0.428 | 0.441 | 0.697 | 0.188 | 0.369 |
| Y | 35.73 | 22.15 | 17.49 | 22.77 | 27.59 | 19.36 | 17.38 | 20.3 | 26.95 | 24.63 | 28.13 | 45.34 | 11.95 | 25.74 |

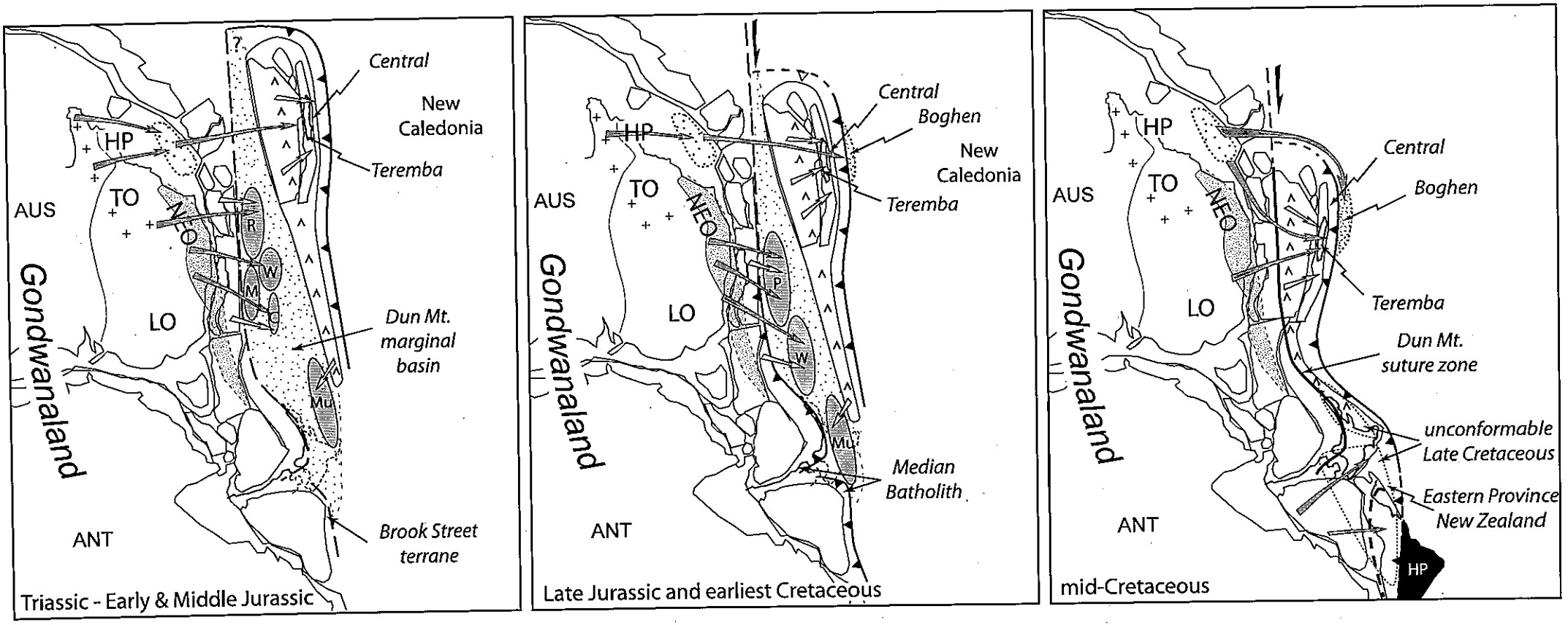

?
Central
New
Caledonia
Teremba
HP
TO
AUS
NEO
R
W
M
C
LO
Dun Mt.
marginal
basin
Mu
Gondwanaland
ANT
Brook Street
terrane
Triassic - Early & Middle Jurassic
Central
Boghen
New
Caledonia
HP
TO
AUS
NEO
Teremba
P
W
LO
Mu
Gondwanaland
ANT
Median
Batholith
Late Jurassic and earliest Cretaceous
HP
Central
Boghen
TO
AUS
NEO
Teremba
LO
Dun Mt.
suture zone
Gondwanaland
unconformable
Late Cretaceous
Eastern Province
New Zealand
ANT
HP
mid-Cretaceous

Fig 6 B

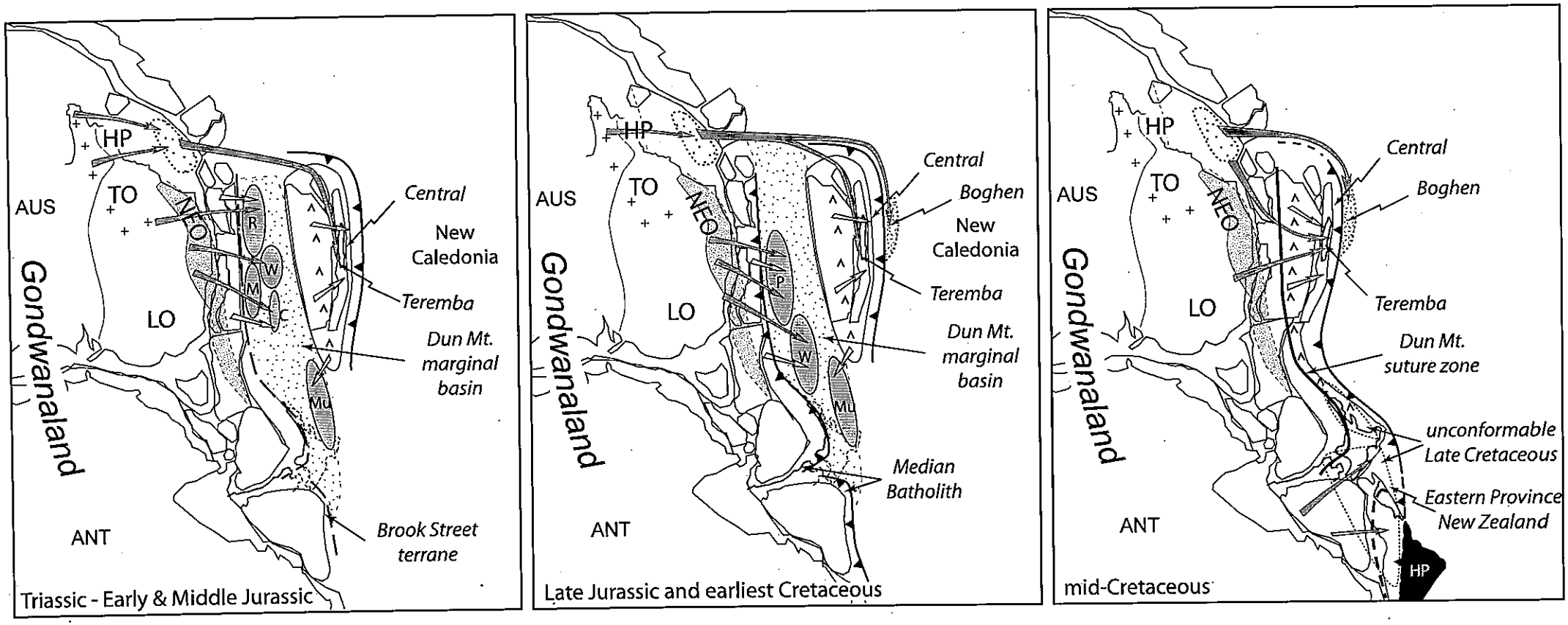

HP
TO
AUS
NEO
Gondwanaland
LO
ANT
R
W
M
Mu
P
Central
New Caledonia
Boghen
Teremba
Dun Mt. marginal basin
Brook Street terrane
Median Batholith
Dun Mt. suture zone
unconformable Late Cretaceous
Eastern Province New Zealand
Triassic - Early & Middle Jurassic
Late Jurassic and earliest Cretaceous
mid-Cretaceous

Fig 6 A

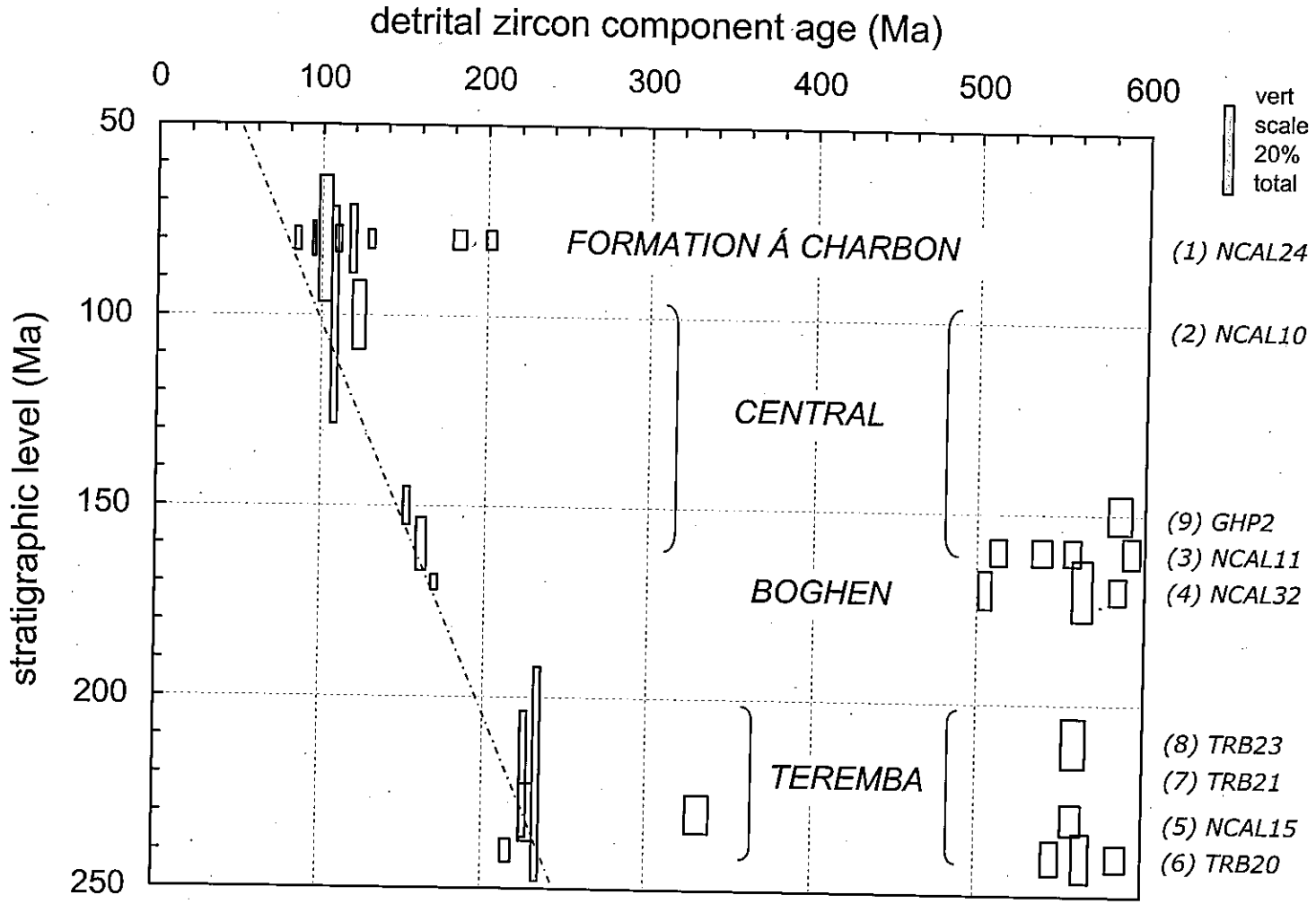
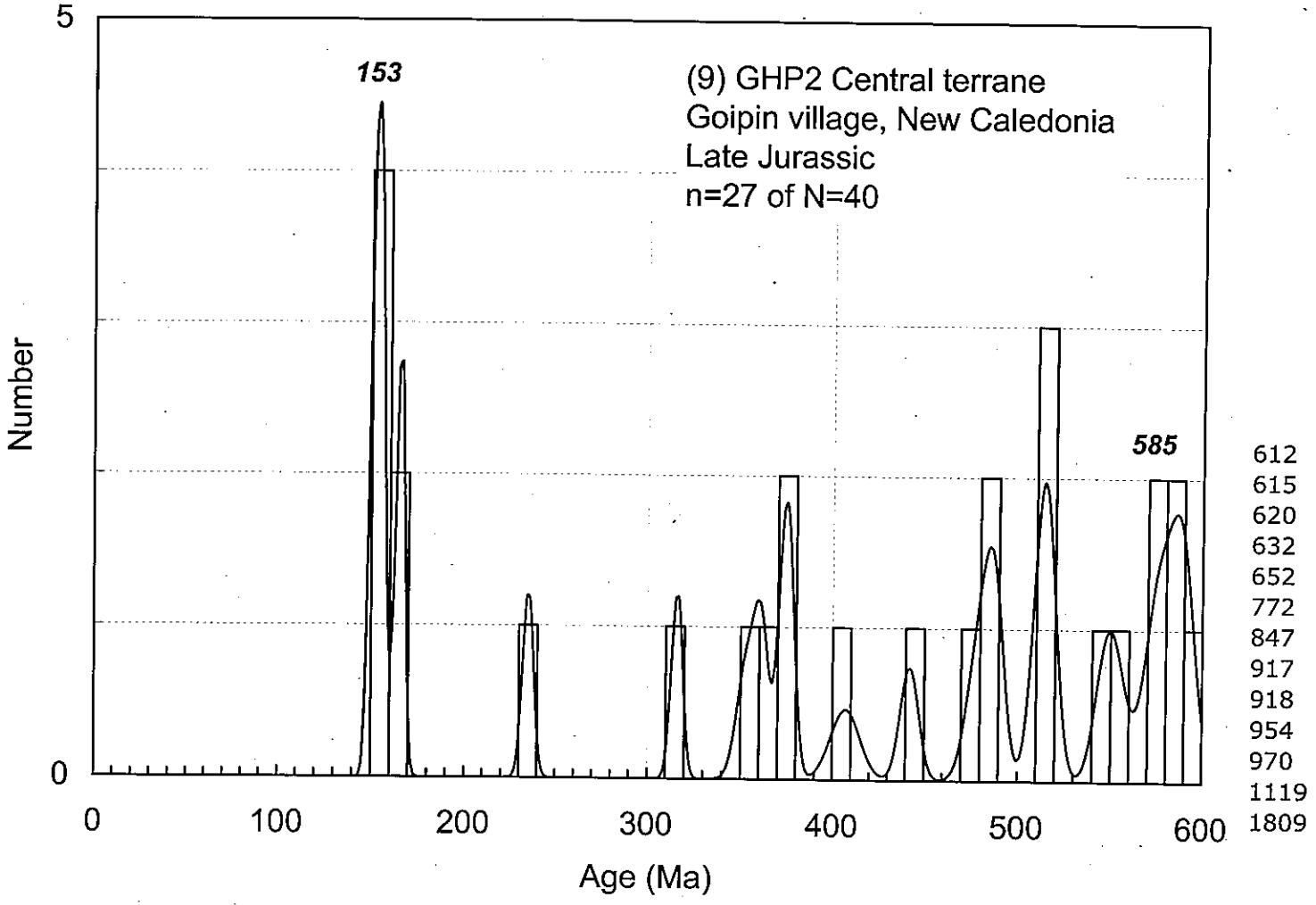
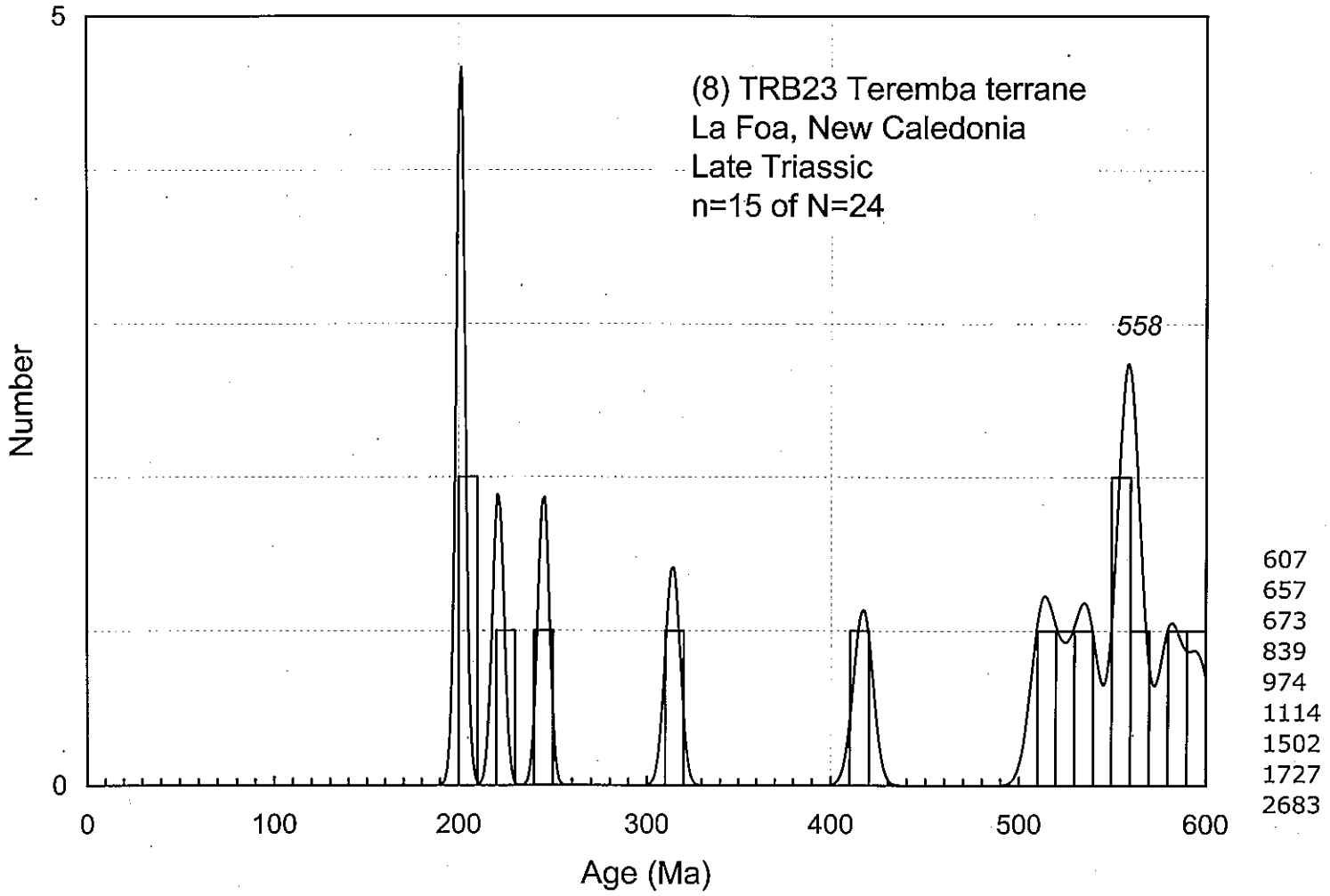
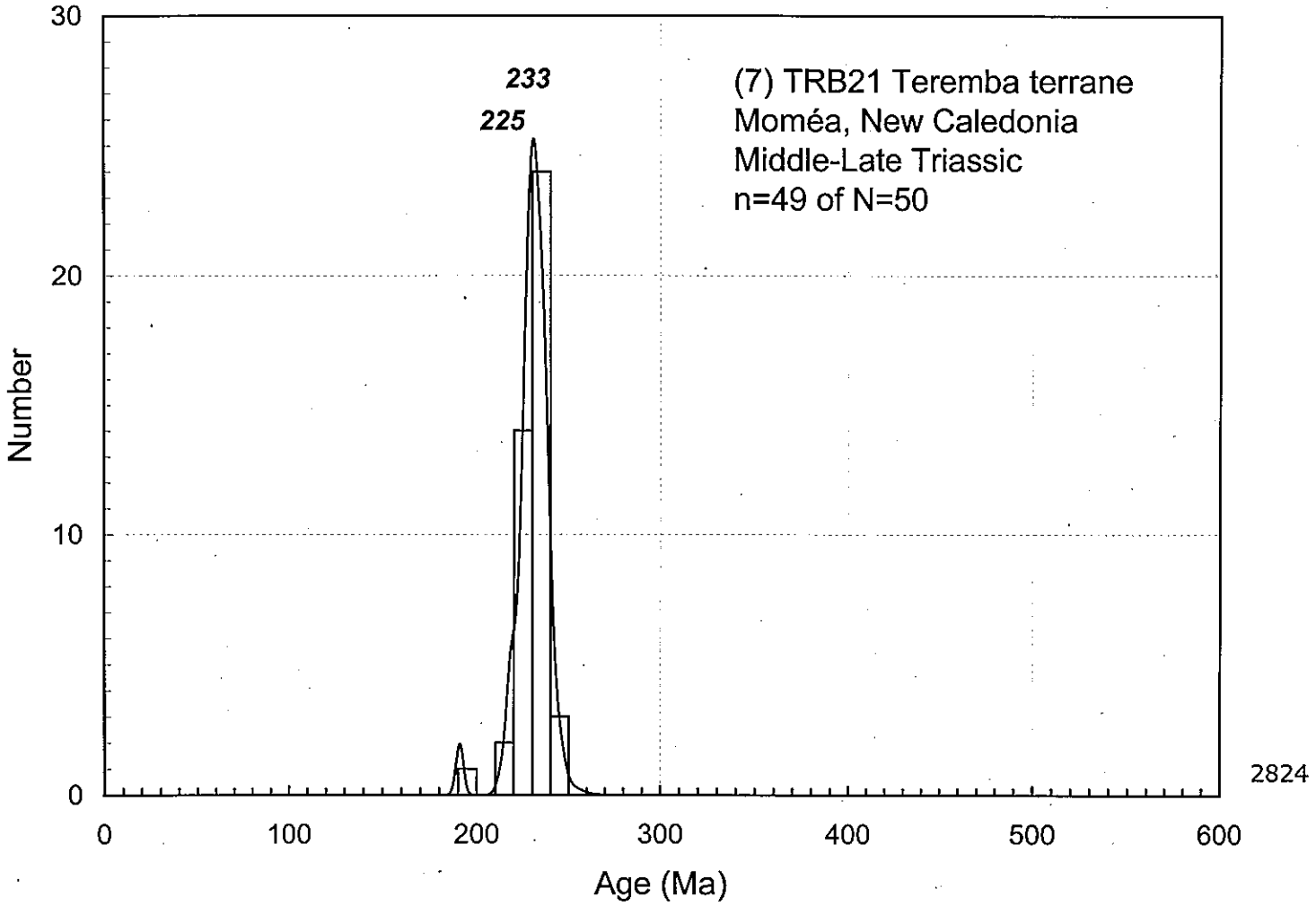
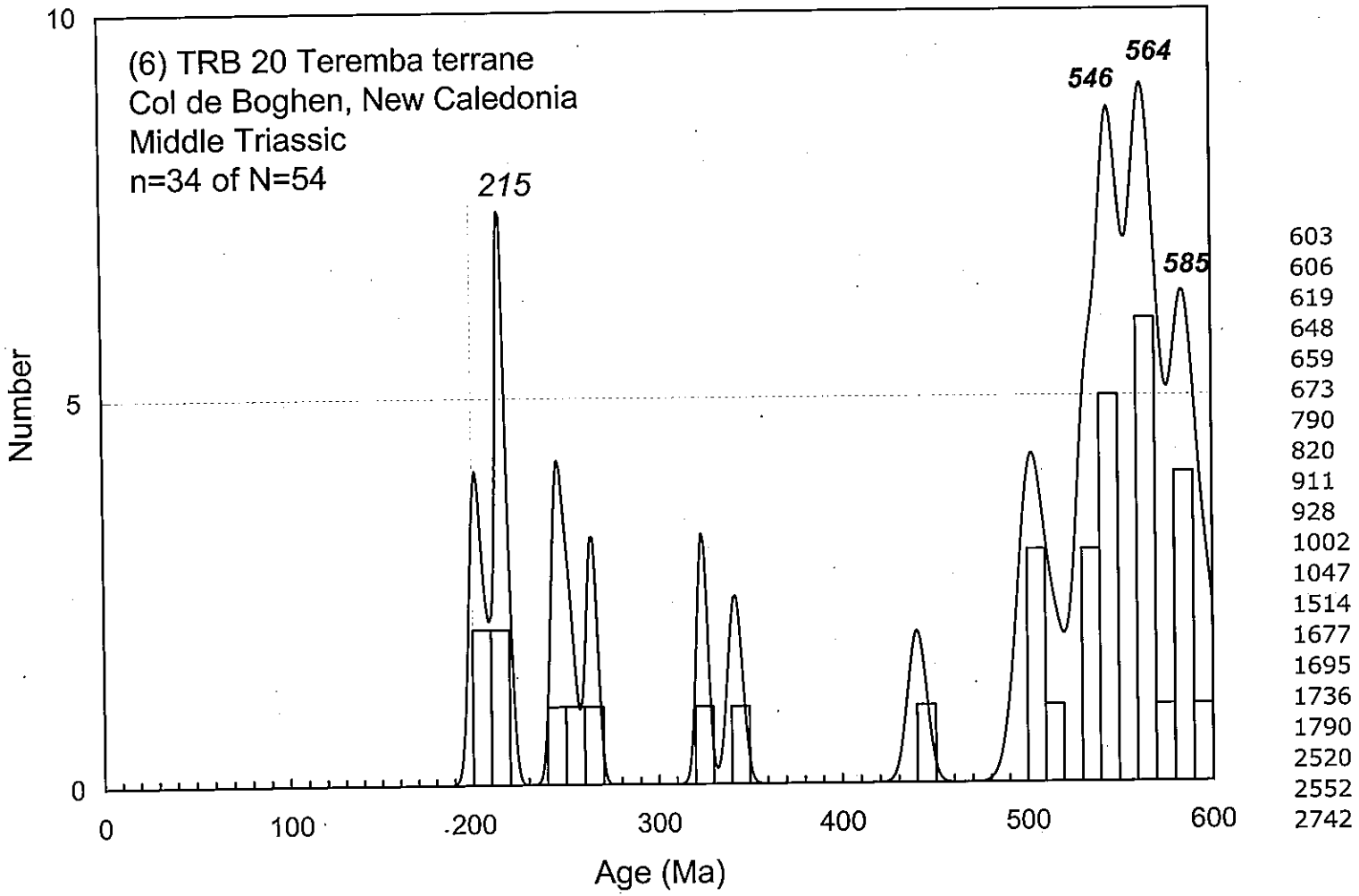

