



Seafloor Geodetic Investigation of Shallow Slow Slip Events at the Hikurangi Subduction Margin, New Zealand

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Shallow slow slip events (<10-15 km depth) are well-documented at the northern Hikurangi subduction margin, New Zealand. During the Hikurangi Ocean Bottom Investigation of Tremor and Slow Slip (HOBITSS) project, we deployed and successfully recovered a dense network (<10 km spacing) of 24 Absolute Pressure Gauges (APG) and 15 Ocean Bottom Seismometers (OBS) to investigate vertical seafloor deformation and seismicity related to shallow slow slip. The HOBITSS network was deployed for one year from May 2014 to June 2015, in a region directly above an area of large, shallow slow slip events offshore Gisborne, New Zealand. A large slow slip event occurred directly beneath the HOBITSS network in September/October of 2014. The APG data reveal the detailed distribution of seafloor deformation above a shallow (< 10 km depth) offshore subduction thrust for the first time ever. We show evidence that slow slip events can occur very close to the trench and within 2km of the seafloor, where very low pressures and temperatures exist. APGs are a viable tool to detect detailed vertical deformation (on the order of 1-4 cm) of the seafloor and thus enable geodetic investigations of shallow SSEs and other similar-sized transient deformation events at offshore plate boundaries.