Geophysical Research Abstracts, Vol. 8, 10125, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10125

Morpho-structural development of the Hikurangi subduction wedge (New Zealand): tectonic and stratigraphic analysis of the Akitio transect

J. Bailleul (1), **F. Chanier** (1), J. Ferrière (1), C. Gorini (1), C. Robin (3), and G. Mahieux (2)

(1) UMR Processus et Bilan des Domaines Sédimentaires, Université des Sciences et Technologies de lille1, France, (2) UMR Processus et Bilan des Domaines Sédimentaires, Université de Haute-Picardie, Amiens, France, (3) Géosciences Rennes, Université de Rennes 1, France (julien.bailleul@total.com)

On active margins, the morphology of the lower trench slopes ($i.e.$ slope between the trench and the highest ridge of the subduction wedge) results from subduction wedges development that is controlled by the motion and coupling of the downgoing slab. Subduction activity is therefore responsible for the distribution and the evolution of lower trench slope sedimentation areas ($e.g.$ trench-slope basins). In this context, the syn-subduction sedimentary infill may record the variations of regional tectonic regimes, but may also reflect more local deformation processes related to basin development.

The stratigraphic and structural analysis of a complete transect of the Hikurangi subduction margin (eastern North Island, New Zealand), based on both offshore and onshore data, led to identify three main morpho-structural domains between the subduction front (Hikurangi Trough) and the forearc basin: the accretionary prism *sensu-stricto*, the Wairarapa shelf and the present-day emerged trench-slope break of the Hikurangi margin (Coastal Ranges). The boundaries between the present-day morpho-structural domains correspond to subduction-related major thrust faults, which coincide with present-day geographic boundaries: the Wairarapa coast-line and the Wairarapa shelf edge. These faults had controlled the growth of structural ridges bounding Mio-Pliocene mature slope basins: the highly confined Akitio (onshore) and Titihaoa (offshore) trench-slope basins (5-10 km wide), and the large Tawhero (onshore) and Turnagain (offshore) slope basins (30-40 km wide). The analysis of slope

basins and of their structural edges has permitted to reconstitute the geometric and structural evolution of the Hikurangi subduction wedge since the onset of subduction, 25 Myr ago.

The evolution of the Hikurangi subduction wedge is discontinuous and was controlled by successive tectonic periods identified across the Akitio transect. These periods of paroxysmal tectonic activity, often short-term (1 to 2 Ma, in duration), have a strong impact on the stratigraphic architecture of the slope basins (discontinuities, angular unconformities, abrupt facies changes).

The structural pattern of the Hikurangi margin therefore results **1**) from a complex tectonic history, and **2**) from transverse variations in the distribution of the deformation during this tectonic evolution. The present-day juxtaposition of three morpho-structural domains along the Akitio transect is therefore explained by their difference in age and their relative position in the subduction wedge trough times. We show notably that some frontal accretion can occur close to the subduction front while extensional deformation and subsidence develops upslope during the period probably dominated by tectonic erosion. Changes in the tectonic regime may have been induced by modifications of the terrigeneous flux within the Hikurangi Trough or by other subduction related processes such as variations in thickness and coupling of the downgoing slab.