detrital zircon component age (Ma)
0
100
200
300
400
500
600
50
100
150
200
250
stratigraphic level (Ma)
vert scale 20% total
FORMATION Á CHARBON
CENTRAL
BOGHEN
TEREMBA
(1) NCAL24
(2) NCAL10
(9) GHP2
(3) NCAL11
(4) NCAL32
(8) TRB23
(7) TRB21
(5) NCAL15
(6) TRB20

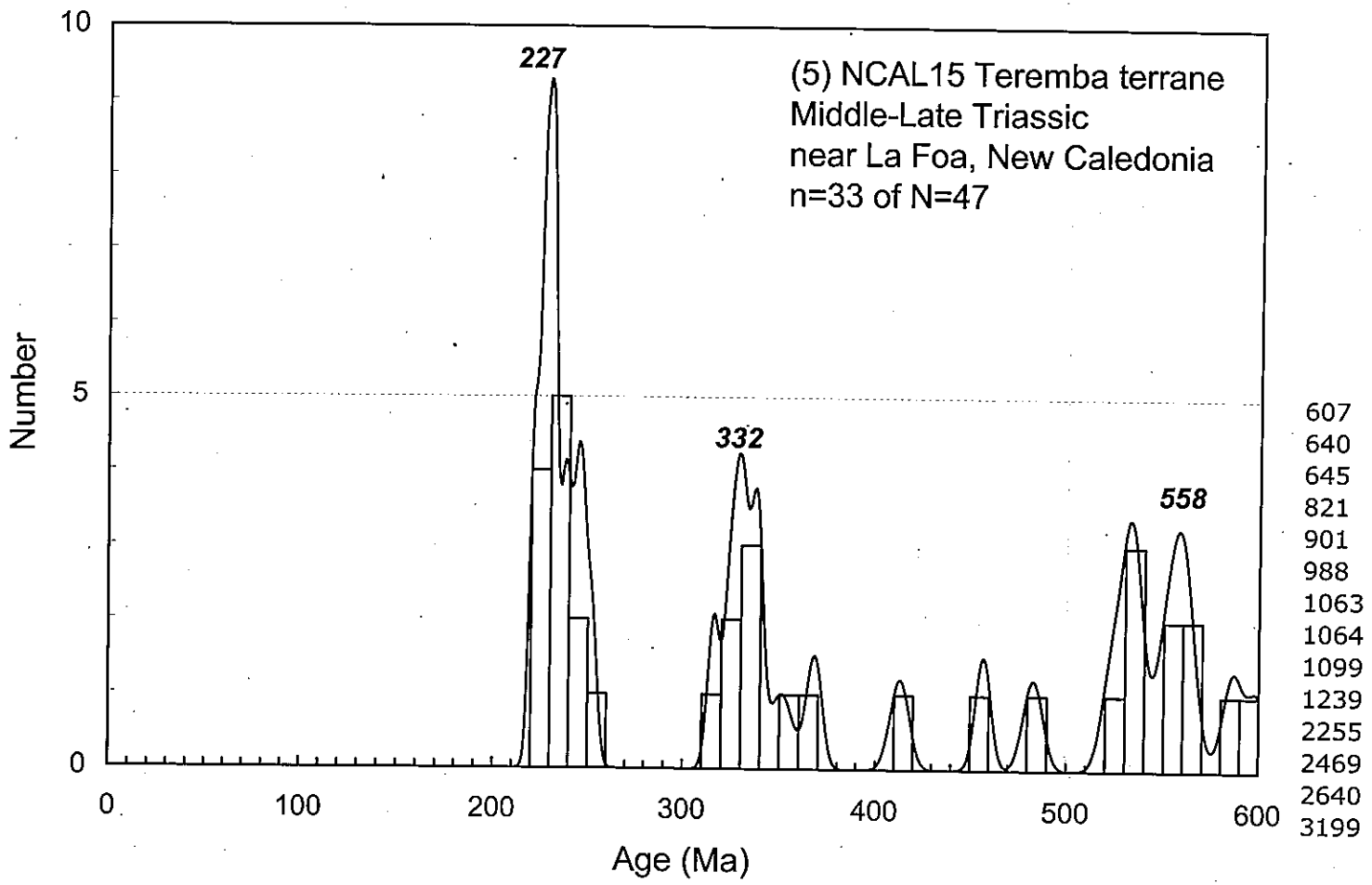
Fig 5


5
0
Number
153
585
(9) GHP2 Central terrane
Goipin village, New Caledonia
Late Jurassic
n=27 of N=40
0
100
200
300
400
500
600
Age (Ma)
612
615
620
632
652
772
847
917
918
954
970
1119
1809


(8) TRB23 Teremba terrane
La Foa, New Caledonia
Late Triassic
n=15 of N=24
558
Number
5
0
0
100
200
300
400
500
600
Age (Ma)
607
657
673
839
974
1114
1502
1727
2683


(7) TRB21 Teremba terrane
Moméa, New Caledonia
Middle-Late Triassic
n=49 of N=50
233
225
Number
Age (Ma)
0
10
20
30
0
100
200
300
400
500
600
2824


(6) TRB 20 Teremba terrane
Col de Boghen, New Caledonia
Middle Triassic
n=34 of N=54
215
546
564
585
Number
10
5
0
0
100
200
300
400
500
600
Age (Ma)
603
606
619
648
659
673
790
820
911
928
1002
1047
1514
1677
1695
1736
1790
2520
2552
2742


(5) NCAL15 Teremba terrane
Middle-Late Triassic
near La Foa, New Caledonia
n=33 of N=47
227
332
558
Number
Age (Ma)
0
5
10
0
100
200
300
400
500
600
607
640
645
821
901
988
1063
1064
1099
1239
2255
2469
2640
3199

| | | | | |
|---|---|---|---|---|
| b | 332 ± 7 | 10 | | |
| c | 558 ± 6 | 8 | | |

*(6) TRB20 (R4300), sandstone; old highway RT1 at Col de Boghen, roadside outcrop, Middle Triassic (Anisian); Lat.21°40'45"S Long.165°39'09"E*

| | | | |
|---|---|---|---|
| a | 215 ± 3 | 6 | 54 |
| b | 546 ± 5 | 9 | |
| c | 564 ± 5 | 13 | |
| d | 585 ± 6 | 7 | |

*(7) TRB21 (R24301), sandstone, N of Moméa village, roadside outcrop, Middle-Late Triassic (Ladinian-Norian); Lat. 21°40'11"S Long165°38'54"E*

| | | | |
|---|---|---|---|
| a | 225 ± 2 | 33 | 45 |
| b | 233 ± 2 | 56 | |

*(8) TRB23 (R24302), sandstone; near La Foa, nr. watertank, Late Triassic (Ladinian-Rhaetian); Lat. 21°43'21"S Long.165°50'17"E*

| | | | |
|---|---|---|---|
| a | 559 ± 7 | 13 | 24 |

NOTES
Italic numbers in brackets are locality numbers of Table. 1
e standard error
o/c outcrop

*version160109*

| | | |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NCA32-31 | 0.04766 | 0.00242 | 0.14494 | 0.00714 | 0.02211 | 0.00036 | 0.00707 | 0.00029 | NCA32-31 | 82 | 113 | 137 | 6 | 141 | 2 | 142 | 6 | NCAL32-11 | 557 | 7 c | | | |
| NCA32-32 | 0.05989 | 0.00117 | 0.69388 | 0.01288 | 0.08422 | 0.00098 | 0.02609 | 0.00081 | NCA32-32 | 600 | 43 | 535 | 8 | 521 | 6 | 521 | 16 | NCA32-44 | 557 | 3 c | | | |
| NCA32-33 | 0.07489 | 0.00196 | 0.85844 | 0.02114 | 0.08332 | 0.00111 | 0.03040 | 0.00109 | NCA32-33 | 569 | 147 | 518 | 26 | 506 | 7 | 504 | 7 | NCA32-65 | 561 | 6 c | 563±6 | | |
| NCA32-34 | 0.05750 | 0.00103 | 0.59737 | 0.00993 | 0.07550 | 0.00084 | 0.02424 | 0.00078 | NCA32-34 | 511 | 40 | 476 | 6 | 469 | 5 | 484 | 15 | NCAL32-4 | 563 | 6 c | n=11 | | |
| NCA32-35 | 0.14450 | 0.00217 | 6.86769 | 0.09359 | 0.34532 | 0.00366 | 0.09840 | 0.00309 | NCA32-35 | 2282 | 26 | 2094 | 12 | 1912 | 18 | 1897 | 57 | NCA32-20 | 564 | 6 c | %16 | | |
| NCA32-36 | 0.05711 | 0.00111 | 0.52300 | 0.00931 | 0.06652 | 0.00074 | 0.02061 | 0.00072 | NCA32-36 | 496 | 44 | 427 | 6 | 415 | 4 | 412 | 14 | NCA32-56 | 564 | 6 c | | | |
| NCA32-37 | 0.05696 | 0.00080 | 0.64615 | 0.00847 | 0.08228 | 0.00068 | 0.02601 | 0.00049 | NCA32-37 | 490 | 32 | 506 | 5 | 510 | 5 | 519 | 10 | NCAL32-9 | 566 | 6 c | | | |
| NCA32-38 | 0.05018 | 0.00117 | 0.23692 | 0.00330 | 0.03424 | 0.00037 | 0.01107 | 0.00025 | NCA32-38 | 203 | 55 | 216 | 4 | 217 | 2 | 223 | 5 | NCA32-63 | 566 | 7 c | | | |
| NCA32-39 | 0.06254 | 0.00113 | 0.77613 | 0.01322 | 0.09002 | 0.00094 | 0.02722 | 0.00058 | NCA32-39 | 693 | 39 | 583 | 8 | 556 | 6 | 543 | 11 | NCA32-41 | 569 | 5 c | | | |
| NCA32-40 | 0.04817 | 0.00095 | 0.18279 | 0.00344 | 0.02753 | 0.00028 | 0.00869 | 0.00020 | NCA32-40 | 108 | 48 | 170 | 3 | 175 | 2 | 175 | 4 | NCAL32-5 | 573 | 6 | | | |
| NCA32-41 | 0.06035 | 0.00083 | 0.76630 | 0.00976 | 0.09209 | 0.00089 | 0.02874 | 0.00060 | NCA32-41 | 616 | 30 | 578 | 6 | 568 | 5 | 573 | 12 | NCA32-71 | 573 | 7 | | | |
| NCA32-42 | 0.06110 | 0.00083 | 0.66907 | 0.00869 | 0.08190 | 0.00079 | 0.02691 | 0.00031 | NCA32-42 | 643 | 30 | 533 | 5 | 507 | 5 | 479 | 6 | NCAL32-1 | 581 | 6 d | | | |
| NCA32-43 | 0.07222 | 0.00091 | 1.36194 | 0.01587 | 0.13679 | 0.00131 | 0.04220 | 0.00098 | NCA32-43 | 992 | 26 | 893 | 7 | 826 | 7 | 835 | 19 | NCA32-51 | 583 | 7 d | 584±6 | | |
| NCA32-44 | 0.05992 | 0.00092 | 0.74597 | 0.01070 | 0.09029 | 0.00090 | 0.02972 | 0.00105 | NCA32-44 | 601 | 34 | 566 | 6 | 557 | 5 | 592 | 21 | NCA32-18 | 584 | 5 d | n=5 | | |
| NCA32-45 | 0.05991 | 0.00093 | 0.72695 | 0.01052 | 0.08801 | 0.00088 | 0.02850 | 0.00072 | NCA32-45 | 600 | 34 | 555 | 6 | 544 | 5 | 568 | 14 | NCAL32-2 | 585 | 6 d | %7 | | |
| NCA32-46 | 0.05102 | 0.00095 | 0.18385 | 0.00324 | 0.02614 | 0.00027 | 0.00981 | 0.00023 | NCA32-46 | 242 | 44 | 171 | 3 | 166 | 2 | 173 | 5 | NCA32-3 | 588 | 6 d | | | |
| NCA32-47 | 0.06131 | 0.00087 | 0.86286 | 0.01216 | 0.10208 | 0.00113 | 0.03235 | 0.00097 | NCA32-47 | 650 | 31 | 632 | 7 | 627 | 7 | 644 | 19 | NCA32-25 | 592 | 6 | | | |
| NCA32-48 | 0.04858 | 0.00187 | 0.17883 | 0.00660 | 0.02665 | 0.00037 | 0.00859 | 0.00038 | NCA32-48 | 132 | 89 | 167 | 6 | 170 | 2 | 173 | 8 | NCA32-54 | 592 | 6 | | | |
| NCA32-49 | 0.07898 | 0.00152 | 2.09631 | 0.04111 | 0.19246 | 0.00264 | 0.05936 | 0.00230 | NCA32-49 | 1172 | 39 | 1148 | 13 | 1135 | 14 | 1166 | 44 | NCA32-14 | 594 | 6 n=49 | | | |
| NCA32-50 | 0.05702 | 0.00095 | 0.64821 | 0.01056 | 0.08245 | 0.00092 | 0.02587 | 0.00060 | NCA32-50 | 492 | 38 | 507 | 7 | 511 | 5 | 516 | 12 | NCA32-47 | 627 | 7 | | | |
| NCA32-51 | 0.05989 | 0.00099 | 0.78137 | 0.01313 | 0.09461 | 0.00116 | 0.02831 | 0.00096 | NCA32-51 | 600 | 37 | 586 | 7 | 583 | 7 | 564 | 19 | NCA32-66 | 631 | 7 | | | |
| NCA32-52 | 0.16056 | 0.00197 | 10.22396 | 0.11763 | 0.46185 | 0.00449 | 0.13468 | 0.00332 | NCA32-52 | 2462 | 21 | 2455 | 11 | 2448 | 20 | 2554 | 59 | NCA32-60 | 663 | 8 | | | |
| NCA32-53 | 0.07060 | 0.00089 | 1.52755 | 0.01744 | 0.15603 | 0.00144 | 0.04252 | 0.00097 | NCA32-53 | 946 | 28 | 942 | 7 | 940 | 8 | 842 | 19 | NCA32-24 | 694 | 7 | | | |
| NCA32-54 | 0.05957 | 0.00111 | 0.78941 | 0.01510 | 0.09613 | 0.00128 | 0.02970 | 0.00153 | NCA32-54 | 588 | 41 | 591 | 9 | 592 | 8 | 592 | 30 | NCA32-43 | 826 | 7 | | | |
| NCA32-55 | 0.05882 | 0.00126 | 0.70458 | 0.01443 | 0.08687 | 0.00099 | 0.03462 | 0.00113 | NCA32-55 | 560 | 48 | 542 | 9 | 537 | 6 | 688 | 22 | NCA32-53 | 940 | 8 | | | |
| NCA32-56 | 0.05900 | 0.00095 | 0.74353 | 0.01166 | 0.09141 | 0.00100 | 0.03011 | 0.00076 | NCA32-56 | 567 | 36 | 564 | 7 | 564 | 6 | 600 | 15 | NCA32-15 | 947 | 9 | | | |
| NCA32-57 | 0.07489 | 0.00103 | 1.93429 | 0.02685 | 0.18733 | 0.00211 | 0.05842 | 0.00166 | NCA32-57 | 1066 | 28 | 1093 | 9 | 1107 | 11 | 1148 | 32 | NCA32-28 | 948 | 10 | | | |
| NCA32-58 | 0.07267 | 0.00116 | 1.77554 | 0.02826 | 0.17720 | 0.00208 | 0.05812 | 0.00180 | NCA32-58 | 1002 | 33 | 1037 | 10 | 1052 | 11 | 1142 | 34 | NCA32-58 | 1008 | 33 | | | |
| NCA32-59 | 0.11806 | 0.00209 | 3.94104 | 0.07083 | 0.24208 | 0.00313 | 0.07379 | 0.00311 | NCA32-59 | 1927 | 32 | 1622 | 15 | 1398 | 16 | 1439 | 59 ** | NCA32-57 | 1068 | 28 | | | |
| NCA32-60 | 0.06321 | 0.00122 | 0.94450 | 0.01837 | 0.10837 | 0.00140 | 0.03378 | 0.00148 | NCA32-60 | 715 | 42 | 675 | 10 | 663 | 8 | 671 | 29 | NCA32-49 | 1172 | 39 | | | |
| NCA32-61 | 0.17333 | 0.00297 | 7.09613 | 0.11220 | 0.30042 | 0.00317 | 0.09930 | 0.00416 | NCA32-61 | 2495 | 42 | 2073 | 19 | 1677 | 16 | 1604 | 19 ** | NCA32-69 | 1156 | 27 | | | |
| NCA32-62 | 0.05869 | 0.00099 | 0.72902 | 0.01183 | 0.09011 | 0.00097 | 0.02948 | 0.00071 | NCA32-62 | 558 | 38 | 556 | 7 | 556 | 6 | 587 | 14 | NCA32-72 | 1210 | 32 | | | |
| NCA32-63 | 0.05897 | 0.00112 | 0.74613 | 0.01429 | 0.09176 | 0.00120 | 0.02900 | 0.00110 | NCA32-63 | 566 | 42 | 566 | 8 | 566 | 7 | 578 | 22 | NCA32-67 | 1239 | 20 | | | |
| NCA32-64 | 0.15708 | 0.00214 | 9.66324 | 0.11902 | 0.44622 | 0.00419 | 0.13445 | 0.00408 | NCA32-64 | 2424 | 24 | 2403 | 11 | 2378 | 19 | 2550 | 73 | NCA32-35 | 2282 | 26 n=64 | | | |
| NCA32-65 | 0.05878 | 0.00076 | 0.73652 | 0.00972 | 0.09089 | 0.00101 | 0.02947 | 0.00077 | NCA32-65 | 559 | 29 | 560 | 6 | 561 | 6 | 587 | 15 | NCA32-64 | 2424 | 24 | | | |
| NCA32-66 | 0.06170 | 0.00088 | 0.87432 | 0.01261 | 0.10279 | 0.00117 | 0.03354 | 0.00096 | NCA32-66 | 664 | 31 | 638 | 7 | 631 | 7 | 667 | 19 | NCA32-52 | 2482 | 21 | | | |
| NCA32-67 | 0.14098 | 0.00163 | 6.63114 | 0.07581 | 0.34121 | 0.00354 | 0.08536 | 0.00191 | NCA32-67 | 2239 | 20 | 2063 | 10 | 1892 | 17 | 1656 | 36 | NCAL32-7 | 2830 | 18 N=67 | | | |
| NCA32-68 | 0.04707 | 0.00120 | 0.15223 | 0.00376 | 0.02346 | 0.00029 | 0.00791 | 0.00026 | NCA32-68 | 53 | 57 | 144 | 3 | 149 | 2 | 159 | 5 | | | | | | |
| NCA32-69 | 0.07835 | 0.00196 | 2.12264 | 0.02716 | 0.19664 | 0.00198 | 0.06335 | 0.00192 | NCA32-69 | 1156 | 27 | 1157 | 9 | 1157 | 11 | 1242 | 36 | | | | | | |
| NCA32-70 | 0.04627 | 0.00252 | 0.13678 | 0.00722 | 0.02145 | 0.00035 | 0.00720 | 0.00038 | NCA32-70 | 12 | 118 | 130 | 6 | 137 | 2 | 145 | 8 | | | | | | |
| NCA32-71 | 0.06028 | 0.00115 | 0.77226 | 0.01452 | 0.09294 | 0.00114 | 0.03027 | 0.00133 | NCA32-71 | 614 | 42 | 581 | 8 | 573 | 7 | 603 | 26 | | | | | | |
| NCA32-72 | 0.06051 | 0.00128 | 2.21258 | 0.03538 | 0.19938 | 0.00239 | 0.06029 | 0.00218 | NCA32-72 | 1210 | 32 | 1185 | 11 | 1172 | 13 | 1183 | 42 | | | | | | |

