



## **Shallow velocity structure of NE South America and SE Caribbean from ambient noise tomography**

Antonio Villaseñor (1), Roberto Cabeceas (2), Sergi Ventosa (1), and Martin Schimmel (1)

(1) CSIC, Institute of Earth Sciences Jaume Almera, Barcelona, Spain (antonio@ictja.csic.es), (2) ROA, Spanish Navy Observatory, San Fernando, Spain (rcabdia@roa.es)

We use 1.5 years of continuous recordings of an amphibious seismic network in NE South America and SE Caribbean to determine the crustal and uppermost mantle structure beneath the region. The combination of broadband OBSs (ocean bottom seismometers) and land stations of this experiment make it an ideal opportunity for testing processing methods to obtain the empirical Green's functions (EGFs) from correlations of ambient noise.

First, we have denoised the vertical component of the OBS data by subtracting a transfer function between the noise source (tilt noise from the horizontal components and compliance noise from the hydrophone) and the vertical component. The denoising process was highly effective below 0.1 Hz achieving a noise reduction of about 10 dB.

Then we have tried different noise preprocessing approaches (none, 1-bit normalization, running absolute mean normalization, spectral whitening), cross-correlation methods (linear and phase cross-correlation) and stacking methods (linear, phase-weighted stacking, and a combination of both). In particular we use an implementation of the phase-weighted stacking called time-scale phase-weighted stack (ts-PWS) that uses complex frames of wavelets to build a time–frequency representation, and that is accurate and computationally efficient for large datasets such as the one used here.

Our preliminary results show EGFs with good signal-to-noise ratio for inter-OBS and land station-OBS paths. From these EGFs we obtain phase and group velocities of fundamental mode Rayleigh waves using automatic and manual frequency-time analysis, which are inverted in 2D to obtain isotropic and anisotropic phase and group velocity maps. These maps show an excellent correlation with tectonic features such as the Guayana Shield and the Maturin basin, and will be inverted to obtain a 3D model of shear-wave velocity of the region.