

3D Crustal Structure of the Hikurangi Subduction Zone revealed by Two Decades of Onshore-Offshore and Multi-Channel Seismic Data: Implications for Megathrust Slip Behaviour

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Abstract

Two decades of onshore-offshore, ocean bottom seismometer and marine multi-channel seismic data are integrated to constrain the crustal structure of the entire Hikurangi subduction zone. Our method provides refined 3-D constraints on the width and properties of the frontal prism, the thickness and geological architecture of the forearc crust, and the crustal structure and geometry of the subducting Hikurangi Plateau to 40 km depth. Our results reveal significant along-strike changes in the distribution of rigid crustal rocks in the overthrusting plate and along-strike changes in the crustal thickness of the subducting Hikurangi Plateau. We also provide regional constraints on seismic structure in the vicinity of the subduction interface. In this presentation, we will describe our observations and integrate our tomographic model with residual gravity anomalies, onshore geology, and geodetic observations to describe the relationship between crustal structure and fault-slip behavior along the Hikurangi margin.

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