***TERESPA TERRANE***

MEASURED ISOTOPIC RATIOS

| *Analysis No.* | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| *(5) NCAL15 (RJ3475). sandstone: hiahway near La Foa. roadside outcroo. Middle Jurassic (Ladinian) Lat.21°41'31"S. Lono.165°44'50 (5) NCAL15 (RJ3475). sandstone: hiahway near La Foa. roadside outcroo. Middle Jurassic (Ladinian) Lat.21°41'31"S. Lono.165°44'50 (5) NCAL15 (RJ3475). sandstone: hiahway near La Foa. roadside outcroo. Middle Jurassic (Ladinian) Lat.21°41'31"S. Lono.165°44'50°E* | | | | | | | | |
| NCAL15-1 | 0.05153 | 0.00086 | 0.25762 | 0.00412 | 0.03626 | 0.00036 | 0.01196 | 0.00023 |
| NCAL15-2 | 0.05152 | 0.00157 | 0.25637 | 0.00784 | 0.03750 | 0.00043 | 0.01190 | 0.00039 |
| NCAL15-3 | 0.12972 | 0.00145 | 3.66300 | 0.03750 | 0.20481 | 0.00191 | 0.05855 | 0.00193 |
| NCAL15-4 | 0.05073 | 0.00071 | 0.24958 | 0.00326 | 0.03568 | 0.00035 | 0.01176 | 0.00021 |
| NCAL15-5 | 0.05306 | 0.00078 | 0.37685 | 0.00530 | 0.05152 | 0.00052 | 0.01713 | 0.00031 |
| NCAL15-6 | 0.05841 | 0.00071 | 0.68090 | 0.00802 | 0.08455 | 0.00085 | 0.02733 | 0.00048 |
| NCAL15-7 | 0.05102 | 0.00096 | 0.25164 | 0.00456 | 0.03577 | 0.00039 | 0.01192 | 0.00027 |
| NCAL15-8 | 0.06031 | 0.00082 | 0.71468 | 0.00905 | 0.08595 | 0.00083 | 0.02600 | 0.00056 |
| NCAL15-9 | 0.06207 | 0.00093 | 0.88995 | 0.01259 | 0.10516 | 0.00103 | 0.03395 | 0.00080 |
| NCAL15-10 | 0.07436 | 0.00099 | 1.69763 | 0.01987 | 0.16559 | 0.00144 | 0.05384 | 0.00120 |
| NCAL15-11 | 0.06123 | 0.00076 | 0.80858 | 0.00998 | 0.10430 | 0.00097 | 0.03423 | 0.00068 |
| NCAL15-12 | 0.05514 | 0.00073 | 0.44623 | 0.00563 | 0.05870 | 0.00059 | 0.01938 | 0.00042 |
| NCAL15-13 | 0.05366 | 0.00095 | 0.38632 | 0.00518 | 0.05222 | 0.00053 | 0.01699 | 0.00028 |
| NCAL15-14 | 0.06701 | 0.00077 | 1.25542 | 0.01475 | 0.13588 | 0.00145 | 0.04353 | 0.00078 |
| NCAL15-15 | 0.05915 | 0.00076 | 0.74350 | 0.00885 | 0.09085 | 0.00085 | 0.02911 | 0.00045 |
| NCAL15-16 | 0.16125 | 0.00192 | 10.44717 | 0.11810 | 0.46993 | 0.00463 | 0.13397 | 0.00286 |
| NCAL15-17 | 0.07483 | 0.00093 | 1.76360 | 0.02162 | 0.17055 | 0.00180 | 0.05024 | 0.00097 |
| NCAL15-18 | 0.07614 | 0.00122 | 1.80978 | 0.02656 | 0.17238 | 0.00156 | 0.05660 | 0.00148 |
| NCAL15-19 | 0.05126 | 0.00085 | 0.24684 | 0.00389 | 0.03493 | 0.00035 | 0.01169 | 0.00023 |
| NCAL15-20 | 0.05986 | 0.00077 | 0.78598 | 0.00945 | 0.09523 | 0.00092 | 0.03358 | 0.00068 |
| NCAL15-21 | 0.18925 | 0.00256 | 11.75274 | 0.16183 | 0.45044 | 0.00523 | 0.13796 | 0.00354 |
| NCAL15-22 | 0.05154 | 0.00187 | 0.25021 | 0.00879 | 0.03521 | 0.00044 | 0.01324 | 0.00050 |
| NCAL15-23 | 0.05441 | 0.00094 | 0.40216 | 0.00686 | 0.05361 | 0.00062 | 0.01754 | 0.00049 |
| NCAL15-24 | 0.05249 | 0.00112 | 0.27363 | 0.00564 | 0.03781 | 0.00043 | 0.01314 | 0.00036 |
| NCAL15-25 | 0.05279 | 0.00166 | 0.26561 | 0.00805 | 0.03690 | 0.00043 | 0.01229 | 0.00036 |
| NCAL15-26 | 0.05339 | 0.00129 | 0.28270 | 0.00685 | 0.03990 | 0.00047 | 0.01317 | 0.00031 |
| NCAL15-27 | 0.05367 | 0.00068 | 0.38949 | 0.00479 | 0.05264 | 0.00054 | 0.01700 | 0.00032 |
| NCAL15-28 | 0.06034 | 0.00072 | 0.81062 | 0.00927 | 0.09743 | 0.00096 | 0.03152 | 0.00060 |
| NCAL15-29 | 0.05228 | 0.00069 | 0.28048 | 0.00362 | 0.03897 | 0.00041 | 0.01312 | 0.00025 |
| NCAL15-30 | 0.05583 | 0.00206 | 0.43098 | 0.01553 | 0.05600 | 0.00098 | 0.01862 | 0.00125 |
| NCAL15-31 | 0.05930 | 0.00081 | 0.60074 | 0.00784 | 0.07349 | 0.00071 | 0.00642 | 0.00018 |
| NCAL15-32 | 0.06095 | 0.00140 | 0.76274 | 0.01757 | 0.09078 | 0.00130 | 0.00910 | 0.00059 |
| NCAL15-33 | 0.05481 | 0.00105 | 0.49941 | 0.00944 | 0.06609 | 0.00079 | 0.02201 | 0.00061 |
| NCAL15-34 | 0.07539 | 0.00119 | 1.55911 | 0.02327 | 0.15013 | 0.00154 | 0.03462 | 0.00122 |
| NCAL15-35 | 0.05916 | 0.00090 | 0.70477 | 0.00995 | 0.08640 | 0.00084 | 0.02732 | 0.00073 |
| NCAL15-36 | 0.08171 | 0.00176 | 2.16275 | 0.04387 | 0.19199 | 0.00217 | 0.02710 | 0.00144 |
| NCAL15-37 | 0.06942 | 0.00102 | 0.72085 | 0.01268 | 0.08653 | 0.00113 | 0.01582 | 0.00061 |
| NCAL15-38 | 0.05905 | 0.00070 | 0.80385 | 0.00903 | 0.09874 | 0.00103 | 0.03086 | 0.00055 |
| NCAL15-39 | 0.05928 | 0.00097 | 0.73496 | 0.01222 | 0.08993 | 0.00110 | 0.02975 | 0.00090 |
| NCAL15-40 | 0.05269 | 0.00087 | 0.36463 | 0.00582 | 0.05020 | 0.00054 | 0.01604 | 0.00032 |
| NCAL15-41 | 0.07480 | 0.00148 | 1.77935 | 0.03368 | 0.17254 | 0.00237 | 0.04247 | 0.00166 |
| NCAL15-42 | 0.05080 | 0.00077 | 0.35516 | 0.00378 | 0.03643 | 0.00038 | 0.01167 | 0.00025 |
| NCAL15-43 | 0.05373 | 0.00074 | 0.39877 | 0.00534 | 0.05383 | 0.00056 | 0.01757 | 0.00035 |
| NCAL15-44 | 0.06226 | 0.00095 | 0.56737 | 0.00985 | 0.07275 | 0.00084 | 0.02540 | 0.00084 |
| NCAL15-45 | 0.05958 | 0.00076 | 0.75498 | 0.00940 | 0.08949 | 0.00097 | 0.02810 | 0.00066 |
| NCAL15-46 | 0.14227 | 0.00173 | 5.83018 | 0.09611 | 0.40964 | 0.00427 | 0.12685 | 0.00292 |
| NCAL15-47 | 0.14987 | 0.00318 | 4.87382 | 0.10069 | 0.23589 | 0.00296 | 0.12311 | 0.00670 |
| NCAL15-48 | 0.05173 | 0.00083 | 0.27638 | 0.00440 | 0.03876 | 0.00044 | 0.01257 | 0.00034 |
| NCAL15-49 | 0.25224 | 0.00456 | 21.99434 | 0.37069 | 0.63249 | 0.00680 | 0.16176 | 0.00680 |

CORRECTED AGES (COMMON PB)

| *Analysis No.* | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| NCAL15-1 | 265 | 39 | 233 | 3 | 230 | 2 | 240 | 5 |
| NCAL15-2 | 264 | 72 | 240 | 6 | 237 | 3 | 239 | 8 |
| NCAL15-3 | 2094 | 20 | 1563 | 8 | 1201 | 10 | 1150 | 19 ** |
| NCAL15-4 | 229 | 33 | 226 | 3 | 226 | 2 | 236 | 4 |
| NCAL15-5 | 331 | 34 | 325 | 4 | 324 | 3 | 343 | 6 |
| NCAL15-6 | 543 | 27 | 527 | 5 | 523 | 5 | 545 | 9 |
| NCAL15-7 | 242 | 44 | 228 | 4 | 227 | 2 | 240 | 5 |
| NCAL15-8 | 615 | 30 | 548 | 5 | 532 | 5 | 519 | 11 |
| NCAL15-9 | 677 | 33 | 652 | 7 | 645 | 6 | 675 | 16 |
| NCAL15-10 | 1051 | 27 | 1008 | 7 | 988 | 8 | 1060 | 23 |
| NCAL15-11 | 647 | 27 | 641 | 5 | 640 | 6 | 680 | 13 |
| NCAL15-12 | 418 | 30 | 375 | 4 | 368 | 4 | 388 | 8 |
| NCAL15-13 | 357 | 32 | 332 | 4 | 328 | 3 | 341 | 6 |
| NCAL15-14 | 838 | 24 | 826 | 7 | 821 | 8 | 861 | 15 |
| NCAL15-15 | 580 | 28 | 564 | 5 | 561 | 5 | 580 | 9 |
| NCAL15-16 | 2469 | 21 | 2475 | 10 | 2483 | 20 | 2541 | 51 |
| NCAL15-17 | 1064 | 26 | 1032 | 8 | 1017 | 10 | 991 | 19 |
| NCAL15-18 | 1099 | 33 | 1049 | 10 | 1025 | 9 | 1113 | 28 |
| NCAL15-19 | 253 | 39 | 224 | 3 | 221 | 2 | 235 | 5 |
| NCAL15-20 | 599 | 29 | 589 | 5 | 586 | 5 | 668 | 13 |
| NCAL15-21 | 2640 | 48 | 2515 | 23 | 2365 | 26 | 2330 | 29 |
| NCAL15-22 | 265 | 85 | 227 | 7 | 223 | 3 | 266 | 10 |
| NCAL15-23 | 358 | 40 | 343 | 5 | 337 | 4 | 351 | 10 |
| NCAL15-24 | 307 | 50 | 246 | 4 | 239 | 3 | 264 | 7 |
| NCAL15-25 | 320 | 73 | 239 | 6 | 231 | 3 | 247 | 7 |
| NCAL15-26 | 338 | 59 | 253 | 5 | 252 | 3 | 264 | 6 |
| NCAL15-27 | 357 | 29 | 334 | 4 | 331 | 3 | 341 | 6 |
| NCAL15-28 | 616 | 26 | 603 | 5 | 599 | 6 | 627 | 12 |
| NCAL15-29 | 298 | 31 | 251 | 3 | 246 | 3 | 263 | 5 |
| NCAL15-30 | 445 | 84 | 384 | 11 | 351 | 6 | 373 | 25 |
| NCAL15-31 | 578 | 31 | 478 | 5 | 457 | 4 | 129 | 4 |
| NCAL15-32 | 637 | 51 | 576 | 10 | 560 | 8 | 183 | 12 |
| NCAL15-33 | 404 | 44 | 413 | 6 | 413 | 5 | 440 | 12 |
| NCAL15-34 | 1079 | 32 | 954 | 9 | 901 | 9 | 689 | 24 |
| NCAL15-35 | 573 | 34 | 542 | 6 | 534 | 5 | 545 | 14 |
| NCAL15-36 | 1239 | 43 | 1169 | 14 | 1132 | 12 | 540 | 28 |
| NCAL15-37 | 619 | 37 | 551 | 7 | 535 | 7 | 337 | 12 |
| NCAL15-38 | 569 | 26 | 599 | 5 | 607 | 6 | 614 | 11 |
| NCAL15-39 | 577 | 36 | 559 | 7 | 555 | 7 | 592 | 18 |
| NCAL15-40 | 315 | 36 | 316 | 4 | 316 | 3 | 322 | 6 |
| NCAL15-41 | 1063 | 41 | 1038 | 13 | 1026 | 13 | 841 | 32 |
| NCAL15-42 | 232 | 36 | 231 | 3 | 233 | 2 | 235 | 5 |
| NCAL15-43 | 360 | 32 | 341 | 4 | 338 | 3 | 352 | 7 |
| NCAL15-44 | 683 | 33 | 519 | 6 | 483 | 5 | 507 | 17 |
| NCAL15-45 | 588 | 28 | 559 | 6 | 553 | 6 | 560 | 13 |
| NCAL15-46 | 2255 | 21 | 2234 | 11 | 2212 | 20 | 2414 | 52 |
| NCAL15-47 | 2275 | 44 | 1757 | 18 | 1355 | 15 | 1289 | 21 ** |
| NCAL15-48 | 273 | 38 | 248 | 4 | 245 | 3 | 252 | 7 |
| NCAL15-49 | 3199 | 29 | 3183 | 16 | 3159 | 27 | 3031 | 118 N=49 |

ACCEPTED SET (in ascending age order)

| *Analysis No.* | *Age** | *±1s* | *Groups* | *Age±2s* |
|---|---|---|---|---|
| NCAL15-19 | 221 | 2 a | | |
| NCA15-22 | 223 | 3 a | | |
| NCAL15-4 | 226 | 2 a | | 227±4 |
| NCAL15-7 | 227 | 2 a | | n=7 |
| NCAL15-1 | 230 | 2 a | | %15 |
| NCA15-25 | 231 | 3 a | | |
| NCA15-42 | 231 | 2 a | | |
| NCAL15-2 | 232 | 3 | | |
| NCA15-24 | 239 | 3 | | |
| NCA15-48 | 245 | 3 | | |
| NCA15-29 | 246 | 3 | | |
| NCA15-26 | 252 | 3 | | |
| NCAL15-40 | 316 | 3 | | |
| NCAL15-5 | 324 | 3 b | | |
| NCA15-13 | 328 | 3 b | | 332±7 |
| NCA15-27 | 331 | 3 b | | n=5 |
| NCA15-23 | 337 | 4 b | | %10 |
| NCA15-43 | 338 | 3 b | | |
| NCA15-30 | 351 | 6 | | |
| NCA15-12 | 368 | 4 | | |
| NCA15-33 | 413 | 5 | | |
| NCAL15-31 | 457 | 4 | | |
| NCA15-44 | 483 | 5 | | |
| NCAL15-6 | 523 | 5 | | |
| NCA15-8 | 532 | 5 | | |
| NCA15-35 | 534 | 5 | | |
| NCA15-32 | 535 | 7 | | |
| NCA15-45 | 553 | 6 c | | |
| NCA15-29 | 555 | 7 c | | 558±6 |
| NCA15-32 | 560 | 8 c | | n=4 |
| NCA15-15 | 561 | 5 c | | %8 |
| NCA15-20 | 586 | 5 | | |
| NCA15-28 | 599 | 6 | | n=33 |
| NCA15-38 | 607 | 6 | | |
| NCAL15-11 | 640 | 6 | | |
| NCAL15-9 | 645 | 6 | | |
| NCA15-14 | 821 | 6 | | |
| NCA15-24 | 901 | 9 | | |
| NCA15-10 | 988 | 8 | | |
| NCA15-41 | 1063 | 41 | | |
| NCA15-17 | 1084 | 26 | | |
| NCA15-18 | 1099 | 33 | | |
| NCA15-36 | 1239 | 43 | | |
| NCA15-46 | 2335 | 21 | | |
| NCA15-16 | 2489 | 21 | | |
| NCA15-21 | 2640 | 48 | | |
| NCA15-49 | 3199 | 29 | | N=47 |

| | K | O | O |
|---|---|---|---|
| | J | O | O |
| | T | 11 | 23 |
| | P | 1 | 2 |
| | Q | 7 | 15 |
| | DS | 2 | 4 |
| | CO | 6 | 13 |
| | PC | 20 | 43 |
| | n= | 47 | NCAL15 |

