



## **Geomorphological features of the supercritical accretionary ridge Rock Garden, Hikurangi convergent margin, New Zealand**

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To gain a better understanding of deformation occurring during the subduction of a seamount, we investigated the frontally accreted ridge Rock Garden of the Hikurangi convergent margin east of New Zealand's North Island during the RV SONNE expedition SO 247. Rock Garden is located in the northern part of the accretionary segment of the Hikurangi margin and therefore mainly is characterized by topographic features characteristic for accretionary wedges.

The exceptional steepness of Rock Garden's flanks has been caused by the subduction of a seamount, which has also uplifted the ridge top to water depths of 600-800 m. A bathymetric map with a grid size of 8-13 m was generated based on EM710 data. Using an EK60 single beam scientific echosounder, we identified 11 different gas flares at Rock Garden. PARASOUND sediment echosounder data provide insight in the uppermost 20 meters of sediments.

With the help of the bathymetric and older side-scan sonar data acquired during SO 214, regional and local geomorphological investigations have been performed computing morphometric parameters like slope steepness, slope azimuth, curvature and roughness.

The local slope gradient map of Rock Garden reveals an area as large as about 150 km<sup>2</sup> with a slope steeper than 10°, and the ridge top rises about 1800-2000 m relative to its surrounding thrust top basins. Landward, large parts of the Paoanui Ridge with local slope gradients of more 15° are even steeper, however, this ridge is only elevated by about 500 m. The azimuth of the steep slopes mainly faces south-east. The curvature map very clearly reveals a complex fault system. From the side-scan sonar data different sedimentation types can be identified: thick sediment deposits in the basins and very thin sedimentation deposits, with carbonates on the top of Rock Garden. Between Rock Garden and Paoanui Ridge fast sediment flux within a channel is taking place. There is evidence for slumping throughout the steep slope with most of them occurring in the west and south-west of the study area.