

# Pre-Campanian Terranes in Nicoya area (Costa Rica, Middle America)

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Detailed field mapping, isotopic and palaeontologic dating in the Nicoya area has revealed coeval pre-Campanian, middle to late Cretaceous sedimentary/magmatic sequences of different geodynamic palaeoenvironments.

1- The Nicoya Complex is a pile of plateau basalts and intrusives of Berriasian to Campanian igneous ages, including Middle Jurassic to Santonian radiolaritic sediments only. This unit is the subject of another abstract (this volume).

2- The Matambu Terrane comprises a basaltic basement of unknown origin and age, overlain by bituminous, siliceous shales of late Albian age (Loma Chumico Formation). This formation seems to be thermally affected by younger basaltic flows and intrusives of Cenomanian to early Campanian age that may be part of the Nicoya (plateau) Complex.

The Loma Chumico Formation is overlain by pelagic, hemipelagic and turbiditic siliceous and calcareous shales and mudstones assigned to the redefined Sabana Grande Formation (palaeontologically undated, but estimated as Cenomanian to Coniacian in age). Upsection, the Nambi Formation (Flores et al. 2003) is characterized by volcanoclastic turbidities that document erosion of the (nearby) Nicoya Complex. A preliminary <sup>87</sup>Sr/<sup>86</sup>Sr isotopic analysis of *Inoceramus* gave a value of 0.70738 that can be interpreted as a Coniacian age. The top of Nambi is marked by the presence of reworked Campanian shallow water bioclasts, announcing the transition to the overlap sediments (see below).

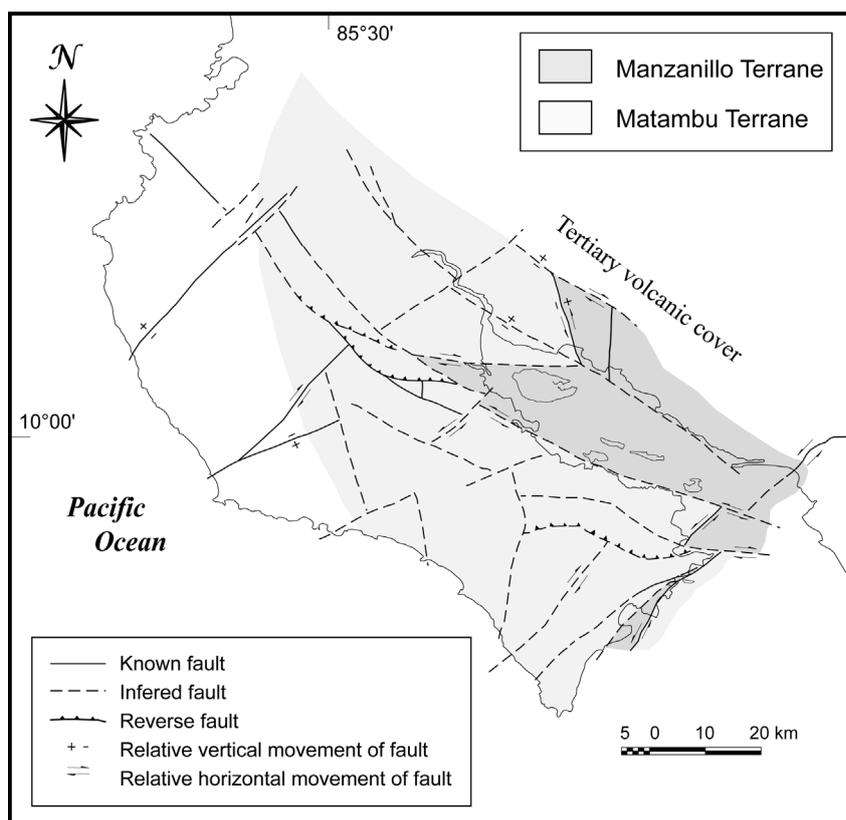


Figure 1 Terranes proposed in Nicoya area

3- The Manzanillo Terrane is floored by a basaltic basement intruded by the Tortugual Komatiitic Suite (Alvarado et al. 1997) of Turonian (89 ma) age. The sedimentary cover is characterized by a thick hemipelagic-turbiditic sequence containing arc-derived volcanoclastic deposits called Berrugate Formation (Flores et al. 2003). This formation has been dated by radiolarian biochronology as Coniacian in age (*Dictyomittra koslova*, *Pseudoaulophacus florensis*, *Pseudoaulophacus lenticulatus* and *Theocampe salillum* associated with *Stichomittra communis*), but may range up to the lower Campanian.

The Manzanillo Terrane documents pre-Campanian evolved arc volcanism that must have resulted from active subduction of “normal” ocean floor. This ocean floor was located between the exotic Nicoya Complex (1) /Matambu Terrane (2), and the Manzanillo Terrane (3). The Manzanillo Terrane could represent a fore-arc area at the foot of the western edge of the future Caribbean Plate. Subduction stopped when (1) and (2) reached the trench and collided with the Caribbean Plate during the Campanian.

Di Marco et al. (1995) provided evidence for Late Campanian-Maastrichtian southern hemisphere palaeolatitudes in two sections of the

outer Nicoya and the Santa Elena Peninsulas. These two sites could be allochthonous with respect to the 3 units discussed above. The hypothetical docking of these sites occurred after the juxtaposition of the terranes discussed above.

The overlap sequences on the discussed terranes document late Campanian-Maastrichtian continental/nearshore to pelagic environments. The nearshore conglomeratic Barbudal Formation reflects uplift and subaerial erosion of the basement of the Manzanillo Terrane. The shallow water rudist and larger foraminifer-bearing El Viejo Formation cap outer tectonic highs of the uplifted Nicoya Complex

and Matambu Terrane. Other, less uplifted areas are covered by pelagic *Globo truncana*-bearing limestones (Piedras Blancas Formation (Flores et al. 2003), ganseri - Zone of the top-most Campanian and the lower half of the Maastrichtian) and shallow-water derived resediments.

#### References

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