MEASURED ISOTOPIC RATIOS

| *Analysis No.* | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| *(6) TRB20 (R43001. sandstone: old hiahway RT1 at Col de Boohen. roadside outcroo. Middle Triassic (Anisian): Lat.21°40'45"S Lono. (6) TRB20 (R4300). sandstone: old hiahway RT1 at Col de Boohen. roadside outcroo. Middle Triassic (Anisian): Lat.21°40'45"S Lono. (6) TRB20 (R4300). sandstone: old hiahway RT1 at Col de Boohen. roadside outcroo. Middle Triassic (Anisian): Lat.21°40'45"S Lono.165°39'09"E* | | | | | | | | |
| TRB20-1 | 0.06138 | 0.00131 | 0.98561 | 0.01756 | 0.0976 | 0.00132 | 0.03018 | 0.00089 |
| TRB20-2 | 0.05721 | 0.00079 | 0.69775 | 0.00955 | 0.08846 | 0.00096 | 0.02525 | 0.00059 |
| TRB20-3 | 0.05996 | 0.00107 | 0.76266 | 0.01337 | 0.09225 | 0.00108 | 0.02864 | 0.00060 |
| TRB20-4 | 0.07135 | 0.00126 | 1.33467 | 0.02397 | 0.13568 | 0.00174 | 0.04258 | 0.00145 |
| TRB20-5 | 0.05986 | 0.00102 | 0.70919 | 0.01184 | 0.08591 | 0.00098 | 0.02708 | 0.00071 |
| TRB20-6 | 0.05925 | 0.00097 | 0.75118 | 0.01192 | 0.09196 | 0.00100 | 0.02953 | 0.00072 |
| TRB20-7 | 0.05511 | 0.00103 | 0.39153 | 0.00691 | 0.05153 | 0.00055 | 0.01712 | 0.00048 |
| TRB20-8 | 0.06185 | 0.00077 | 0.85947 | 0.01073 | 0.10079 | 0.00108 | 0.03117 | 0.00066 |
| TRB20-9 | 0.05422 | 0.00081 | 0.40691 | 0.00596 | 0.05443 | 0.00059 | 0.01782 | 0.00041 |
| TRB20-10 | 0.05929 | 0.00119 | 0.72237 | 0.01448 | 0.08834 | 0.00115 | 0.03802 | 0.00236 |
| TRB20-11 | 0.09268 | 0.00170 | 2.90831 | 0.03468 | 0.15716 | 0.00179 | 0.05145 | 0.00155 |
| TRB20-12 | 0.06028 | 0.00118 | 0.75489 | 0.01438 | 0.09084 | 0.00107 | 0.02653 | 0.00076 |
| TRB20-13 | 0.05269 | 0.00098 | 0.30332 | 0.00546 | 0.04176 | 0.00046 | 0.01352 | 0.00031 |
| TRB20-14 | 0.10220 | 0.00177 | 3.47328 | 0.05778 | 0.24653 | 0.00281 | 0.07832 | 0.00319 |

CORRECTED AGES (COMMON PB)

| *Analysis No.* | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| *(6) TRB20 (R4300). sandstone: old hiahway RT1 at Col de Boohen. roadside outcroo. Middle Triassic (Anisian): Lat.21°40'45"S Lono. (6) TRB20 (R4300). sandstone: old hiahway RT1 at Col de Boohen. roadside outcroo. Middle Triassic (Anisian): Lat.21°40'45"S Lono.165°39'09"E* | | | | | | | | |
| TRB20-1 | 647 | 43 | 648 | 9 | 648 | 8 | 599 | 17 |
| TRB20-2 | 500 | 31 | 537 | 6 | 546 | 6 | 504 | 12 |
| TRB20-3 | 602 | 40 | 576 | 8 | 569 | 6 | 571 | 12 |
| TRB20-4 | 967 | 37 | 861 | 10 | 820 | 10 | 843 | 28 |
| TRB20-5 | 599 | 38 | 544 | 7 | 531 | 6 | 540 | 14 |
| TRB20-6 | 576 | 36 | 569 | 7 | 567 | 6 | 586 | 14 |
| TRB20-7 | 417 | 43 | 335 | 5 | 324 | 3 | 343 | 10 |
| TRB20-8 | 669 | 27 | 630 | 6 | 619 | 6 | 620 | 13 |
| TRB20-9 | 380 | 34 | 347 | 4 | 342 | 4 | 357 | 8 |
| TRB20-10 | 578 | 45 | 552 | 9 | 546 | 7 | 754 | 46 |
| TRB20-11 | 1240 | 100 | 1026 | 31 | 928 | 11 | 913 | 11 |
| TRB20-12 | 614 | 43 | 571 | 8 | 561 | 6 | 569 | 15 |
| TRB20-13 | 315 | 43 | 269 | 4 | 264 | 3 | 271 | 6 |
| TRB20-14 | 1514 | 98 | 1450 | 38 | 1407 | 17 | 1399 | 17 |

ACCEPTED SET (in ascending age order)

| *Analysis No.* | *Age** | *±1s* | *Groups* | *Age±2s* |
|---|---|---|---|---|
| TRB20-30 | 201 | 3 | | |
| TRB20-37 | 208 | 5 x | | 215±3 |
| TRB20-30 | 215 | 2 x | | n=3 |
| TRB20-35 | 218 | 3 x | | %6 |
| TRB20-38 | 245 | 3 | | |
| TRB20-45 | 251 | 4 | | |
| TRB20-13 | 264 | 3 | | |
| TRB20-7 | 324 | 3 | | |
| TRB20-9 | 342 | 4 | | |
| TRB20-29 | 440 | 5 | | |
| TRB20-22 | 500 | 7 | | |
| TRB20-27 | 500 | 7 | | |
| TRB20-36 | 505 | 6 | | |
| TRB20-28 | 516 | 6 | | |

| | K | O | O |
|---|---|---|---|
| | J | O | O |
| | T | 5 | 9 |
| | P | 2 | 4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NCA10-19 | 0.04688 | 0.00155 | 0.10878 | 0.00350 | 0.01683 | 0.00020 | 0.00573 | 0.00017 |
| NCA10-20 | 0.04675 | 0.00140 | 0.11319 | 0.00315 | 0.01684 | 0.00019 | 0.00554 | 0.00014 |
| NCA10-21 | 0.04921 | 0.00437 | 0.11617 | 0.01012 | 0.01712 | 0.00035 | 0.00571 | 0.00031 |
| NCA10-22 | 0.05147 | 0.00321 | 0.12137 | 0.00736 | 0.01710 | 0.00033 | 0.00540 | 0.00033 |
| NCA10-23 | 0.05093 | 0.00124 | 0.11815 | 0.00274 | 0.01683 | 0.00018 | 0.00545 | 0.00015 |
| NCA10-24 | 0.05483 | 0.00132 | 0.30611 | 0.00727 | 0.04049 | 0.00053 | 0.01303 | 0.00065 |
| NCA10-25 | 0.11653 | 0.00712 | 0.29557 | 0.01694 | 0.01840 | 0.00046 | 0.01094 | 0.00073 |
| NCA10-26 | 0.04934 | 0.00177 | 0.11903 | 0.00416 | 0.01750 | 0.00025 | 0.00585 | 0.00022 |
| NCA10-27 | 0.04885 | 0.00143 | 0.11447 | 0.00323 | 0.01700 | 0.00019 | 0.00526 | 0.00014 |
| NCA10-28 | 0.05322 | 0.00188 | 0.12822 | 0.00476 | 0.01884 | 0.00028 | 0.00783 | 0.00040 |
| NCA10-29 | 0.04940 | 0.00120 | 0.11412 | 0.00264 | 0.01676 | 0.00018 | 0.00567 | 0.00017 |
| NCA10-30 | 0.04948 | 0.00099 | 0.12104 | 0.00234 | 0.01775 | 0.00019 | 0.00632 | 0.00016 |
| NCA10-31 | 0.04992 | 0.00098 | 0.15942 | 0.00305 | 0.02316 | 0.00026 | 0.00791 | 0.00025 |

MEASURED ISOTOPIC RATIOS

*Analysis no. $^{207}Pb/^{206}Pb$ ±1s $^{207}Pb/^{235}U$ ±1s $^{206}Pb/^{238}U$ ±1s $^{208}Pb/^{232}Th$ ±1s*

*(3) NCA11 (R234711, orewacke: Goloin River, streambank o/c, Late Jurassic:Lat.21°33'48"S, Lono.165°49'57"E*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NCA11-1 | 0.05842 | 0.00072 | 0.68578 | 0.00786 | 0.08514 | 0.00081 | 0.02683 | 0.00045 |
| NCA11-2 | 0.05807 | 0.00073 | 0.65929 | 0.00758 | 0.08234 | 0.00077 | 0.02518 | 0.00040 |
| NCA11-3 | 0.06965 | 0.00098 | 1.22576 | 0.01727 | 0.12763 | 0.00142 | 0.03942 | 0.00105 |
| NCA11-4 | 0.05787 | 0.00094 | 0.62583 | 0.01025 | 0.07844 | 0.00093 | 0.02017 | 0.00055 |
| NCA11-5 | 0.05724 | 0.00072 | 0.64543 | 0.00795 | 0.08179 | 0.00085 | 0.02383 | 0.00058 |
| NCA11-6 | 0.06494 | 0.00079 | 1.08822 | 0.01284 | 0.12153 | 0.00123 | 0.03906 | 0.00081 |
| NCA11-7 | 0.05178 | 0.00104 | 0.21302 | 0.00422 | 0.02984 | 0.00036 | 0.00957 | 0.00027 |
| NCA11-8 | 0.05103 | 0.00138 | 0.18041 | 0.00474 | 0.02564 | 0.00032 | 0.00865 | 0.00026 |
| NCA11-9 | 0.17521 | 0.00385 | 6.04445 | 0.13275 | 0.24876 | 0.00354 | 0.05679 | 0.00340 |
| NCA11-10 | 0.05875 | 0.00079 | 0.73241 | 0.00947 | 0.09041 | 0.00093 | 0.02899 | 0.00062 |
| NCA11-11 | 0.06321 | 0.00159 | 0.20958 | 0.00504 | 0.02403 | 0.00029 | 0.00865 | 0.00025 |
| NCA11-12 | 0.05222 | 0.00097 | 0.27856 | 0.00503 | 0.03869 | 0.00044 | 0.01233 | 0.00037 |
| NCA11-13 | 0.05440 | 0.00163 | 0.18405 | 0.00536 | 0.02454 | 0.00035 | 0.00796 | 0.00030 |
| NCA11-14 | 0.07644 | 0.00087 | 2.01850 | 0.02313 | 0.19343 | 0.00190 | 0.05707 | 0.00102 |
| NCA11-15 | 0.06135 | 0.00082 | 0.81605 | 0.01128 | 0.09649 | 0.00112 | 0.03090 | 0.00105 |
| NCA11-16 | 0.05003 | 0.00078 | 0.16284 | 0.00252 | 0.02361 | 0.00027 | 0.00790 | 0.00019 |
| NCA11-17 | 0.06068 | 0.00078 | 0.79279 | 0.01037 | 0.09476 | 0.00104 | 0.02852 | 0.00068 |
| NCA11-18 | 0.06194 | 0.00119 | 0.79978 | 0.01515 | 0.09365 | 0.00115 | 0.03008 | 0.00092 |
| NCA11-19 | 0.05365 | 0.00074 | 0.42991 | 0.00552 | 0.05812 | 0.00058 | 0.01827 | 0.00036 |
| NCA11-20 | 0.05902 | 0.00083 | 0.70648 | 0.01016 | 0.08682 | 0.00100 | 0.02705 | 0.00078 |
| NCA11-21 | 0.05107 | 0.00125 | 0.26883 | 0.00641 | 0.03818 | 0.00049 | 0.01192 | 0.00040 |
| NCA11-22 | 0.06114 | 0.00080 | 0.90994 | 0.01135 | 0.10794 | 0.00108 | 0.03384 | 0.00077 |
| NCA11-23 | 0.05427 | 0.00125 | 0.39918 | 0.00905 | 0.05335 | 0.00070 | 0.01709 | 0.00065 |
| NCA11-24 | 0.05990 | 0.00084 | 0.73433 | 0.01004 | 0.08891 | 0.00094 | 0.02865 | 0.00084 |
| NCA11-25 | 0.17392 | 0.00196 | 9.61405 | 0.10808 | 0.40096 | 0.00421 | 0.12315 | 0.00320 |
| NCA11-26 | 0.06108 | 0.00078 | 0.82707 | 0.01028 | 0.09821 | 0.00102 | 0.02990 | 0.00059 |
| NCA11-27 | 0.05801 | 0.00079 | 0.67114 | 0.00914 | 0.08392 | 0.00093 | 0.02661 | 0.00059 |
| NCA11-28 | 0.05802 | 0.00095 | 0.69981 | 0.01098 | 0.08749 | 0.00092 | 0.02996 | 0.00088 |
| NCA11-29 | 0.07455 | 0.00106 | 1.78417 | 0.02644 | 0.17360 | 0.00208 | 0.05222 | 0.00152 |
| NCA11-30 | 0.06230 | 0.00088 | 0.83456 | 0.01180 | 0.09717 | 0.00095 | 0.02356 | 0.00095 |
| NCA11-31 | 0.05840 | 0.00072 | 0.73942 | 0.00871 | 0.09184 | 0.00091 | 0.02763 | 0.00055 |
| NCA11-32 | 0.05719 | 0.00087 | 0.58596 | 0.00912 | 0.07431 | 0.00089 | 0.02306 | 0.00073 |
| NCA11-33 | 0.06549 | 0.00087 | 1.13888 | 0.01452 | 0.12613 | 0.00128 | 0.03783 | 0.00092 |
| NCA11-34 | 0.05571 | 0.00085 | 0.57399 | 0.00869 | 0.07473 | 0.00084 | 0.02503 | 0.00068 |
| NCA11-35 | 0.05057 | 0.00085 | 0.17942 | 0.00293 | 0.02573 | 0.00027 | 0.00806 | 0.00018 |
| NCA11-36 | 0.12124 | 0.00159 | 3.05632 | 0.03859 | 0.18286 | 0.00187 | 0.04746 | 0.00131 |
| NCA11-37 | 0.05766 | 0.00066 | 0.72021 | 0.00784 | 0.09060 | 0.00084 | 0.02757 | 0.00047 |
| NCA11-38 | 0.05021 | 0.00084 | 0.17176 | 0.00275 | 0.02481 | 0.00026 | 0.00852 | 0.00016 |
| NCA11-39 | 0.05763 | 0.00092 | 0.68696 | 0.01087 | 0.08647 | 0.00099 | 0.02718 | 0.00073 |
| NCA11-40 | 0.05090 | 0.00148 | 0.17235 | 0.00502 | 0.02527 | 0.00032 | 0.00772 | 0.00021 |
| NCA11-41 | 0.05984 | 0.00093 | 0.80248 | 0.01292 | 0.09727 | 0.00120 | 0.02356 | 0.00120 |
| NCA11-42 | 0.05845 | 0.00120 | 0.71005 | 0.01393 | 0.08811 | 0.00100 | 0.02821 | 0.00077 |
| NCA11-43 | 0.07188 | 0.00089 | 1.69245 | 0.01954 | 0.17077 | 0.00163 | 0.05068 | 0.00120 |
| NCA11-44 | 0.07587 | 0.00134 | 1.70837 | 0.03156 | 0.16618 | 0.00216 | 0.04806 | 0.00183 |
| NCA11-45 | 0.04943 | 0.00146 | 0.20831 | 0.00608 | 0.03057 | 0.00041 | 0.00980 | 0.00033 |
| NCA11-46 | 0.04986 | 0.00076 | 0.17200 | 0.00257 | 0.02502 | 0.00027 | 0.00801 | 0.00020 |
| NCA11-47 | 0.10855 | 0.00178 | 0.70927 | 0.01077 | 0.04739 | 0.00049 | 0.00682 | 0.00025 |
| NCA11-48 | 0.06211 | 0.00128 | 0.84793 | 0.01751 | 0.09903 | 0.00132 | 0.02032 | 0.00096 |
| NCA11-49 | 0.05874 | 0.00078 | 0.77247 | 0.01033 | 0.09540 | 0.00105 | 0.03042 | 0.00067 |
| NCA11-50 | 0.05975 | 0.00077 | 0.79119 | 0.00982 | 0.09605 | 0.00098 | 0.03068 | 0.00059 |
| NCA11-51 | 0.07380 | 0.00143 | 1.68135 | 0.03339 | 0.16528 | 0.00231 | 0.04487 | 0.00228 |
| NCA11-52 | 0.05019 | 0.00073 | 0.18212 | 0.00266 | 0.02632 | 0.00030 | 0.00698 | 0.00020 |
| NCA11-53 | 0.05999 | 0.00104 | 0.70795 | 0.01233 | 0.08560 | 0.00106 | 0.02536 | 0.00082 |
| NCA11-54 | 0.04919 | 0.00094 | 0.14754 | 0.00273 | 0.02176 | 0.00024 | 0.00667 | 0.00015 |
| NCA11-55 | 0.05829 | 0.00070 | 0.73188 | 0.00885 | 0.09108 | 0.00097 | 0.02745 | 0.00060 |
| NCA11-56 | 0.05739 | 0.00109 | 0.66174 | 0.01265 | 0.08364 | 0.00108 | 0.02511 | 0.00099 |
| NCA11-57 | 0.05122 | 0.00089 | 0.18450 | 0.00303 | 0.02613 | 0.00032 | 0.00892 | 0.00023 |
| NCA11-58 | 0.05339 | 0.00076 | 0.38775 | 0.00558 | 0.05268 | 0.00059 | 0.01678 | 0.00043 |
| NCA11-59 | 0.06848 | 0.00127 | 1.38080 | 0.02629 | 0.14627 | 0.00196 | 0.03023 | 0.00174 |
| NCA11-60 | 0.07117 | 0.00101 | 1.49448 | 0.02118 | 0.15232 | 0.00172 | 0.04712 | 0.00139 |
| NCA11-61 | 0.05909 | 0.00178 | 0.65139 | 0.01918 | 0.07997 | 0.00124 | 0.02893 | 0.00066 |
| NCA11-62 | 0.11394 | 0.00164 | 5.25972 | 0.07299 | 0.33483 | 0.00364 | 0.10037 | 0.00287 |

CORRECTED AGES (COMMON PB)

*Analysis No. $^{207}Pb/^{206}Pb$ ±1s $^{207}Pb/^{235}U$ ±1s $^{206}Pb/^{238}U$ ±1s $^{208}Pb/^{232}Th$ ±1s*

