STRUCTURE AND PROCESSES IN ERODING AND ACCRETING SUBDUCTION MARGINS – NEW DEVELOPMENTS BASED ON MARINE OBSERVATIONS.

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Abstract

The subduction channel model is revised using structures in seismic images acquired during the past decade. In the model, trench sediment piles up in a zone of compression at the inlet to a subduction zone that accepts only a finite amount of sediment. Trench sediment exceeding channel capacity accrets to the upper plate in a zone of compression. The zone of compression is now recognized as the *frontal prism* resolved in seismic records and multibeam bathymetry. With the improved spatial resolution in well processed seismic records and multibeam bathymetry it is imaged as a discrete unit.

Convergent margin tectonism is most active in frontal prisms and is the part of the upper plate at critical taper. Restricted width globally indicates that frontal prisms are self limiting. Subduction zone capacity is evidenced in global compilations showing that more than about 1 km of sediment in trenches exceeds capacity. The accreted excess is transferred landward to an *older prism* that accumulates little permanent deformation and deform elastically. A first-order control of erosion or accretion is trench sediment abundance. Subducted erosional debris and accreting sediment may respond to plate convergence differently during interseismic periods but during coseismic rupture friction along the plate boundary may differ far less. A few in-situ indicators show that frontal prism material and plate interface friction are weak in both eroding and accreting margins.

If structural character can help identify tsunamigenic margins their dynamic coseismic behavior is important and observations of subduction channel materials, margin topography, and strength indicators are areas of focus.