AN EXAMPLE OF THE LINKS BETWEEN THRUST TECTONICS AND SEDIMENTATION : THE PALEOGENE BARREME BASIN, SE FRANCE

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The Late Eocene Barrême basin-remnant is located in the external zones of the SW Alpine foreland thrust belt. This small thrust-sheet-top basin preserves a 750m fill which records an overall transition from marine to non-marine deposits, and displays extensive evidence of thrust-related deformation during sedimentation. The basin-fill comprises the following formations and members : Calcaires Nummulitiques (shallow marine transgressive carbonate facies) ; Marnes Bleues (marine mudstones, with evidence of increasing water depths) ; Grès de Ville member (storm-influenced event beds) ; La Poste member (submarine channels incised into the Marnes Bleues basin slope); St. Lions member (southerly prograding Gilbert-type deltas) ; Grès de Senez member (storm-dominated prograding sandy shoreline) ; Molasse Rouge (semi-arid red-beds, with paleosols and conglomeratic channels) ; série Saumon-Série Grise (palustrine and lacustrine facies, deposited in an intermontane lake basin) ; Grès Verts (ephemeral sandy channels, with associated overbank mudstones and paleosols).

Progressive east to west subsidence, attributed to thrust loading in the internal Alps, combined with a widespread synchronous rise in sea level, resulted in the Calcaires Nummulitiques transgression. Topographic highs, related to thrust uplift, compartmentalised this basin, resulting in the local development of counter-regional slopes (dipping to the west). Slope instability, due to tectonic oversteepening, and/or seismic shock, resulted in the supply of exotic submarines gravity glide blocks to the marine basin. The Grès de Ville consists of storm-generated graded sandstones, deposited in maximum water depths of 40-50m. Submarine channels (La Poste member) incised into the Marnes Bleues possess a conglomerate and sandstone fill, dominated by gravity-flow processes. This coarse sediment influx was dually sourced, from both local and internal Alpine terrains, and reflects Sannoisian thrust uplift in the foreland. Thrust deformation at this time, at the eastern margin of the Barrême basin-remnant, resulted in a localised syntectonic unconformity (Le Chateau de Clumanc).

By the late Early Oligocene the basin was totally infilled by marine sediments. A later syntectonic unconformity, and a growth fold at Senez, record a further episode of thrust activity during deposition of the first continental sediments, the fluviatile Molasse Rouge. The fine grained lake and lake-marginal sediments of the Série Saumon-Série Grise were deposited during a tectonically quiescent phase, characterised by low rates of clastic sediment production. The upwards-passage into the fluviatile Grès Verts indicates renewed thrust uplift, and clastic input into the basin, with exotic sediment derived from the ophiolitic slices incorporated within the Embrum-Ubaye nappes. The terminal event in the basin was culmination collapse at the front of the Haute-Provence duplex, resulting in Upper Cretaceous rocks overthrusting the eastern margin. This thrust-sheet top basin fill therefore records frequent, discontinuous thrust movements during sedimentation, which can be used to constrain the timing and rates of thrust movement.

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