*(3) NCA11 (R234711, orewacke: Goloin River, streambank o/c, Late Jurassic:Lat.21°33'48"S, Lono.165°*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NCA11-1 | 546 | 28 | 530 | 5 | 527 | 5 | 535 | 9 | |
| NCA11-2 | 532 | 28 | 514 | 5 | 510 | 5 | 503 | 8 | |
| NCA11-3 | 918 | 30 | 812 | 8 | 774 | 8 | 781 | 20 | |
| NCA11-4 | 525 | 36 | 493 | 6 | 487 | 6 | 404 | 11 | |
| NCA11-5 | 501 | 28 | 506 | 5 | 507 | 5 | 476 | 11 | |
| NCA11-6 | 772 | 26 | 748 | 6 | 739 | 7 | 774 | 16 | |
| NCA11-7 | 276 | 47 | 196 | 4 | 190 | 2 | 193 | 5 | |
| NCA11-8 | 242 | 64 | 168 | 4 | 163 | 2 | 174 | 5 | |
| NCA11-9 | 2618 | 37 | 1982 | 19 | 1432 | 18 | 1116 | 65 ** | |
| NCA11-10 | 558 | 30 | 558 | 6 | 558 | 5 | 578 | 12 | |
| NCA11-11 | 189 | 135 | 153 | 8 | 151 | 2 | 150 | 2 | |
| NCA11-12 | 295 | 43 | 250 | 4 | 245 | 3 | 248 | 7 | |
| NCA11-13 | 388 | 69 | 172 | 5 | 158 | 2 | 160 | 6 | |
| NCA11-14 | 1107 | 21 | 1128 | 7 | 1140 | 10 | 1122 | 20 | |
| NCA11-15 | 652 | 29 | 606 | 6 | 594 | 7 | 732 | 20 | |
| NCA11-16 | 196 | 37 | 153 | 2 | 150 | 2 | 159 | 4 | |
| NCA11-17 | 628 | 28 | 593 | 6 | 584 | 6 | 568 | 13 | |
| NCA11-18 | 672 | 42 | 597 | 9 | 577 | 7 | 599 | 18 | |
| NCA11-19 | 355 | 32 | 363 | 4 | 364 | 4 | 366 | 7 | |
| NCA11-20 | 568 | 31 | 543 | 6 | 537 | 6 | 539 | 15 | |
| NCA11-21 | 244 | 58 | 242 | 5 | 242 | 3 | 240 | 8 | |
| NCA11-22 | 644 | 29 | 657 | 6 | 661 | 6 | 673 | 15 | |
| NCA11-23 | 382 | 53 | 341 | 7 | 335 | 4 | 343 | 13 | |
| NCA11-24 | 600 | 31 | 559 | 6 | 549 | 6 | 571 | 17 | |
| NCA11-25 | 2487 | 41 | 2324 | 19 | 2144 | 22 | 2104 | 24 | |
| NCA11-26 | 642 | 27 | 612 | 6 | 604 | 6 | 595 | 12 | |
| NCA11-27 | 530 | 31 | 521 | 6 | 519 | 6 | 531 | 12 | |
| NCA11-28 | 531 | 37 | 539 | 7 | 541 | 5 | 597 | 17 | |
| NCA11-29 | 1056 | 29 | 1040 | 10 | 1032 | 11 | 1029 | 29 | |
| NCA11-30 | 643 | 39 | 607 | 7 | 597 | 5 | 595 | 6 | |
| NCA11-31 | 545 | 28 | 562 | 5 | 566 | 5 | 551 | 10 | |
| NCA11-32 | 499 | 34 | 468 | 6 | 462 | 5 | 461 | 14 | |
| NCA11-33 | 790 | 29 | 772 | 7 | 766 | 7 | 751 | 18 | |
| NCA11-34 | 441 | 35 | 461 | 6 | 465 | 5 | 500 | 13 | |
| NCA11-35 | 221 | 40 | 168 | 3 | 164 | 2 | 162 | 4 | |
| NCA11-36 | 1975 | 24 | 1422 | 10 | 1083 | 10 | 937 | 25 ** | |
| NCA11-37 | 517 | 26 | 551 | 5 | 559 | 5 | 550 | 9 | |
| NCA11-38 | 205 | 40 | 161 | 2 | 158 | 2 | 179 | 3 | |
| NCA11-39 | 516 | 36 | 531 | 7 | 535 | 6 | 542 | 14 | |
| NCA11-40 | 236 | 69 | 166 | 4 | 161 | 2 | 155 | 4 | |
| NCA11-41 | 598 | 34 | 598 | 7 | 598 | 7 | 451 | 24 | |
| NCA11-42 | 547 | 46 | 545 | 8 | 544 | 6 | 562 | 15 | |
| NCA11-43 | 983 | 26 | 1006 | 7 | 1016 | 9 | 999 | 23 | |
| NCA11-44 | 1092 | 36 | 1023 | 12 | 991 | 12 | 949 | 35 | |
| NCA11-45 | 168 | 71 | 192 | 5 | 194 | 3 | 197 | 7 | |
| NCA11-46 | 188 | 36 | 161 | 2 | 159 | 2 | 162 | 4 | |
| NCA11-47 | 1775 | 31 | 544 | 6 | 298 | 3 | 137 | 5 ** | |
| NCA11-48 | 678 | 45 | 624 | 10 | 609 | 8 | 607 | 19 | |
| NCA11-49 | 557 | 30 | 581 | 6 | 587 | 6 | 606 | 13 | |
| NCA11-50 | 595 | 29 | 592 | 6 | 591 | 6 | 611 | 12 | |
| NCA11-51 | 1036 | 40 | 1061 | 13 | 986 | 13 | 887 | 43 | |
| NCA11-52 | 204 | 35 | 170 | 2 | 167 | 2 | 181 | 4 | |
| NCA11-53 | 603 | 38 | 544 | 7 | 529 | 6 | 506 | 16 | |
| NCA11-54 | 157 | 46 | 140 | 2 | 139 | 2 | 134 | 3 | |
| NCA11-55 | 541 | 27 | 558 | 5 | 561 | 6 | 547 | 12 | |
| NCA11-56 | 507 | 43 | 516 | 8 | 518 | 6 | 501 | 20 | |
| NCA11-57 | 251 | 41 | 172 | 3 | 166 | 2 | 179 | 5 | |
| NCA11-58 | 345 | 33 | 333 | 4 | 331 | 4 | 336 | 9 | |
| NCA11-59 | 863 | 39 | 881 | 11 | 869 | 11 | 602 | 34 | |
| NCA11-60 | 962 | 30 | 928 | 9 | 914 | 10 | 932 | 27 | |
| NCA11-61 | 570 | 67 | 509 | 12 | 496 | 7 | 180 | 17 | |
| NCA11-62 | 1863 | 27 | 1862 | 12 | 1862 | 18 | 1933 | 53 N=62 | |

ACCEPTED SET (in ascending age order)

*Analysis no. Age* ±1s Groups Age±2s*

*(3) NCA11 (R234711, orewacke: Goloin River, streambank o/c, Late Jurassic:Lat.21°33'48"S, Lono.165°49'57"E*

| | | | | | | |
|---|---|---|---|---|---|---|
| NCA11-54 | 139 | 2 | | | | |
| NCA11-16 | 150 | 2 aa | | | | |
| NCA11-11 | 151 | 2 aa | | | | |
| NCA11-13 | 156 | 2 a | | | | |
| NCA11-38 | 158 | 2 a | 162±3 | | | |
| NCA11-45 | 159 | 2 a | n=8 | | | |
| NCA11-40 | 161 | 2 a | %14 | | | |
| NCA11-8 | 163 | 2 a | | | | |
| NCA11-35 | 164 | 2 a | | | | |
| NCA11-57 | 166 | 2 a | | | | |
| NCA11-52 | 167 | 2 a | | | | |
| NCA11-7 | 190 | 2 | | | | |
| NCA11-45 | 194 | 3 | | | | |
| NCA11-21 | 242 | 3 | | | | |
| NCA11-12 | 245 | 3 | | | | |
| NCA11-58 | 331 | 4 | | | | |
| NCA11-23 | 335 | 4 | | | | |
| NCA11-19 | 364 | 4 | | | | |
| NCA11-32 | 462 | 5 | | | | |
| NCA11-34 | 465 | 5 | | | | |
| NCA11-4 | 487 | 6 | | | | |
| NCA11-61 | 496 | 7 | | | | |
| NCA11-5 | 507 | 5 b | | | | |
| NCA11-2 | 510 | 5 b | 513±5 | | | |
| NCA11-56 | 518 | 6 b | n=4 | | | |
| NCA11-27 | 519 | 6 b | %7 | | | |
| NCA11-1 | 527 | 5 | | | | |
| NCA11-53 | 529 | 6 | | | | |
| NCA11-39 | 535 | 6 cc | | | | |
| NCA11-20 | 537 | 6 cc | 539±6 | | | |
| NCA11-28 | 541 | 5 cc | n=4 | | | |
| NCA11-42 | 544 | 6 cc | %7 | | | |
| NCA11-24 | 549 | 6 c | | | | |
| NCA11-10 | 558 | 5 c | 557±5 | | | |
| NCA11-37 | 559 | 5 c | n=4 | | | |
| NCA11-55 | 562 | 6 c | %7 | | | |
| NCA11-31 | 566 | 5 | | | | |
| NCA11-18 | 577 | 7 | | | | |
| NCA11-17 | 584 | 6 d | | | | |
| NCA11-49 | 587 | 6 d | 592±5 | | | |
| NCA11-50 | 591 | 6 d | n=5 | | | |
| NCA11-15 | 594 | 7 d | %8 | | | |
| NCA11-30 | 597 | 5 d | | | | |
| NCA11-41 | 598 | 7 d | n=44 | | | |
| NCA11-26 | 604 | 6 | | | | |
| NCA11-48 | 609 | 8 | | | | |
| NCA11-22 | 661 | 6 | | | | |
| NCA11-6 | 739 | 7 | | | | |
| NCA11-33 | 766 | 7 | | | | |
| NCA11-3 | 774 | 8 | | | | |
| NCA11-59 | 880 | 11 | | | | |
| NCA11-60 | 914 | 10 | | | | |
| NCA11-43 | 983 | 26 | | | | |
| NCA11-51 | 986 | 13 | | | | |
| NCA11-44 | 991 | 12 | | | | |
| NCA11-29 | 1056 | 29 | | | | |
| NCA11-14 | 1107 | 23 | | | | |
| NCA11-62 | 1863 | 27 | | | | |
| NCA11-25 | 2487 | 41 N=59 | | | | |

| | K | 1 | 2 |
|---|---|---|---|
| | J | 12 | 20 |
| | T | 2 | 3 |
| | P | 0 | 0 |
| | C | 2 | 3 |
| | DS | 1 | 2 |
| | CO | 13 | 22 |
| | PC | 28 | 47 |
| | n= | 59 | NCA11 |

***BOGHEN TERRANE***

MEASURED ISOTOPIC RATIOS

*Analysis no. $^{207}Pb/^{206}Pb$ ±1s $^{207}Pb/^{235}U$ ±1s $^{206}Pb/^{238}U$ ±1s $^{208}Pb/^{232}Th$ ±1s*

*(4) NCAL32 (R240961, orewacke: Komendu River, streambank o/c, Late Jurassic: Lat.21°19'26"S, Lono.165°24'40"E*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NCAL32-1 | 0.05874 | 0.00027 | 0.76433 | 0.00991 | 0.09438 | 0.00100 | 0.02906 | 0.00051 |
| NCAL32-2 | 0.05875 | 0.00096 | 0.76912 | 0.01229 | 0.09496 | 0.00105 | 0.02912 | 0.00060 |
| NCAL32-3 | 0.05938 | 0.00067 | 0.78178 | 0.00865 | 0.09550 | 0.00097 | 0.03107 | 0.00057 |
| NCAL32-4 | 0.05938 | 0.00116 | 0.74741 | 0.01431 | 0.09129 | 0.00109 | 0.02810 | 0.00060 |
| NCAL32-5 | 0.05847 | 0.00114 | 0.74949 | 0.01422 | 0.09297 | 0.00109 | 0.02901 | 0.00064 |
| NCAL32-6 | 0.05725 | 0.00072 | 0.63555 | 0.00810 | 0.08052 | 0.00088 | 0.02510 | 0.00056 |
| NCAL32-7 | 0.20294 | 0.00221 | 13.93205 | 0.14954 | 0.49794 | 0.00504 | 0.13575 | 0.00257 |
| NCAL32-8 | 0.05418 | 0.00155 | 0.51164 | 0.01420 | 0.06860 | 0.00082 | 0.01875 | 0.00055 |
| NCAL32-9 | 0.05679 | 0.00096 | 0.73697 | 0.01175 | 0.09182 | 0.00099 | 0.02897 | 0.00067 |
| NCAL32-10 | 0.05806 | 0.00132 | 0.63019 | 0.01392 | 0.07985 | 0.00091 | 0.02686 | 0.00084 |
| NCAL32-11 | 0.05951 | 0.00142 | 0.73979 | 0.01738 | 0.09018 | 0.00124 | 0.02806 | 0.00131 |
| NCAL32-12 | 0.05734 | 0.00112 | 0.66120 | 0.01231 | 0.08393 | 0.00091 | 0.02585 | 0.00087 |
| NCAL32-13 | 0.05798 | 0.00076 | 0.68339 | 0.00865 | 0.08550 | 0.00068 | 0.02728 | 0.00054 |
| NCAL32-14 | 0.06012 | 0.00081 | 0.80036 | 0.01051 | 0.09656 | 0.00101 | 0.03059 | 0.00060 |
| NCAL32-15 | 0.07172 | 0.00098 | 1.56467 | 0.02029 | 0.15825 | 0.00160 | 0.05029 | 0.00126 |
| NCAL32-16 | 0.05853 | 0.00095 | 0.74192 | 0.01091 | 0.08763 | 0.00092 | 0.02843 | 0.00060 |
| NCAL32-17 | 0.15069 | 0.00170 | 6.74485 | 0.07518 | 0.32466 | 0.00337 | 0.09306 | 0.00171 |
| NCAL32-18 | 0.06004 | 0.00080 | 0.78443 | 0.00969 | 0.09477 | 0.00091 | 0.03070 | 0.00060 |
| NCAL32-19 | 0.06004 | 0.00085 | 0.64607 | 0.00922 | 0.07806 | 0.00088 | 0.01982 | 0.00050 |
| NCAL32-20 | 0.05969 | 0.00090 | 0.75228 | 0.01145 | 0.09142 | 0.00107 | 0.02688 | 0.00083 |
| NCAL32-21 | 0.05714 | 0.00069 | 0.64271 | 0.00773 | 0.08158 | 0.00085 | 0.02747 | 0.00066 |
| NCAL32-22 | 0.05872 | 0.00139 | 0.72194 | 0.01643 | 0.08918 | 0.00110 | 0.02968 | 0.00090 |
| NCAL32-23 | 0.82941 | 0.01140 | 167.76666 | 2.38586 | 1.46716 | 0.01967 | 0.18220 | 0.00459 |
| NCAL32-24 | 0.05339 | 0.00093 | 0.59349 | 0.01449 | 0.11369 | 0.00127 | 0.03540 | 0.00100 |
| NCAL32-25 | 0.06099 | 0.00084 | 0.80867 | 0.01104 | 0.09617 | 0.00106 | 0.03053 | 0.00082 |
| NCAL32-26 | 0.05825 | 0.00148 | 0.60581 | 0.01496 | 0.07556 | 0.00101 | 0.02207 | 0.00075 |
| NCAL32-27 | 0.05615 | 0.00092 | 0.45426 | 0.00733 | 0.05879 | 0.00069 | 0.01351 | 0.00049 |
| NCAL32-28 | 0.07638 | 0.00117 | 1.66399 | 0.02515 | 0.15836 | 0.00183 | 0.04700 | 0.00133 |
| NCAL32-29 | 0.05929 | 0.00085 | 0.59339 | 0.00833 | 0.07276 | 0.00081 | 0.02112 | 0.00059 |
| NCAL32-30 | 0.19407 | 0.00284 | 11.09892 | 0.15604 | 0.41577 | 0.00477 | 0.11809 | 0.00339 |

CORRECTED AGES (COMMON PB)

*Analysis no. $^{207}Pb/^{206}Pb$ ±1s $^{207}Pb/^{235}U$ ±1s $^{206}Pb/^{238}U$ ±1s $^{208}Pb/^{232}Th$ ±1s*

*(4) NCAL32 (R240961, orewacke: Komendu River, streambank o/c, Late Jurassic: Lat.21°19'26"S, Lono.1*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NCAL32-1 | 557 | 29 | 577 | 6 | 581 | 6 | 579 | 10 | |
| NCAL32-2 | 558 | 36 | 579 | 7 | 585 | 6 | 580 | 12 | |
| NCAL32-3 | 581 | 25 | 586 | 5 | 588 | 6 | 618 | 11 | |
| NCAL32-4 | 581 | 43 | 567 | 8 | 563 | 6 | 560 | 12 | |
| NCAL32-5 | 547 | 44 | 568 | 8 | 573 | 6 | 578 | 13 | |
| NCAL32-6 | 501 | 28 | 500 | 5 | 499 | 5 | 501 | 11 | |
| NCAL32-7 | 2850 | 18 | 2745 | 10 | 2603 | 22 | 2573 | 46 | |
| NCAL32-8 | 375 | 66 | 420 | 10 | 428 | 5 | 375 | 11 | |
| NCAL32-9 | 596 | 36 | 572 | 7 | 566 | 6 | 577 | 13 | |
| NCAL32-10 | 532 | 51 | 502 | 9 | 495 | 5 | 536 | 17 | |
| NCAL32-11 | 586 | 53 | 562 | 10 | 557 | 7 | 559 | 26 | |
| NCAL32-12 | 497 | 44 | 515 | 8 | 520 | 5 | 516 | 17 | |
| NCAL32-13 | 529 | 29 | 529 | 5 | 529 | 5 | 544 | 11 | |
| NCAL32-14 | 608 | 30 | 597 | 6 | 594 | 6 | 609 | 12 | |
| NCAL32-15 | 978 | 28 | 956 | 8 | 947 | 9 | 992 | 24 | |
| NCAL32-16 | 565 | 36 | 546 | 6 | 542 | 5 | 567 | 12 | |
| NCAL32-17 | 2354 | 20 | 2079 | 10 | 1812 | 16 | 1799 | 32 ** | |
| NCAL32-18 | 605 | 29 | 588 | 6 | 584 | 5 | 611 | 12 | |
| NCAL32-19 | 605 | 31 | 506 | 6 | 485 | 5 | 397 | 10 | |
| NCAL32-20 | 592 | 33 | 570 | 7 | 564 | 6 | 596 | 16 | |
| NCAL32-21 | 497 | 27 | 504 | 5 | 506 | 5 | 548 | 13 | |
| NCAL32-22 | 557 | 53 | 552 | 10 | 551 | 7 | 591 | 18 | |
| NCAL32-23 | 4973 | 20 | 5207 | 14 | 5922 | 51 | 3383 | 78 ** | |
| NCAL32-24 | 721 | 32 | 700 | 7 | 694 | 7 | 703 | 20 | |
| NCAL32-25 | 629 | 30 | 602 | 6 | 592 | 6 | 608 | 16 | |
| NCAL32-26 | 539 | 37 | 481 | 9 | 470 | 6 | 441 | 15 | |
| NCAL32-27 | 458 | 37 | 380 | 5 | 368 | 4 | 271 | 10 | |
| NCAL32-28 | 1105 | 31 | 995 | 10 | 948 | 10 | 928 | 26 | |
| NCAL32-29 | 578 | 32 | 473 | 5 | 453 | 5 | 422 | 12 | |
| NCAL32-30 | 2777 | 25 | 2531 | 13 | 2241 | 22 | 2256 | 61 ** | |

ACCEPTED SET (in ascending age order)

*Analysis No. Age* ±1s Groups Age±2s*

*(4) NCAL32 (R240961, orewacke: Komendu River, streambank o/c, Late Jurassic: Lat.21°19'26"S, Lono.165°24'40"E*

| | | | | | | |
|---|---|---|---|---|---|---|
| NCA32-70 | 137 | 2 | | | | |
| NCA32-31 | 141 | 2 | | | | |
| NCA32-68 | 149 | 2 | | | | |
| NCA32-46 | 166 | 2 a | 170±2 | | | |
| NCA32-48 | 170 | 2 a | n=3 | | | |
| NCA32-40 | 175 | 2 a | %4 | | | |
| NCA32-38 | 217 | 2 | | | | |
| NCA32-27 | 368 | 4 | | | | |
| NCA32-36 | 415 | 4 | | | | |
| NCA32-8 | 428 | 5 | | | | |
| NCA32-29 | 453 | 5 | | | | |
| NCA32-34 | 469 | 5 | | | | |
| NCA32-26 | 470 | 6 | | | | |
| NCA32-19 | 485 | 5 | | | | |
| NCA32-10 | 495 | 5 b | | | | |
| NCA32-6 | 499 | 5 b | | | | |
| NCA32-21 | 506 | 5 b | 505±4 | | | |
| NCA32-53 | 506 | 7 b | n=7 | | | |
| NCA32-42 | 507 | 5 b | %10 | | | |
| NCA32-37 | 510 | 5 b | | | | |
| NCA32-50 | 511 | 5 b | | | | |
| NCA32-12 | 520 | 5 | | | | |
| NCA32-32 | 521 | 6 | | | | |
| NCA32-13 | 528 | 5 | | | | |
| NCA32-55 | 537 | 6 | | | | |
| NCA32-16 | 542 | 5 | | | | |
| NCA32-45 | 544 | 5 | | | | |
| NCA32-22 | 551 | 7 | | | | |
| NCA32-39 | 556 | 6 c | | | | |
| NCA32-62 | 556 | 6 c | | | | |

| | K | 2 | 3 |
|---|---|---|---|
| | J | 4 | 6 |
| | T | 1 | 1 |
| | P | 0 | 0 |
| | C | 0 | 0 |
| | DS | 3 | 4 |
| | CO | 17 | 25 |
| | PC | 40 | 60 |
| | n= | 67 | NCAL32 |

