



Tectonic control on stratigraphic evolution of trench-slope basins, Hikurangi subduction margin, New Zealand

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The Eastern margin of the North Island (New Zealand) corresponds to the forearc domain of the Hikurangi subduction zone. Offshore, the central and southern parts of this active margin are characterized by the present development of an accretionary prism. Onshore, the forearc domain comprises the Coastal Ranges (emerged trench-slope break of the accretionary complex) associated with a forearc basin. The Coastal Ranges comprise pre-subduction basement structural highs separating NNE-SSW elongated synclines (trench-slope basins) containing syn-subduction deposits (25 – 0 Ma). Recent deformation of this domain is mainly contractional. Most of the right-lateral strike-slip deformation accommodating the oblique component of the subduction is observed west of the forearc basin (within the Axial Ranges).

The stratigraphy of the sediments preserved in the synclines, mainly turbidites, has been studied at high resolution from outcrop, in order to reconstruct the evolution of these trench-slope basins. Unconformities and facies changes were identified and correlated between selected transects in order to constrain the interaction between tectonic activity and stratigraphic architecture. The characteristics of onshore trench-slope sedimentation are also compared with similar basins identified offshore on industrial seismic profiles.

Along this subduction margin, two main types of trench-slope basins were identified: 1) large basins (30-40 km wide) with an homogeneous infill 2) small basins (5-10 km wide) more confined, with specific turbiditic systems. Both record rapid infilling soon after tectonic nucleation of their depocenter. All these basins are characterized by a major unconformity located at their base and top, and their lifetime reach only about

4 to 8 My.

Most of the events that have been recorded within the basin by changes in turbidite facies are associated with deformation episodes along the basin boundaries. Except for the first compressional episode caused by the onset of the subduction (from 25 Ma to 20-18 Ma), the deformation of the margin is characterized by short paroxysmal tectonic events (1-2 Ma in duration). The reduced lifetime of the trench-slope basin is a consequence of the brevity of associated tectonic events.

Both basin development and tectonic activity appear to be sporadic, whereas subduction processes are continuous. Some discontinuities observed margin-wide, may be related to adjustments (or variations) in subduction processes (*e.g.*, changes in kinematics or thickness of the downgoing slab). Nevertheless, more spatially localized discontinuities are linked to the distribution and/or migration of the deformation.