Geophysical Research Abstracts
Vol. 17, EGU2015-11015, 2015
EGU General Assembly 2015

Seismic tomography of Basse-Terre volcanic island, Guadeloupe, Lesser Antilles, using earthquake travel times and noise correlations

Anne Barnoud (1,2), Olivier Coutant (1,2), Claire Bouligand (1,2), Frédérick Massin (3), Laurent Stehly (1,2)

(1) Université Grenoble Alpes, ISTerre, Grenoble, France (anne.barnoud@ujf-grenoble.fr), (2) CNRS, ISTerre, Grenoble, France, (3) CDSA, OVSG, IPGP, France

We image the volcanic island of Basse-Terre, Guadeloupe, Lesser Antilles, using both earthquake travel times and noise correlations. (1) A new earthquake catalog was recently compiled for the Lesser Antilles by the CDSA/OVSG/IPGP (Massin et al., EGU General Assembly 2014) and allows us to perform classical travel time tomography to obtain smooth 3D body wave velocity models. The geometrical configuration of the volcanic arc controls the resolution of the model in our zone of interest. (2) Surface wave tomography using noise correlations was successfully applied to volcanoes (Brenguier et al., Geophys. Res. Lett. 2007). We use seismic noise recorded at 16 broad-band stations and 9 short-period stations from Basse-Terre over a period of six years (2007-2012). For each station pair, we extract a dispersion curve from the noise correlation to get surface wave velocity models. The inversion of the dispersion curves produces a 3D S-wave velocity model of the island. The spatial distribution of seismic stations accross the island is highly heterogeneous, leading to higher resolution near the dome of the Soufrière of Guadeloupe volcano.

Resulting velocity models are compared with densities obtained by 3D inversion of gravimetric data (Barnoud et al., AGU Fall Meeting 2013). Further work should include simultaneous inversion of seismic and gravimetric datasets to overcome resolution limitations.