8th International Symposium
on Andean Geodynamics
(ISAG)

Long-term vertical movements and construction of the continental margin along the forearc of the central Peruvian Andes (6-10°S)

M. C. Genge[1], C. Witt[1], F. Chanier[1], J.-Y. Reynaud[1]

[1]Univ. Lille, CNRS, Univ. Littoral Côte d'Opale, UMR 8187, LOG, Laboratoire d'Océanologie et de Géosciences, F 59000 Lille, France

The forearc of the North-Central Peruvian Andes (6-10°S) provides an exceptional opportunity to study the long-term processes that affect a convergent plate boundary. First, it shows large-scale depocenter migration and superimposition. Second, characterized as a typical erosive margin, the FNCPA shows a complex relationship between uplift and subsidence resulting from the temporal and spatial interactions between the unroofing Paleozoic-Cretaceous Coastal Cordillera and wide-spread subsidence along adjacent forearc depocenters. The FNCPA is affected by major and regional extensional processes, alternating with more localized compressional events next to the slope break. Older deformation is expressed by basement horst and grabens disposed in a complex geometry along the so-called Main Deformation Zone. They believed to result from strike-slip tectonics related to subduction partitioning and were active from Late Cretaceous to Oligocene with an increase of the activity during Eocene, which is consistent with structures observed onland. Then, a long-lived episode of regional subsidence, coeval with the documented installation of the subduction-erosion regime (~20 Ma), affected the forearc and led to the relatively thick and regional deposition of the Lower Miocene series. This period was followed by trench-parallel uplift of restricted parts of the Main Deformation Zone by the end of the Lower Miocene. Uplift individualized a forearc depocenter and is responsible for landward tilting of strata. Indeed, the effects on basin geometry of this raised zone resembles that of typical outer forearc highs along accretionary margins such as the Kumano basin in Japan. OFH uplift may be explained either by (i) a change in convergence obliquity, (ii) localized underplating, (iii) the onset of the Peruvian slab flattening, or by a combination of these processes. The uplift period ended during the Pleistocene south of 8°S and is still ongoing north of 8°S. Finally, the flat geometry of the current shelf seafloor indicates an overfilled basin where erosion and deposition keep pace with vertical movements along the forearc.