



Very long period seismic activity recorded on White Island Volcano, New Zealand: kinematics of volcano edifice constrained by numerical modelling

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Following the deployment of a dense temporary seismic network (12 broadband sensors) on White Island volcano, a small swarm of 25 seismic events was recorded between 19th and 21st August 2011. The spectral content of most waveforms comprises 3 frequency bands: VLP ($f < 0.1$ Hz), LP ($f \leq 1$ Hz) and higher frequency signals (HF, $f > 2$ Hz). While the VLP part of the signals is similar between all the recorded events, there are certain variations observed in LP and HF parts. The aim of this study is to (i) understand the interplay between the VLP and LP activity, and (ii) perform in-depth analysis of VLP waveforms in terms of translational and rotational (tilt) ground motion. We combine the observations, cross-correlation in individual frequency bands and full-waveform numerical modelling in order to understand the connection between VLP and LP signals. The relative amount of ground translation and tilt is obtained by (i) using the tilt-free vertical component to separate the translation from tilt on horizontal components and (ii) calculating the horizontal gradient of vertical ground motion from a dense network across the volcano. Further constraints to the kinematics of the volcano edifice are provided by the full-waveform numerical using the velocity model obtained from the noise cross-correlation tomography. The results will be discussed in terms of possible magmatic and hydrothermal activity of White Island volcano.