



## **Ground deformation in the Taupo Volcanic Zone, New Zealand, observed by ALOS PALSAR interferometry**

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We present ground deformation measurements in the Taupo Volcanic Zone (TVZ) using differential interferometric synthetic aperture radar (DInSAR) observations collected by ALOS PALSAR during 2006-2010. We acquired and processed close to a hundred images from two ascending paths (324 and 325) and one descending path (628) covering the TVZ, and produced linear deformation rates and time series of deformation. A modified version of the small baseline subset algorithm (SBAS) that simultaneously solves for deformation rates and residual topographic noise was utilized, which improved the DInSAR results. The accuracy of the DInSAR displacement rates along line-of-sight to the satellite is 0.5-3 cm/year depending on the number of SAR images and their coherence. We compared the DInSAR-derived displacement rates with those measured by continuous GPS and found good agreement for the two ascending paths; the DInSAR uncertainties were too large to make a useful comparison for the descending path. We identified ground deformation that is probably of volcanic and tectonic origin, as well as localized signals related to groundwater and steam extraction for geothermal power. We calculated simplified source models for some of the geothermal signals using ellipsoidal and tabular approximations.