Geophysical Research Abstracts, Vol. 9, 05883, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05883

Crustal structure along the Hikurangi margin subduction system, North Island, New Zealand, from seismic reflection imaging

Barker, D., Sutherland, R., Bannister, S., Toulmin, S., Henrys, S., Reyners, M., Pecher, I., Uruski, C., and G. Maslen

GNS Science, Lower Hutt, New Zealand

Seismic reflection data from the Hikurangi subduction margin off the east coast of the North Island, New Zealand, show variations in first-order structural features of the upper plate and subducting slab geometry that may relate to plate coupling at the subduction interface. Beneath the eastern coastline of North Island, New Zealand, the subducted Pacific plate dips at less than 3 degrees to the northwest and is at a depth of less than 15 km. This shallow geometry is optimum for detailed geophysical studies of the subduction decollement using both active-source and passive-source experiments. In March-May 2005 a new industry seismic reflection survey, 05CM, was undertaken offshore of the east coast. Although primarily a hydrocarbon exploration survey, data acquisition parameters were also designed to be capable of seismically imaging the subducted plate (e.g., a 12-km-long streamer, 12 s record lengths). In total, over 2800 km of data were recorded along the margin. Repeated shark attack damage to the seismic streamer meant only some profiles were collected to the original full survey specifications. However, the shorter streamer (4-6 km) and record length (8 s) were still sufficient for remaining data to fill a regional grid of high quality reflection data imaging this subduction system. Significant along-strike changes in first-order structural features of the upper plate and subducting slab geometry are revealed, particularly in the Hawke Bay – Mahia region. Estimation of slip rate deficit from inversion of GPS data have suggested a present-day low slip rate deficit region beneath Hawke Bay, within a northward decreasing band of higher slip rate deficit along the margin. Long-term differences in plate coupling in the Hawke Bay segment of the margin may also exist, perhaps directly related to these seismically observed structural features.