APPENDIX 2: U-PB DETRITAL ZIRCON ISOTOPIC RATIO AND AGE DATA, NEW CALEDONIA BASEMENT TERRANES

***FORMATION À CHARBON***

MEASURED ISOTOPIC RATIOS

| Analysis No. | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| (1) NCAL24 (R234851, orewacke: highway outcrop above Koh village. Late Cretaceous: Lat.21°33'48"S, Lono.165°49'57"E | | | | | | | | |
| NCA24-1 | 0.04865 | 0.00269 | 0.10534 | 0.00573 | 0.01571 | 0.00022 | 0.00504 | 0.00016 |
| NCA24-2 | 0.04851 | 0.00200 | 0.12567 | 0.00507 | 0.01875 | 0.00025 | 0.00638 | 0.00019 |
| NCA24-3 | 0.06036 | 0.00387 | 0.16335 | 0.01001 | 0.01963 | 0.00041 | 0.00734 | 0.00030 |
| NCA24-4 | 0.04949 | 0.00185 | 0.13104 | 0.00472 | 0.01921 | 0.00026 | 0.00613 | 0.00022 |
| NCA24-5 | 0.04698 | 0.00099 | 0.10251 | 0.00218 | 0.01583 | 0.00017 | 0.00524 | 0.00012 |
| NCA24-6 | 0.04849 | 0.00091 | 0.12761 | 0.00232 | 0.01909 | 0.00020 | 0.00607 | 0.00013 |
| NCA24-7 | 0.05041 | 0.00215 | 0.10801 | 0.00446 | 0.01554 | 0.00025 | 0.00465 | 0.00022 |
| NCA24-8 | 0.04800 | 0.00175 | 0.10792 | 0.00385 | 0.01631 | 0.00021 | 0.00530 | 0.00018 |
| NCA24-9 | 0.05572 | 0.00263 | 0.14261 | 0.00650 | 0.01856 | 0.00032 | 0.00620 | 0.00040 |
| NCA24-10 | 0.05159 | 0.00176 | 0.11243 | 0.00359 | 0.01581 | 0.00021 | 0.00516 | 0.00019 |
| NCA24-11 | 0.04831 | 0.00209 | 0.09799 | 0.00415 | 0.01471 | 0.00020 | 0.00479 | 0.00019 |
| NCA24-12 | 0.04907 | 0.00315 | 0.08465 | 0.00531 | 0.01254 | 0.00025 | 0.00419 | 0.00025 |
| NCA24-13 | 0.04794 | 0.00110 | 0.10802 | 0.00240 | 0.01634 | 0.00019 | 0.00532 | 0.00013 |
| NCA24-14 | 0.04797 | 0.00109 | 0.10536 | 0.00215 | 0.01593 | 0.00018 | 0.00523 | 0.00012 |
| NCA24-15 | 0.06046 | 0.00178 | 0.11841 | 0.00329 | 0.01421 | 0.00018 | 0.00479 | 0.00017 |
| NCA24-16 | 0.04995 | 0.00091 | 0.22187 | 0.00391 | 0.03222 | 0.00035 | 0.01053 | 0.00021 |
| NCA24-17 | 0.04829 | 0.00097 | 0.12123 | 0.00237 | 0.01821 | 0.00020 | 0.00580 | 0.00012 |
| NCA24-18 | 0.04898 | 0.00118 | 0.10486 | 0.00246 | 0.01553 | 0.00018 | 0.00510 | 0.00013 |
| NCA24-19 | 0.04849 | 0.00257 | 0.12579 | 0.00653 | 0.01882 | 0.00026 | 0.00614 | 0.00025 |
| NCA24-20 | 0.04842 | 0.00201 | 0.10956 | 0.00445 | 0.01641 | 0.00022 | 0.00554 | 0.00021 |
| NCA24-21 | 0.04861 | 0.00066 | 0.11428 | 0.00151 | 0.01705 | 0.00018 | 0.00557 | 0.00011 |
| NCA24-22 | 0.04854 | 0.00097 | 0.10477 | 0.00158 | 0.01566 | 0.00018 | 0.00498 | 0.00011 |
| NCA24-23 | 0.07664 | 0.00097 | 1.90358 | 0.02252 | 0.18015 | 0.00177 | 0.05353 | 0.00117 |
| NCA24-24 | 0.04706 | 0.00090 | 0.09939 | 0.00184 | 0.01532 | 0.00017 | 0.00481 | 0.00013 |
| NCA24-25 | 0.04761 | 0.00244 | 0.09965 | 0.00498 | 0.01518 | 0.00026 | 0.00471 | 0.00022 |
| NCA24-26 | 0.04866 | 0.00229 | 0.11159 | 0.00513 | 0.01663 | 0.00023 | 0.00550 | 0.00020 |
| NCA24-27 | 0.04983 | 0.00233 | 0.12363 | 0.00538 | 0.01800 | 0.00025 | 0.00577 | 0.00023 |
| NCA24-28 | 0.05058 | 0.00093 | 0.21934 | 0.00387 | 0.03146 | 0.00033 | 0.01014 | 0.00022 |
| NCA24-29 | 0.04846 | 0.00211 | 0.12452 | 0.00531 | 0.01864 | 0.00029 | 0.00594 | 0.00024 |
| NCA24-30 | 0.04884 | 0.00150 | 0.11090 | 0.00328 | 0.01647 | 0.00020 | 0.00533 | 0.00018 |
| NCA24-31 | 0.05414 | 0.00095 | 0.19740 | 0.00320 | 0.02644 | 0.00026 | 0.00821 | 0.00026 |
| NCA24-32 | 0.04955 | 0.00209 | 0.11203 | 0.00458 | 0.01640 | 0.00023 | 0.00531 | 0.00022 |
| NCA24-33 | 0.04861 | 0.00110 | 0.10694 | 0.00236 | 0.01596 | 0.00018 | 0.00519 | 0.00014 |
| NCA24-34 | 0.05009 | 0.00179 | 0.20568 | 0.00712 | 0.02990 | 0.00045 | 0.01023 | 0.00045 |
| NCA24-35 | 0.04826 | 0.00183 | 0.11487 | 0.00425 | 0.01726 | 0.00025 | 0.00576 | 0.00021 |
| NCA24-36 | 0.05400 | 0.01137 | 0.11186 | 0.02309 | 0.01503 | 0.00067 | 0.00490 | 0.00069 |
| NCA24-37 | 0.04656 | 0.00259 | 0.08286 | 0.00435 | 0.01291 | 0.00019 | 0.00440 | 0.00016 |
| NCA24-38 | 0.04867 | 0.00183 | 0.12304 | 0.00449 | 0.01834 | 0.00024 | 0.00607 | 0.00021 |
| NCA24-39 | 0.04926 | 0.00086 | 0.10592 | 0.00178 | 0.01559 | 0.00017 | 0.00537 | 0.00013 |
| NCA24-40 | 0.04841 | 0.00471 | 0.09026 | 0.00661 | 0.01352 | 0.00028 | 0.00409 | 0.00027 |
| NCA24-41 | 0.04882 | 0.00278 | 0.13648 | 0.00787 | 0.02027 | 0.00030 | 0.00628 | 0.00033 |
| NCA24-42 | 0.05115 | 0.00131 | 0.09242 | 0.00228 | 0.01310 | 0.00015 | 0.00439 | 0.00010 |
| NCA24-43 | 0.04939 | 0.00186 | 0.10670 | 0.00390 | 0.01567 | 0.00020 | 0.00509 | 0.00019 |
| NCA24-44 | 0.05208 | 0.00154 | 0.12634 | 0.00354 | 0.01760 | 0.00024 | 0.00587 | 0.00021 |
| NCA24-45 | 0.04847 | 0.00145 | 0.11294 | 0.00329 | 0.01690 | 0.00020 | 0.00559 | 0.00017 |
| NCA24-46 | 0.04971 | 0.00175 | 0.19331 | 0.00665 | 0.02821 | 0.00042 | 0.00933 | 0.00045 |
| NCA24-47 | 0.05313 | 0.00161 | 0.23110 | 0.00686 | 0.03155 | 0.00044 | 0.01092 | 0.00046 |
| NCA24-48 | 0.04901 | 0.00135 | 0.10792 | 0.00286 | 0.01597 | 0.00018 | 0.00533 | 0.00017 |
| NCA24-49 | 0.04924 | 0.00136 | 0.13106 | 0.00368 | 0.01912 | 0.00019 | 0.00568 | 0.00016 |
| NCA24-50 | 0.04939 | 0.00098 | 0.10150 | 0.00188 | 0.01490 | 0.00015 | 0.00514 | 0.00014 |
| NCA24-51 | 0.04830 | 0.00101 | 0.10611 | 0.00218 | 0.01594 | 0.00019 | 0.00551 | 0.00017 |
| NCA24-52 | 0.04766 | 0.00099 | 0.11720 | 0.00235 | 0.01785 | 0.00019 | 0.00598 | 0.00016 |
| NCA24-53 | 0.04928 | 0.00106 | 0.09816 | 0.00206 | 0.01445 | 0.00016 | 0.00484 | 0.00013 |
| NCA24-54 | 0.04968 | 0.00117 | 0.13995 | 0.00313 | 0.02043 | 0.00021 | 0.00713 | 0.00022 |
| NCA24-55 | 0.04845 | 0.00210 | 0.09967 | 0.00418 | 0.01492 | 0.00020 | 0.00529 | 0.00023 |
| NCA24-56 | 0.04824 | 0.00206 | 0.10857 | 0.00459 | 0.01632 | 0.00021 | 0.00550 | 0.00020 |
| NCA24-57 | 0.04911 | 0.00120 | 0.12831 | 0.00309 | 0.01895 | 0.00022 | 0.00639 | 0.00021 |
| NCA24-58 | 0.05006 | 0.00251 | 0.10976 | 0.00534 | 0.01590 | 0.00023 | 0.00566 | 0.00028 |
| NCA24-59 | 0.04763 | 0.00103 | 0.10329 | 0.00214 | 0.01572 | 0.00016 | 0.00535 | 0.00015 |
| NCA24-60 | 0.04691 | 0.00160 | 0.10353 | 0.00345 | 0.01601 | 0.00022 | 0.00519 | 0.00025 |
| NCA24-61 | 0.05227 | 0.00084 | 0.22155 | 0.00364 | 0.03074 | 0.00033 | 0.01113 | 0.00037 |
| NCA24-62 | 0.05040 | 0.00157 | 0.80174 | 0.02059 | 0.09628 | 0.00139 | 0.03490 | 0.00159 |
| NCA24-63 | 0.05009 | 0.00114 | 0.12449 | 0.00271 | 0.01802 | 0.00020 | 0.00615 | 0.00017 |
| NCA24-64 | 0.05247 | 0.00260 | 0.09801 | 0.00469 | 0.01355 | 0.00020 | 0.00468 | 0.00020 |
| NCA24-65 | 0.05101 | 0.00135 | 0.11127 | 0.00286 | 0.01582 | 0.00018 | 0.00576 | 0.00015 |
| NCA24-66 | 0.04859 | 0.00116 | 0.13819 | 0.00323 | 0.02063 | 0.00023 | 0.00691 | 0.00017 |
| NCA24-67 | 0.04996 | 0.00105 | 0.10877 | 0.00225 | 0.01579 | 0.00019 | 0.00652 | 0.00020 |
| NCA24-68 | 0.05041 | 0.00104 | 0.20350 | 0.00416 | 0.02918 | 0.00030 | 0.01005 | 0.00032 |
| NCA24-69 | 0.05486 | 0.00105 | 0.21746 | 0.00406 | 0.02875 | 0.00033 | 0.00967 | 0.00034 |
| NCA24-70 | 0.04938 | 0.00111 | 0.13086 | 0.00279 | 0.01922 | 0.00021 | 0.00687 | 0.00026 |
| NCA24-71 | 0.04780 | 0.00087 | 0.11482 | 0.00203 | 0.01742 | 0.00019 | 0.00601 | 0.00018 |
| NCA24-72 | 0.05004 | 0.00103 | 0.74472 | 0.01749 | 0.08996 | 0.00104 | 0.03905 | 0.00118 |
| NCA24-73 | 0.04803 | 0.00094 | 0.12299 | 0.00235 | 0.01857 | 0.00021 | 0.00629 | 0.00014 |
| NCA24-74 | 0.05013 | 0.00219 | 0.09387 | 0.00398 | 0.01358 | 0.00018 | 0.00453 | 0.00016 |
| NCA24-75 | 0.04885 | 0.00121 | 0.10301 | 0.00249 | 0.01530 | 0.00019 | 0.00501 | 0.00013 |
| NCA24-76 | 0.05153 | 0.00299 | 0.23308 | 0.01312 | 0.03294 | 0.00061 | 0.01077 | 0.00055 |
| NCA24-77 | 0.04947 | 0.00324 | 0.12816 | 0.00818 | 0.01879 | 0.00032 | 0.00677 | 0.00037 |
| NCA24-78 | 0.04892 | 0.00061 | 0.10933 | 0.00128 | 0.01621 | 0.00016 | 0.00566 | 0.00011 |
| NCA24-79 | 0.04852 | 0.00124 | 0.13530 | 0.00336 | 0.02023 | 0.00024 | 0.00672 | 0.00019 |
| NCA24-80 | 0.05039 | 0.00342 | 0.12014 | 0.00793 | 0.01729 | 0.00036 | 0.00628 | 0.00039 |
| NCA24-81 | 0.05317 | 0.00075 | 0.40737 | 0.00562 | 0.05558 | 0.00059 | 0.01835 | 0.00046 |
| NCA24-82 | 0.04887 | 0.00111 | 0.10429 | 0.00230 | 0.01548 | 0.00018 | 0.00522 | 0.00016 |
| NCA24-83 | 0.05174 | 0.00091 | 0.10481 | 0.00172 | 0.01469 | 0.00015 | 0.00488 | 0.00017 |
| NCA24-84 | 0.05874 | 0.00086 | 0.72502 | 0.01047 | 0.08965 | 0.00099 | 0.02817 | 0.00079 |
| NCA24-85 | 0.04863 | 0.00094 | 0.09703 | 0.00182 | 0.01447 | 0.00016 | 0.00465 | 0.00012 |

CORRECTED AGES (COMMON PB)

| Analysis No. | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±2s |
|---|---|---|---|---|---|---|---|---|
| (1) NCAL24 (R234851, orewacke: highway outcrop above Koh village. Late Cretaceous: Lat.21°33'48"S, Lono.165°49'57"E | | | | | | | | |
| NCA24-1 | 131 | 125 | 102 | 5 | 100 | 1 | 102 | 3 |
| NCA24-2 | 129 | 94 | 120 | 5 | 120 | 2 | 129 | 4 |
| NCA24-3 | 140 | 213 | 124 | 11 | 124 | 3 | 123 | 7 |
| NCA24-4 | 171 | 89 | 125 | 4 | 123 | 2 | 124 | 4 |
| NCA24-5 | 48 | 47 | 99 | 2 | 101 | 1 | 106 | 2 |
| NCA24-6 | 123 | 45 | 122 | 2 | 122 | 1 | 122 | 3 |
| NCA24-7 | 214 | 101 | 104 | 4 | 99 | 2 | 94 | 4 |
| NCA24-8 | 99 | 83 | 104 | 4 | 104 | 1 | 107 | 4 |
| NCA24-9 | 441 | 108 | 135 | 6 | 119 | 2 | 125 | 8 |
| NCA24-10 | 267 | 80 | 108 | 3 | 101 | 1 | 104 | 4 |
| NCA24-11 | 114 | 98 | 95 | 4 | 94 | 1 | 97 | 4 |
| NCA24-12 | 151 | 146 | 83 | 5 | 80 | 2 | 85 | 5 |
| NCA24-13 | 96 | 55 | 104 | 2 | 104 | 1 | 107 | 3 |
| NCA24-14 | 98 | 50 | 102 | 2 | 102 | 1 | 105 | 2 |
| NCA24-15 | 144 | 201 | 92 | 8 | 90 | 1 | 89 | 2 |
| NCA24-16 | 193 | 43 | 203 | 3 | 204 | 2 | 212 | 4 |
| NCA24-17 | 114 | 48 | 116 | 2 | 116 | 1 | 117 | 2 |
| NCA24-18 | 147 | 58 | 101 | 2 | 99 | 1 | 103 | 3 |
| NCA24-19 | 123 | 120 | 120 | 6 | 120 | 2 | 124 | 5 |
| NCA24-20 | 120 | 95 | 106 | 4 | 105 | 1 | 112 | 4 |
| NCA24-21 | 129 | 33 | 110 | 1 | 109 | 1 | 112 | 2 |
| NCA24-22 | 128 | 38 | 101 | 1 | 100 | 1 | 100 | 2 |
| NCA24-23 | 1112 | 26 | 1082 | 8 | 1068 | 10 | 1054 | 22 |
| NCA24-24 | 52 | 44 | 96 | 2 | 98 | 1 | 97 | 3 |
| NCA24-25 | 80 | 114 | 96 | 5 | 97 | 2 | 95 | 4 |
| NCA24-26 | 131 | 107 | 107 | 5 | 106 | 1 | 111 | 4 |
| NCA24-27 | 187 | 105 | 118 | 5 | 115 | 2 | 116 | 5 |
| NCA24-28 | 222 | 44 | 201 | 3 | 200 | 2 | 204 | 4 |
| NCA24-29 | 122 | 99 | 119 | 5 | 119 | 2 | 120 | 5 |
| NCA24-30 | 140 | 73 | 107 | 3 | 105 | 1 | 107 | 4 |
| NCA24-31 | 327 | 40 | 183 | 3 | 168 | 2 | 165 | 5 |
| NCA24-32 | 174 | 99 | 108 | 4 | 105 | 1 | 107 | 4 |
| NCA24-33 | 129 | 54 | 103 | 2 | 102 | 1 | 103 | 3 |
| NCA24-34 | 199 | 85 | 188 | 6 | 187 | 3 | 206 | 9 |
| NCA24-35 | 112 | 87 | 110 | 4 | 110 | 2 | 116 | 4 |
| NCA24-36 | 371 | 410 | 108 | 21 | 96 | 4 | 99 | 14 |
| NCA24-37 | 27 | 111 | 81 | 4 | 83 | 1 | 89 | 3 |
| NCA24-38 | 132 | 87 | 118 | 4 | 117 | 2 | 122 | 4 |
| NCA24-39 | 160 | 42 | 102 | 2 | 100 | 1 | 104 | 3 |
| NCA24-40 | 119 | 217 | 88 | 8 | 87 | 2 | 82 | 5 |
| NCA24-41 | 139 | 38 | 130 | 2 | 129 | 1 | 127 | 3 |
| NCA24-42 | 248 | 60 | 90 | 2 | 83.9 | 1 | 89 | 2 |
| NCA24-43 | 166 | 89 | 103 | 4 | 100 | 1 | 103 | 4 |
| NCA24-44 | 1 | 150 | 107 | 7 | 112 | 2 | 112 | 3 |
| NCA24-45 | 122 | 71 | 109 | 3 | 108 | 1 | 113 | 3 |
| NCA24-46 | 161 | 84 | 179 | 6 | 179 | 3 | 188 | 9 |
| NCA24-47 | 334 | 70 | 211 | 6 | 200 | 3 | 220 | 9 |
| NCA24-48 | 148 | 66 | 104 | 3 | 102 | 1 | 107 | 3 |
| NCA24-49 | 159 | 66 | 106 | 3 | 104 | 1 | 114 | 3 |
| NCA24-50 | 166 | 47 | 98 | 2 | 95.3 | 1 | 104 | 3 |
| NCA24-51 | 114 | 50 | 102 | 2 | 102 | 1 | 111 | 3 |
| NCA24-52 | 82 | 50 | 113 | 2 | 114 | 1 | 121 | 3 |
| NCA24-53 | 161 | 51 | 95 | 2 | 92 | 1 | 98 | 3 |
| NCA24-54 | 180 | 56 | 133 | 3 | 130 | 1 | 144 | 4 |
| NCA24-55 | 121 | 99 | 96 | 4 | 95 | 1 | 107 | 5 |
| NCA24-56 | 111 | 98 | 105 | 4 | 104 | 1 | 111 | 4 |
| NCA24-57 | 153 | 59 | 123 | 3 | 121 | 1 | 129 | 4 |
| NCA24-58 | 198 | 116 | 106 | 5 | 102 | 1 | 114 | 6 |
| NCA24-59 | 82 | 52 | 100 | 2 | 101 | 1 | 108 | 3 |
| NCA24-60 | 45 | 74 | 100 | 3 | 102 | 1 | 105 | 5 |
| NCA24-61 | 297 | 38 | 203 | 3 | 195 | 2 | 224 | 7 |
| NCA24-62 | 618 | 57 | 598 | 12 | 593 | 8 | 693 | 31 |
| NCA24-63 | 199 | 54 | 119 | 2 | 115 | 1 | 124 | 3 |
| NCA24-64 | 306 | 116 | 95 | 4 | 87 | 1 | 94 | 4 |
| NCA24-65 | 241 | 62 | 167 | 3 | 161 | 1 | 176 | 3 |
| NCA24-66 | 126 | 57 | 151 | 3 | 132 | 1 | 139 | 3 |
| NCA24-67 | 193 | 50 | 105 | 2 | 101 | 1 | 131 | 4 |
| NCA24-68 | 214 | 49 | 188 | 4 | 186 | 2 | 202 | 6 |
| NCA24-69 | 28 | 157 | 170 | 11 | 181 | 2 | 182 | 4 |
| NCA24-70 | 166 | 54 | 125 | 3 | 123 | 1 | 138 | 5 |
| NCA24-71 | 89 | 44 | 110 | 2 | 111 | 1 | 121 | 4 |
| NCA24-72 | 605 | 38 | 565 | 7 | 555 | 6 | 559 | 23 |
| NCA24-73 | 101 | 47 | 118 | 2 | 119 | 1 | 127 | 3 |
| NCA24-74 | 201 | 103 | 91 | 4 | 87 | 1 | 91 | 3 |
| NCA24-75 | 141 | 60 | 100 | 2 | 98 | 1 | 101 | 3 |
| NCA24-76 | 265 | 135 | 213 | 11 | 209 | 4 | 217 | 11 |
| NCA24-77 | 170 | 149 | 122 | 7 | 120 | 2 | 136 | 7 |
| NCA24-78 | 144 | 30 | 105 | 1 | 104 | 1 | 114 | 2 |
| NCA24-79 | 125 | 61 | 129 | 3 | 129 | 2 | 135 | 4 |
| NCA24-80 | 213 | 155 | 115 | 7 | 111 | 2 | 127 | 8 |
| NCA24-81 | 336 | 33 | 347 | 4 | 349 | 4 | 368 | 9 |
| NCA24-82 | 142 | 55 | 101 | 2 | 99 | 1 | 105 | 3 |
| NCA24-83 | | 136 | 90 | 5 | 93 | 1 | 95 | 3 |
| NCA24-84 | 557 | 33 | 554 | 6 | 553 | 6 | 562 | 16 |
| NCA24-85 | 130 | 47 | 94 | 2 | 93 | 1 | 94 | 2 N=85 |

