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Polarization anisotropy for monitoring seismogenic and volcanic zones- application to Mount Fuji at the time of the 2011 Tohoku earthquake

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In active regions (seismogenic and volcanic zones), the polarization of surface waves is mainly related to seismic anisotropy. It can be derived by using seismic interferometry.
We use continuous data recorded in the area around Mount Fuji, covering the year 2011 in which the Tohoku-Oki earthquake, Japan (Mw=9.0) occurred. Previously, seismic velocity measurements done using cross-correlations of seismic noise, revealed that the Tohoku-Oki earthquake also affected the velocity structure of volcanic zones such as the Mount Fuji area (Brenguier et al. 2014). In fact, seismic velocity dropped by 0.1% in the shallow depth (<10km) underneath the area of Mount Fuji due to the high sensitivity of the volcanic crust and the presence of pressurized fluids in the volcanic fissures. Results of this study show that the orientation of seismic anisotropy has significantly changed at the time of the earthquake inducing strong and rapid deviations of the horizontal polarization of surface waves. These changes might be due to a change in the alignment of cracks when subject to a co-seismic stress perturbation.