

IODP Expedition 375: Hikurangi Subduction Margin –first chronostratigraphic constraints derived from shipboard palaeomagnetic analyses

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The Hikurangi margin, located offshore the eastern coast of the Central North Island in New Zealand is the site of oblique convergence between the Pacific and Australian Plates. It has recently received a considerable amount of public and scientific attention due to periodic re-occurrence of so-called slow-slip or low frequency earthquakes, which are believed to be triggered by the slow release of strain.

Subduction initiation along the Hikurangi margin is believed to date back to ca. 20 - 25 Myrs ago. The entire margin is known to have experienced significant clockwise rotation, which was probably initiated approximately 2 Myrs ago in association with the onset of subduction of the buoyant and Mesozoic aged Hikurangi Plateau at its southern end, which resulted in coupling between the underlying Pacific and overriding Australian plates.

Partitioning between margin normal and parallel strain significantly affected the whole-sale evolution of the Central North Island and the geometry of the accretionary complex. The onshore expressions of the Hikurangi margin are generally well studied. In contrast, to date all studies of the accretionary history and structure of the offshore margin were limited to the interpretations of active and passive source seismic surveys, thus providing little absolute chronological information.

Expedition 375 of the International Ocean Discovery Program (March & April, 2018) targets four drill sites along a transect that encompasses the upper slope, frontal thrust and sediments of the incoming plates with inferred ages spanning the Cenozoic.

In this presentation I will briefly introduce the key expedition objectives and achievements. I will then focus on the chronostratigraphic constraints provided from the shipboard palaeomagnetic investigations. The results may provide a first insight into the accretionary and deformation history along the upper slope, timing of seismic slip along a major frontal thrust fault and depositional history of the Pacific Plate.

Highlights and pitfalls of the palaeo- and rock magnetic analyses will be outlined and avenues for further research discussed.

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