ACCEPTED SET (in ascending age order)

| Analysis No. | Age* | ±1s | Groups | Age±2s |
|---|---|---|---|---|
| (1) NCAL24 (R234851, orewacke: highway outcrop above Koh village. Late Cretaceous: Lat.21°33'48"S, Lono.165°49'57"E | | | | |
| NCA24-12 | 80 | 2 | | |
| NCA24-37 | 83 | 1 ab | | |
| NCA24-42 | 84 | 1 aa | | |
| NCA24-40 | 87 | 2 aa | | 85±2 |
| NCA24-64 | 87 | 1 aa | | n=5 |
| NCA24-74 | 87 | 1 aa | | %6 |
| NCA24-15 | 90 | 1 | | |
| NCA24-53 | 92 | 1 a | | |
| NCA24-83 | 93 | 1 a | | |
| NCA24-85 | 93 | 1 a | | |
| NCA24-11 | 94 | 1 a | | |
| NCA24-55 | 95 | 1 a | | 95±1 |
| NCA24-50 | 95 | 1 a | | n=9 |
| NCA24-36 | 96 | 4 a | | %9 |
| NCA24-25 | 97 | 2 a | | |
| NCA24-24 | 98 | 1 a | | |
| NCA24-75 | 98 | 1 b | | |
| NCA24-7 | 99 | 2 b | | |
| NCA24-18 | 99 | 1 b | | |
| NCA24-82 | 99 | 1 b | | |
| NCA24-1 | 100 | 1 b | | |
| NCA24-22 | 100 | 1 b | | |
| NCA24-39 | 100 | 1 b | | |
| NCA24-43 | 100 | 1 b | | |
| NCA24-5 | 101 | 1 b | | |
| NCA24-10 | 101 | 1 b | | |
| NCA24-59 | 101 | 1 b | | |
| NCA24-65 | 101 | 1 b | | |
| NCA24-67 | 101 | 1 b | | |
| NCA24-14 | 102 | 1 b | | |
| NCA24-53 | 102 | 1 b | | 102±4 |
| NCA24-48 | 102 | 1 b | | n=28 |
| NCA24-51 | 102 | 1 b | | %33 |
| NCA24-58 | 102 | 1 b | | |
| NCA24-60 | 102 | 1 b | | |
| NCA24-8 | 104 | 1 b | | |
| NCA24-13 | 104 | 1 b | | |
| NCA24-45 | 104 | 1 b | | |
| NCA24-56 | 104 | 1 b | | |
| NCA24-78 | 104 | 1 b | | |
| NCA24-20 | 105 | 1 b | | |
| NCA24-30 | 105 | 1 b | | |
| NCA24-32 | 105 | 1 b | | |
| NCA24-26 | 106 | 1 b | | |
| NCA24-45 | 108 | 1 c | | |
| NCA24-21 | 109 | 1 c | | |
| NCA24-35 | 110 | 2 c | | 110±2 |
| NCA24-71 | 111 | 1 c | | n=6 |
| NCA24-60 | 111 | 2 c | | %7 |
| NCA24-44 | 112 | 2 c | | |
| NCA24-52 | 114 | 1 | | |
| NCA24-27 | 115 | 2 d | | |
| NCA24-63 | 115 | 1 d | | |
| NCA24-12 | 116 | 1 d | | |
| NCA24-38 | 117 | 2 d | | |
| NCA24-9 | 119 | 2 d | | |
| NCA24-29 | 119 | 2 d | | |
| NCA24-73 | 119 | 1 d | | 119±2 |
| NCA24-2 | 120 | 2 d | | n=15 |
| NCA24-19 | 120 | 2 d | | %18 |
| NCA24-77 | 120 | 2 d | | |
| NCA24-57 | 121 | 1 d | | |
| NCA24-6 | 122 | 1 d | | |
| NCA24-4 | 123 | 2 d | | |
| NCA24-70 | 123 | 1 d | | |
| NCA24-3 | 124 | 3 d | | |
| NCA24-41 | 129 | 1 e | | |
| NCA24-79 | 129 | 2 e | | 130±2 |
| NCA24-54 | 130 | 1 e | | n=4 |
| NCA24-66 | 132 | 1 e | | %5 |
| NCA24-31 | 168 | 2 | | |
| NCA24-46 | 179 | 3 f | | |
| NCA24-69 | 181 | 2 f | | 183±4 |
| NCA24-68 | 186 | 2 f | | n=4 |
| NCA24-34 | 187 | 3 f | | %5 |
| NCA24-61 | 195 | 2 | | |
| NCA24-28 | 200 | 2 a | | |
| NCA24-47 | 200 | 3 a | | 202±3 |
| NCA24-16 | 204 | 2 a | | n=4 |
| NCA24-76 | 209 | 4 a | | %5 |
| NCA24-81 | 349 | 4 | | |
| NCA24-84 | 553 | 6 | | |
| NCA24-72 | 555 | 6 | | |
| NCA24-62 | 593 | 8 | | n=84 |
| NCA24-23 | 1112 | 26 | | N=85 |

***CENTRAL TERRANE***

MEASURED ISOTOPIC RATIOS

| Analysis No. | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| (2) NCAL10 (R234701, orewacke. Pouembout River, streambank outcrop, mapped as Late Jurassic; Lat.21°06'41"S, Lono.165 | | | | | | | | |
| NCAL10-1 | 0.04958 | 0.00106 | 0.11043 | 0.00219 | 0.01616 | 0.00015 | 0.00520 | 0.00012 |
| NCAL10-4 | 0.05107 | 0.00119 | 0.13673 | 0.00307 | 0.01942 | 0.00022 | 0.00644 | 0.00017 |
| NCAL10-5 | 0.05511 | 0.00280 | 0.12373 | 0.00609 | 0.01629 | 0.00025 | 0.00539 | 0.00025 |
| NCAL10-6 | 0.05079 | 0.00189 | 0.13143 | 0.00473 | 0.01877 | 0.00025 | 0.00616 | 0.00020 |
| NCAL10-7 | 0.04832 | 0.00139 | 0.12444 | 0.00346 | 0.01868 | 0.00023 | 0.00615 | 0.00019 |
| NCAL10-8 | 0.05176 | 0.00209 | 0.13123 | 0.00515 | 0.01839 | 0.00029 | 0.00602 | 0.00031 |
| NCAL10-9 | 0.05020 | 0.00106 | 0.11590 | 0.00231 | 0.01675 | 0.00017 | 0.00552 | 0.00014 |
| NCAL10-10 | 0.08564 | 0.00199 | 2.26504 | 0.02498 | 0.19182 | 0.00161 | 0.05839 | 0.00146 |
| NCAL10-11 | 0.05329 | 0.00150 | 0.12328 | 0.00332 | 0.01678 | 0.00019 | 0.00569 | 0.00019 |
| NCAL10-12 | 0.06636 | 0.00087 | 1.23262 | 0.01473 | 0.13473 | 0.00123 | 0.04200 | 0.00105 |
| NCAL10-13 | 0.05418 | 0.00275 | 0.12865 | 0.00639 | 0.01722 | 0.00025 | 0.00630 | 0.00026 |
| NCA10-14 | 0.15036 | 0.00179 | 8.99438 | 0.09928 | 0.43386 | 0.00414 | 0.12629 | 0.00255 |
| NCA10-15 | 0.04750 | 0.00139 | 0.11954 | 0.00366 | 0.01978 | 0.00023 | 0.00632 | 0.00019 |
| NCA10-16 | 0.04752 | 0.00094 | 0.10761 | 0.00204 | 0.01642 | 0.00017 | 0.00530 | 0.00012 |
| NCA10-17 | 0.05015 | 0.00209 | 0.12328 | 0.00499 | 0.01783 | 0.00022 | 0.00596 | 0.00024 |
| NCA10-18 | 0.07658 | 0.00307 | 0.18109 | 0.00694 | 0.01715 | 0.00028 | 0.00819 | 0.00027 |

CORRECTED AGES (COMMON PB)

| Analysis No. | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| (2) NCAL10 (R234701, orewacke. Pouembout River, streambank outcrop, mapped as Late Jurassic: Lat.21°06'41"S, Lono.165°01'25 | | | | | | | | |
| NCAL10-1 | 175 | 51 | 106 | 2 | 103.3 | 1 | 105 | 2 |
| NCAL10-4 | 244 | 55 | 130 | 3 | 124 | 1 | 130 | 3 |
| NCAL10-5 | 417 | 117 | 118 | 6 | 104 | 2 | 108 | 5 |
| NCAL10-6 | 231 | 88 | 125 | 4 | 120 | 2 | 124 | 4 |
| NCAL10-7 | 115 | 68 | 119 | 3 | 119 | 1 | 126 | 4 |
| NCAL10-8 | 275 | 95 | 125 | 5 | 117 | 2 | 121 | 6 |
| NCAL10-9 | 204 | 50 | 111 | 2 | 107 | 1 | 111 | 3 |
| NCAL10-10 | 1330 | 25 | 1201 | 8 | 1131 | 9 | 1147 | 28 |
| NCAL10-11 | | 124 | 102 | 5 | 106 | 1 | 107 | 3 |
| NCAL10-12 | 818 | 28 | 816 | 7 | 815 | 7 | 832 | 20 |
| NCAL10-13 | 379 | 117 | 123 | 6 | 110 | 2 | 127 | 5 |
| NCA10-14 | 2350 | 21 | 2337 | 10 | 2323 | 19 | 2404 | 46 |
| NCA10-15 | 74 | 66 | 124 | 3 | 126 | 1 | 127 | 4 |
| NCA10-16 | 75 | 47 | 104 | 2 | 105 | 1 | 107 | 2 |
| NCA10-17 | 202 | 98 | 118 | 5 | 114 | 1 | 120 | 5 |
| NCA10-18 | 1110 | 82 | 169 | 8 | 110 | 2 | 165 | 7 ** |

ACCEPTED SET (in ascending age order)

| Analysis No. | Age* | ±1s | Groups | Age±2s |
|---|---|---|---|---|
| (2) NCAL10 (R234701, orewacke. Pouembout River, streambank outcrop, mapped as Late Jurassic: Lat.21°06'41"S, Lono.165°01'25"E | | | | |
| NCAL10-3 | 103 | 1 a | | |
| NCAL10-5 | 104 | 2 a | | |
| NCA10-16 | 105 | 1 a | | |
| NCAL10-11 | 106 | 1 a | | |
| NCAL10-9 | 107 | 1 a | | |
| NCA10-29 | 107 | 1 a | | 108±2 |
| NCA10-19 | 108 | 1 a | | n=16 |
| NCA10-20 | 108 | 1 a | | %57 |
| NCA10-23 | 108 | 1 a | | |
| NCA10-21 | 109 | 2 a | | |
| NCA10-22 | 109 | 2 a | | |
| NCA10-25 | 109 | 3 a | | |
| NCA10-27 | 109 | 1 a | | |
| NCAL10-13 | 110 | 2 a | | |
| NCA10-26 | 112 | 2 a | | |
| NCA10-30 | 113 | 1 a | | |

| | K | 23 | 82 |
|---|---|---|---|
| J | 1 | 4 | |
| T | 0 | 0 | |
| P | 1 | 4 | |
| C | 0 | 0 | |
| DS | 0 | 0 | |
| CD | 0 | 0 | |
| PC | 3 | 11 | |

| | K | 70 | 82 |
|---|---|---|---|
| J | 6 | 7 | |
| T | 4 | 5 | |
| P | 0 | 0 | |
| C | 1 | 1 | |
| DS | 0 | 0 | |
| CD | 0 | 0 | |
| PC | 4 | 5 | |
| n= | 85 | NCAL24 | |

TABLE 6A: DETRITAL ZIRCON AGE DATA FOR NEW CALEDONIA: PERCENTAGE PROPORTIONS IN GEOLOGICAL PERIODS

| DATA SOURCE | SAMPLE NAME/NO. | Location | Strat. range (Ma) young | old | Zircon percentages in selected age ranges: Cret | Juras | Trias | Per | Carb | Dev-Sil | Ord-Cam | Precam | SAMPLE NAME/NO. | comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *FORMATION À CHARBON* | | | | | | | | | | | | | |
| 10 *(1)* | **NCAL24** | | 65 | 145 | 82 | 7 | 5 | | 1 | | | 5 | **NCAL24** | |
| | *CENTRAL TERRANE* | | | | | | | | | | | | | |
| C | PIAMB1 | | | | | 4 | 14 | | 4 | 7 | 11 | | PIAMB1 | |
| C | PIAMB2 | | | | | 3 | | | | | | | PIAMB2 | |
| C | PIAMB3 | | | | 100 | | | | | | | | PIAMB3 | |
| 10 *(2)* | **NCAL10** | | 145* | 157* | 82 | 4 | | 4 | | | | 11 | **NCAL10** | |
| 10 (3) | **NCAL11** | | 145 | 157 | 3 | | 3 | | 3 | 2 | | | **NCAL11** | |
| 10(9) | **GHP2** | | 145 | 155 | | 15 | 3 | | 5 | 13 | 15 | | **GHP2** | |
| | *BOGHEN TERRANE* | | | | | | | | | | | | | |
| 10 (4) | **NCAL32** | | | | 3 | 6 | 1 | | | 4 | | | **NCAL32** | |
| C | NCB134 | | | | | | 10 | 10 | 3 | | | | NCB134 | |
| C | NCB154 | | | | | 4 | 13 | | 4 | 4 | 4 | | NCB154 | |
| C | NCB169 | | | | | | 3 | 3 | | | | | NCB169 | |
| C | TWKB1 | | | | | 2 | | | | | | | TWKB1 | |
| C | TWKD1 | | | | | 9 | 5 | | | | 14 | | TWKD1 | |
| | *TEREMBA TERRANE* | | | | | | | | | | | | | |
| 10 (5) | **NCAL15** | | 237* | 245* | | | | 2 | 15 | 4 | 13 | | **NCAL15** | |
| 10 *(6)* | **TRB20** | | 241* | 245* | | 9 | | 4 | | 4 | 17 | | **TRB20** | |
| 10 *(7)* | **TRB21** | | 203 | 241 | | 2 | 96 | | | | | 2 | **TRB21** | |
| 10 *(8)* | **TRB23** | | 200 | 227 | | | 17 | 4 | 4 | 4 | 13 | | **TRB23** | |
| | | | | | Cret | Juras | Trias | Per | Carb | Dev-Sil | Ord-Cam | Precam | | |

TABLE 6B: DETRITAL ZIRCON AGE DATA FOR EASTERN QUEENSLAND TERRANES: PERCENTAGE PROPORTIONS IN GEOLOGICAL PERIODS

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *SHOALWATER - BEENLEIGH COMPOSITE TERRANE* | | | | | | | | | | | | | |
| | *Shoalwater Terrane* | | | | | | | | | | | | | |
| A | SHW48 | Arthur Point | | | | | | | 1 | 10 | 13 | | SHW48 | |
| A | SHW13 | Hummock Str | | | | | | | 10 | 12 | 11 | | SHW13 | |
| K | 988 | Byfield | | | | | | 3 | | 5 | 1 | 19 | 988 | |
| A | O21/5 | Byfield | | | | | | 3 | | 19 | 5 | | O21/5 | |
| | *Beenleigh Terrane* | | | | | | | | | | | | | |
| K | 983 | Miami Beach | | | | | | | 4 | | | | 983 | |
| A | BYR10 | Broken Hd | | | | | | | 6 | 12 | | | BYR10 | |
| K | 982 | Broken Hd | | | | | | | 12 | | | | 982 | |
| | *Gympie Terrane* | | | | | | | | | | | | | |
| A | GYM36 | Keafton | 200 | 241 | | | 15 | | | | 3 | 6 | GYM36 | |
| A | GYM106 | Eldorado Mine | 251 | 260 | | | 95 | | 5 | | | | GYM106 | |
| | *Neranwood Fernvale Belt* | | | | | | | | | | | | | |
| K | 984 | Neranwood | | | | | | | | 6 | | | 984 | |
| | *SOUTH D'AGUILAR BLOCK* | | | | | | | | | | | | | |
| K | 985 | Mt. Nebo | | | | | | | | 3 | 2 | | 985 | |
| | *WANDILLA TERRANE* | | | | | | | | | | | | | |
| A | WAN30 | Alligator Ck | | | | | | | 81 | 11 | 3 | 5 | WAN30 | |
| K | 986 | Gladstone | | | | | | | 97 | 3 | | | 986 | |
| A | WAN1 | Gladstone | | | | | | 1 | 96 | 3 | | | WAN1 | |
| | | | | | Cret | Juras | Trias | Per | Carb | Dev-Sil | Ord-Cam | Precam | | |

DATA SOURCES
- 10 this work, data highlighted in bild type
- A Adams, unpublished data
- C Cluzel, unpublished data
- K Korsch, unpublished data

Italic numbers in brackets refer to locality numbers of this study (Table 1)

percentage abundance categories

| | | |
|---|---|---|
| accessory | 1-4% | 1-4% |
| minor | 5-19% | 5-19% |
| major | 20-49% | 20-49% |
| large | 50-79% | 50-79% |
| dominant | 80-100% | 80-100% |

TABLE 5A: DETRITAL ZIRCON AGE DATA FOR NEW CALEDONIA: PERCENTAGE PROPORTIONS IN GEOLOGICAL PERIODS

| DATA SOURCE | SAMPLE NAME/NO. | Location | Strat. range (Ma) young | old | Zircon percentages in selected age ranges: Cret | Juras | Trias | Per | Carb | Dev-Sil | Ord-Cam | Precam | SAMPLE NAME/NO. | comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *FORMATION À CHARBON* | | | | | | | | | | | | | |
| 10 *(1)* | **NCAL24** | | 65 | 145 | 82 | 7 | 5 | | 1 | | | 5 | **NCAL24** | |
| | *CENTRAL TERRANE* | | | | | | | | | | | | | |
| C | PIAMB1 | | | | | 14 | 14 | | 4 | 7 | 11 | | PIAMB1 | |
| C | PIAMB2 | | | | | 3 | | | | | | | PIAMB2 | |
| C | PIAMB3 | | | | 100 | | | | | | | | PIAMB3 | |
| 10 *(2)* | **NCAL10** | | 145* | 157* | 82 | 4 | | 4 | | | | 11 | **NCAL10** | |
| 10 *(3)* | **NCAL11** | | 145 | 157 | 3 | | 3 | | 3 | 2 | | | **NCAL11** | |
| 10(9) | **GHP2** | | 145 | 155 | | 15 | 3 | | 5 | 13 | 15 | | **GHP2** | |
| | *BOGHEN TERRANE* | | | | | | | | | | | | | |
| 10 *(4)* | **NCAL32** | | | | 3 | 6 | 1 | | | 4 | | | **NCAL32** | |
| C | NCB134 | | | | | 10 | | 10 | 3 | | | | NCB134 | |
| C | NCB154 | | | | 4 | 13 | | | 4 | 4 | 4 | | NCB154 | |
| C | NCB169 | | | | | 3 | | 3 | | | | | NCB169 | |
| C | TWKB1 | | | | | 7 | | | | | | | TWKB1 | |
| C | TWKD1 | | | | | 19 | 5 | | | | 4 | | TWKD1 | |
| | *TEREMBA TERRANE* | | | | | | | | | | | | | |
| 10 *(5)* | **NCAL15** | | 227* | 245* | | | 2 | | 15 | 4 | 13 | | **NCAL15** | *mapped as Ladinian, but probably Norian i.e. <227±4 Ma |
| 10 *(6)* | **TRB20** | | 241* | 245* | | 9 | 4 | | | 4 | 17 | | **TRB20** | *mapped as Anisian, but probably Norian i.e. <227±4 Ma |
| 10 *(7)* | **TRB21** | | 203 | 241 | | 2 | 96 | | | | | 2 | **TRB21** | |
| 10 *(8)* | **TRB23** | | 200 | 227 | | | 17 | 4 | 4 | 4 | 13 | | **TRB23** | |

TABLE 5B: DETRITAL ZIRCON AGE DATA FOR NEW ZEALAND EASTERN PROVINCE TERRANES AND NORTHLAND ALLOCHTHONS: PERCENTAGE PROPORTIONS IN GEOLOGICAL PERIODS

| | | | | |
|---|---|---|---|---|
| | *NORTHLAND-MOUNT CAMEL ALLOCHTHONS* | | | |
| A | TKL3 | | | TKL3 |
| A | HOU8 | | | HOU8 |
| A | KAE012 | | | KAE012 |
| | *WAIOEKA TERRANE* | | | |
| 3 | t420 | 95 | 108 | t420 |
| | *PAHAU TERRANE* | | | |
| 7 | Ethelton | 140 | 150 | Ethelton |
| 5 | HUN4 | | | HUN4 |
| 5 | CPD5 | | | CPD5 |
| 9 | RUX2 | 145 | 160 | RUX2 |
| | *RAKAIA TERRANE* | | | |
| 5 | RBW1 | 205 | 220 | RBW1 |
| 2 | OTO1 | 220 | 230 | OTO1 |
| 2 | HERM2 | 220 | 230 | HERM2 |
| 5 | NGO2 | 220 | 230 | NGO2 |
| 5 | NGO2 | 220 | 230 | NGO2 |
| 5 | PUD1 | 220 | 230 | PUD1 |
| 8 | Balmacaan | 235 | 242 | Balmacaan |
| 9 | SEL4 | 251 | 260 | SEL4 |
| 5 | PAR2 | 251 | 260 | PAR2 |
| 1 | Aviemore | | | Aviemore |
| 8 | KUROW | 251 | 260 | KUROW |
| 9 | BMOX35 | | | BMOX35 |
| | *Kakahu Terrane* | | | |
| 5 | KAK35 | 251 | | KAK35 |
| | *Akatarawa Terrane* | | | |
| 5 | TAKA10 | 251 | | TAKA10 |
| 3 | te94 | 251 | | te94 |
| | *WAIPAPA TERRANE* | | | |
| 3 | t44 | 133 | 148 | t44 |
| 3 | w4 | 135 | 152 | w4 |
| 3 | w1 | 148 | 160 | w1 |
| 9 | TWHX1 | 148 | 160 | TWHX1 |
| 3 | w5 | 144 | 160 | w5 |
| 9 | TPWX1 | 150 | 160 | TPWX1 |
| 9 | TWX1 | 150 | 155 | TWX1 |
| 5 | SPE1 | | | SPE1 |
| 5 | BLU8A | | | BLU8A |
| 5 | BOIX31 | | | BOIX31 |
| 5 | ADMX2 | | | ADMX2 |
| 9 | PKTNX1 | | | PKTNX1 |
| 9 | STEPH1 | 220 | 230 | STEPH1 |
| | *CAPLES TERRANE* | | | |
| 9 | QUOX1 | 220 | 230 | QUOX1 |
| 9 | VON2 | | | VON2 |
| A | WRLB1 | | | WRLB1 |
| | *DUN MOUNTAIN-MAITAI TE* | | | |
| 9 | STPH12 | 225 | 235 | STPH12 |
| 9 | CST10 | 235 | 251 | CST10 |
| 6 | RODG17 | 251 | 260 | RODG17 |
| 6 | WDX1 | 251 | 260 | WDX1 |
| | *MURIHIKU TERRANE* | | | |
| 9 | HURW4 | 145 | 160 | HURW4 |
| 9 | ROAR2 | 210 | 230 | ROAR2 |
| 9 | PIOX5 | 210 | 230 | PIOX5 |
| 9 | MATI4 | 251 | 260 | MATI4 |
| | *BROOK STREET TERRANE* | | | |
| 6 | BAR2A | 160 | 180 | BARJA |
| 9 | MAIVX1 | 251 | 260 | MAIVX1 |

Cret Juras Trias Per Carb Dev-Sil Ord-Cam Precam

DATA SOURCES

1 Ireland (1992)
2 Adams et al. (1998)
3 Cawood et al. (1999)
4 Cawood et al. (2002)
5 Pickard et al. (2000)
6 Adams et al. (2002)
7 Wandres et al. (2004a)
8 Wandres et al. (2004b)
9 Adams et al., 2007
10 this work, data highlighted in bold type
A Adams, unpublished data
C Cluzel, unpublished data

Italic numbers in brackets refer to locality numbers of this study (Table 1)

percentage abundance categories

| | |
|---|---|
| accessory | 1-4% |
| minor | 5-19% |
| major | 20-49% |
| large | 50-79% |
| dominant | 80-100% |

190508

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TR823-16 | 0.06715 | 0.00100 | 0.83775 | 0.01178 | 0.09049 | 0.00093 | 0.02497 | 0.00072 | TR823-16 | 842 | 32 | 618 | 7 | 558 | 5 | 499 | 14 | TR823-6 | 657 | 7 | | |
| TR823-17 | 0.06722 | 0.00112 | 1.28884 | 0.02041 | 0.13907 | 0.00147 | 0.04399 | 0.00098 | TR823-17 | 845 | 35 | 841 | 9 | 839 | 8 | 870 | 19 | TR823-1 | 673 | 8 | | |
| TR823-18 | 0.05257 | 0.00111 | 0.22947 | 0.00463 | 0.03167 | 0.00036 | 0.00925 | 0.00027 | TR823-18 | 310 | 49 | 210 | 4 | 201 | 2 | 186 | 5 | TR823-17 | 839 | 8 | | |
| TR823-19 | 0.06060 | 0.00099 | 0.80865 | 0.01333 | 0.09679 | 0.00116 | 0.03259 | 0.00113 | TR823-19 | 625 | 36 | 602 | 7 | 596 | 7 | 648 | 22 | TR823-9 | 974 | 10 | | |
| TR823-20 | 0.07674 | 0.00115 | 1.89715 | 0.02912 | 0.17933 | 0.00214 | 0.04908 | 0.00151 | TR823-20 | 1114 | 31 | 1080 | 10 | 1063 | 12 | 968 | 29 | **TR823-20** | **1114** | **31** | | |
| TR823-21 | 0.09369 | 0.00170 | 2.74553 | 0.04695 | 0.21256 | 0.00231 | 0.04988 | 0.00215 | TR823-21 | 1502 | 35 | 1341 | 13 | 1242 | 12 | 984 | 41 | **TR823-21** | **1502** | **35** | | |
| TR823-22 | 0.05142 | 0.00123 | 0.24712 | 0.00589 | 0.03486 | 0.00049 | 0.00940 | 0.00045 | TR823-22 | 260 | 56 | 224 | 5 | 221 | 3 | 189 | 9 | **TR823-8** | **1727** | **31** | | |
| TR823-23 | 0.06007 | 0.00113 | 0.78121 | 0.01432 | 0.09433 | 0.00108 | 0.02931 | 0.00081 | TR823-23 | 606 | 42 | 586 | 8 | 581 | 6 | 588 | 16 | **TR823-13** | **3883** | **32** N=24 | | |
| TR823-24 | 0.05291 | 0.00135 | 0.28208 | 0.00697 | 0.03867 | 0.00048 | 0.01332 | 0.00044 | TR823-24 | 325 | 59 | 252 | 6 | 245 | 3 | 267 | 9 N=24 | | | | | |

**MEASURED ISOTOPIC RATIOS**

| *Analysis No.* | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s |
|---|---|---|---|---|---|---|---|---|
| *(9) GHP2 (R24477), sandstone; Golpin River valley; Late Jurassic; Lat.21°1'23"S Long.161°16'11"E* | | | | | | | | |
| GHP-1 | 0.05884 | 0.00078 | 0.87620 | 0.00878 | 0.08341 | 0.00090 | 0.02574 | 0.00042 |
| GHP-2 | 0.06397 | 0.00093 | 0.93404 | 0.01390 | 0.10637 | 0.00124 | 0.03466 | 0.00105 |
| GHP-3 | 0.05107 | 0.00063 | 0.17250 | 0.00215 | 0.02453 | 0.00026 | 0.00872 | 0.00017 |
| GHP-4 | 0.06187 | 0.00070 | 0.87463 | 0.00990 | 0.10295 | 0.00105 | 0.03323 | 0.00051 |
| GHP-5 | 0.05124 | 0.00134 | 0.17027 | 0.00429 | 0.02411 | 0.00028 | 0.00784 | 0.00015 |
| GHP-6 | 0.06108 | 0.00077 | 0.84130 | 0.01086 | 0.10003 | 0.00111 | 0.03068 | 0.00054 |
| GHP-7 | 0.05744 | 0.00102 | 0.65337 | 0.01119 | 0.08258 | 0.00091 | 0.02745 | 0.00051 |
| GHP-8 | 0.05941 | 0.00067 | 0.78746 | 0.00889 | 0.09377 | 0.00101 | 0.03013 | 0.00047 |
| GHP-9 | 0.05962 | 0.00100 | 0.78064 | 0.01305 | 0.09589 | 0.00108 | 0.02872 | 0.00040 |
| GHP-10 | 0.07691 | 0.00096 | 1.87783 | 0.02329 | 0.17725 | 0.00188 | 0.05314 | 0.00067 |
| GHP-11 | 0.05245 | 0.00096 | 0.26782 | 0.00478 | 0.03707 | 0.00041 | 0.01162 | 0.00021 |
| GHP-12 | 0.05799 | 0.00135 | 0.81420 | 0.01404 | 0.07682 | 0.00101 | 0.02304 | 0.00065 |
| GHP-13 | 0.17159 | 0.00212 | 2.09459 | 0.02373 | 0.08853 | 0.00085 | 0.01764 | 0.00037 |
| GHP-14 | 0.06155 | 0.00072 | 0.84442 | 0.00962 | 0.09960 | 0.00103 | 0.03350 | 0.00056 |
| GHP-15 | 0.05537 | 0.00078 | 0.43907 | 0.00584 | 0.05756 | 0.00060 | 0.01592 | 0.00023 |
| GHP-16 | 0.07077 | 0.00098 | 1.36979 | 0.01657 | 0.14034 | 0.00122 | 1.36979 | 0.00110 |
| GHP-17 | 0.05436 | 0.00078 | 0.44921 | 0.00652 | 0.05994 | 0.00068 | 0.44921 | 0.00050 |
| GHP-18 | 0.07168 | 0.00100 | 1.57602 | 0.02248 | 0.15947 | 0.00183 | 1.57602 | 0.00135 |
| GHP-19 | 0.04922 | 0.00052 | 0.17473 | 0.00356 | 0.02575 | 0.00043 | 0.17473 | 0.00037 |
| GHP-20 | 0.05906 | 0.00092 | 0.72053 | 0.01101 | 0.08846 | 0.00097 | 0.72053 | 0.00079 |
| GHP-21 | 0.06522 | 0.00156 | 1.21379 | 0.02636 | 0.12720 | 0.00156 | 1.21379 | 0.00165 |
| GHP-22 | 0.05291 | 0.00093 | 0.36587 | 0.00624 | 0.05016 | 0.00056 | 0.36587 | 0.00048 |
| GHP-23 | 0.05605 | 0.00099 | 0.62961 | 0.01057 | 0.07870 | 0.00090 | 0.62961 | 0.00088 |
| GHP-24 | 0.07307 | 0.00145 | 1.63513 | 0.03077 | 0.16231 | 0.00184 | 1.63513 | 0.00288 |
| GHP-26 | 0.07191 | 0.00131 | 1.51555 | 0.02697 | 0.15289 | 0.00181 | 1.51555 | 0.00228 |
| GHP-27 | 0.05677 | 0.00147 | 0.55502 | 0.01373 | 0.07091 | 0.00090 | 0.55502 | 0.00108 |
| GHP-28 | 0.04942 | 0.00199 | 0.16060 | 0.00623 | 0.02358 | 0.00034 | 0.16060 | 0.00034 |
| GHP-30 | 0.05492 | 0.00108 | 0.45275 | 0.00856 | 0.05980 | 0.00069 | 0.45275 | 0.00080 |
| GHP-31 | 0.05909 | 0.00120 | 0.77524 | 0.01537 | 0.09517 | 0.00115 | 0.77524 | 0.00144 |
| GHP-32 | 0.04900 | 0.00136 | 0.17608 | 0.00409 | 0.02606 | 0.00032 | 0.00621 | 0.00029 |
| GHP-33 | 0.04913 | 0.00233 | 0.16136 | 0.00741 | 0.02382 | 0.00039 | 0.00841 | 0.00033 |
| GHP-34 | 0.05778 | 0.00108 | 0.58270 | 0.01195 | 0.08318 | 0.00094 | 0.02571 | 0.00077 |
| GHP-35 | 0.05932 | 0.00184 | 0.78435 | 0.02368 | 0.09592 | 0.00140 | 0.01653 | 0.00109 |
| GHP-36 | 0.06610 | 0.00304 | 0.90458 | 0.02612 | 0.09525 | 0.00128 | 0.02004 | 0.00154 |
| GHP-37 | 0.05287 | 0.00165 | 0.40989 | 0.01231 | 0.05623 | 0.00080 | 0.01711 | 0.00081 |
| GHP-38 | 0.05696 | 0.00134 | 0.70520 | 0.01534 | 0.08580 | 0.00120 | 0.02411 | 0.00058 |
| GHP-39 | 0.05849 | 0.00207 | 0.81351 | 0.02749 | 0.10069 | 0.00149 | 0.02612 | 0.00133 |
| GHP-40 | 0.06037 | 0.00097 | 0.77167 | 0.01213 | 0.09221 | 0.00104 | 0.02479 | 0.00079 |
| GHP-41 | 0.07258 | 0.00119 | 1.53173 | 0.02478 | 0.15310 | 0.00177 | 0.04067 | 0.00154 |
| GHP-42 | 0.11061 | 0.00178 | 4.89543 | 0.09035 | 0.32101 | 0.00395 | 0.05069 | 0.00195 |
| GHP-43 | 0.05637 | 0.00114 | 0.60715 | 0.01196 | 0.07813 | 0.00093 | 0.02118 | 0.00072 |

**CORRECTED AGES (COMMON Pb)**

| *Analysis No.* | $^{207}Pb/^{206}Pb$ | ±1s | $^{207}Pb/^{235}U$ | ±1s | $^{206}Pb/^{238}U$ | ±1s | $^{208}Pb/^{232}Th$ | ±1s | |
|---|---|---|---|---|---|---|---|---|---|
| *(9) GHP2 (R24477), sandstone; Golpin River valley; Late Jurassic; Lat.21°1'23"S Long.161°16'11"E* | | | | | | | | | |
| GHP-1 | 561 | 29 | 624 | 5 | 516 | 5 | 533 | 8 | |
| GHP-2 | 734 | 32 | 679 | 7 | 652 | 7 | 689 | 21 | |
| GHP-3 | 232 | 38 | 161 | 2 | 156 | 2 | 158 | 2 | |
| GHP-4 | 663 | 25 | 638 | 5 | 632 | 6 | 661 | 10 | |
| GHP-5 | 252 | 62 | 160 | 4 | 154 | 2 | 158 | 3 | |
| GHP-6 | 642 | 28 | 620 | 6 | 615 | 7 | 611 | 11 | |
| GHP-7 | 508 | 40 | 511 | 7 | 512 | 5 | 547 | 10 | |
| GHP-8 | 582 | 25 | 578 | 5 | 576 | 6 | 600 | 9 | |
| GHP-9 | 597 | 37 | 590 | 7 | 589 | 6 | 572 | 8 | |
| GHP-10 | 1119 | 25 | 1073 | 6 | 1052 | 10 | 1047 | 17 | |
| GHP-11 | 305 | 43 | 241 | 4 | 235 | 3 | 234 | 4 | |
| GHP-12 | 529 | 52 | 486 | 9 | 478 | 5 | 460 | 13 | |
| GHP-13 | 2573 | 21 | 1147 | 6 | 547 | 5 | 353 | 7 ** | |
| GHP-14 | 659 | 26 | 622 | 5 | 612 | 6 | 666 | 11 | |
| GHP-15 | 427 | 31 | 370 | 4 | 361 | 4 | 319 | 5 | |
| GHP-16 | 951 | 29 | 876 | 7 | 847 | 7 | 17439 | 9 | |
| GHP-17 | 386 | 33 | 377 | 5 | 375 | 4 | 7499 | 7 | |
| GHP-18 | 977 | 29 | 961 | 9 | 954 | 10 | 19726 | 11 | |
| GHP-19 | 158 | 122 | 164 | 8 | 164 | 3 | 3265 | 6 | |
| GHP-20 | 569 | 35 | 551 | 6 | 547 | 5 | 10968 | 9 | |
| GHP-21 | 905 | 48 | 897 | 12 | 772 | 9 | 16063 | 15 | |
| GHP-22 | 325 | 41 | 317 | 5 | 316 | 3 | 6302 | 7 | |
| GHP-23 | 532 | 38 | 496 | 7 | 488 | 5 | 9873 | 11 | |
| GHP-24 | 1015 | 41 | 984 | 12 | 970 | 10 | 19584 | 22 | |
| GHP-26 | 983 | 38 | 937 | 11 | 917 | 9 | 18646 | 18 | |
| GHP-27 | 483 | 59 | 448 | 9 | 442 | 5 | 8923 | 14 | |
| GHP-28 | 168 | 94 | 151 | 5 | 150 | 2 | 3010 | 6 | |
| GHP-30 | 409 | 45 | 379 | 6 | 374 | 4 | 7548 | 11 | |
| GHP-31 | 570 | 45 | 583 | 9 | 586 | 7 | 11501 | 15 | |
| GHP-32 | 148 | 87 | 155 | 4 | 166 | 2 | 165 | 6 | |
| GHP-33 | 154 | 109 | 152 | 6 | 152 | 2 | 129 | 7 | |
| GHP-34 | 521 | 42 | 516 | 7 | 515 | 6 | 513 | 15 | |
| GHP-35 | 579 | 68 | 588 | 13 | 590 | 8 | 331 | 22 | |
| GHP-36 | 456 | 123 | 415 | 18 | 407 | 8 | 407 | 31 | |
| GHP-37 | 323 | 73 | 349 | 8 | 353 | 5 | 343 | 15 | |
| GHP-38 | 490 | 53 | 542 | 10 | 554 | 7 | 482 | 17 | |
| GHP-39 | 548 | 79 | 604 | 15 | 620 | 9 | 521 | 26 | |
| GHP-40 | 617 | 35 | 581 | 7 | 572 | 6 | 495 | 16 | |
| GHP-41 | 1002 | 34 | 943 | 10 | 918 | 10 | 806 | 30 | |
| GHP-42 | 1809 | 30 | 1801 | 14 | 1795 | 19 | 1003 | 38 | |
| GHP-43 | 467 | 46 | 482 | 8 | 485 | 6 | 424 | 14 N=41 | |

**ACCEPTED SET (in ascending age order)**

| *Analysis No.* | *Age** | *±1s* | *Groups* | *Age±2s* |
|---|---|---|---|---|
| *(9) GHP2 (R24477), sandstone; Golpin River valley; Late Jurassic; Lat.21°1'23"S Long.161°* | | | | |
| GHP-26 | 150 | 2 a | | |
| GHP-33 | 152 | 2 a | | 153±2 |
| GHP-5 | 154 | 2 a | | n=4 |
| GHP-3 | 156 | 2 a | | %10 |
| GHP-19 | 164 | 3 | | |
| GHP-32 | 166 | 2 | | |
| GHP-11 | 235 | 3 | | |
| GHP-22 | 316 | 3 | | |
| GHP-37 | 353 | 5 | | |
| GHP-15 | 361 | 4 | | |
| GHP-30 | 374 | 4 | | |
| GHP-17 | 375 | 4 | | |
| GHP-36 | 407 | 8 | | |
| GHP-27 | 442 | 9 | | |
| GHP-12 | 478 | 6 | | |
| GHP-43 | 485 | 6 | | |
| GHP-23 | 488 | 5 | | |
| GHP-7 | 512 | 5 | | |
| GHP-34 | 515 | 6 | | |
| GHP-1 | 518 | 5 | | |
| GHP-20 | 547 | 6 | | |
| GHP-35 | 554 | 7 | | |
| GHP-40 | 572 | 6 | | |
| GHP-8 | 576 | 6 b | | 585±7 |
| GHP-31 | 586 | 7 b | | n=4 |
| GHP-9 | 589 | 6 b | | %10 |
| GHP-35 | 590 | 8 b | | n=27 |
| GHP-14 | 612 | 6 | | |
| GHP-6 | 615 | 7 | | |
| GHP-39 | 620 | 9 | | |
| GHP-4 | 632 | 6 | | |
| GHP-2 | 652 | 7 | | |
| GHP-21 | 772 | 9 | | |
| GHP-18 | 947 | 7 | | |
| GHP-26 | 917 | 9 | | |
| GHP-41 | 918 | 10 | | |
| GHP-18 | 954 | 10 | | |
| GHP-24 | 970 | 10 | | |
| GHP-10 | 1118 | 25 | | |
| GHP-42 | 1808 | 30 N=40 | | |

| | | | |
|---|---|---|---|
| K | 0 | 0 | |
| J | 6 | 15 | |
| T | 1 | 3 | |
| P | 0 | 0 | |
| C | 2 | 5 | |
| DS | 5 | 13 | |
| CO | 6 | 15 | |
| PC | 20 | 50 | |
| n= | 40 | GHP1 | |

**NOTES**

s: standard error

* Ages <1000 Ma are $^{206}Pb/^{238}U$; >1000 Ma are $^{207}Pb/^{206}Pb$ data

** discordant age data

Yellow boxes show the number of zircons, and their percentage of total, in selected geological periods.

*version0109*