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# A 3D seismic tomography of the Lesser Antilles Subduction Zone offshore Dominica and Martinique islands

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Along the eastern border of the Caribbean plate the Lesser Antilles islands form an active volcanic arc above the Atlantic subducting lithosphere. The crustal structure of this convergent margin is presented here from first arrival tomographic inversion of a 3D wide-angle seismic dataset acquired offshore Dominica and Martinique islands by a network of 27 Ocean Bottom Seismometers (OBS).
The resulting 3D velocity model shows good resolution from 7-8 km down to ∼15 km depth in a 150 km x 150 km area.
Though our study area is located at the northern termination of one of the world's largest accretionary prisms we still observe about 5 to 7 km of sediment (v< 4 km/s) in the southeastern corner of our model.
Our network is centered on a remarkable bathymetric feature: the Arawak Basin, a 6 km deep basin trending NW-SE, filled with 3 km of sediment on average. The western side of the Arawak Basin is bordered at depth by a basement high, highlighted by the rise of the 6.0-6.5 km/s velocity contours up to 2 km below seafloor.
To the east of the Arawak Basin, below the accretionary prism, SW-NE cross-sections show two successive rises of velocity contours from 4.0 to 6.0 km/s. The first one, also clearly seen on the MCS data, is coincident with the eastern border of the Arawak Basin, while the second one seems located ∼30 km to the East, below the thick accretionary prism. We interpret these highs as basement uplifts associated with the subduction of the Tiburon ridge.
We do not sample the interplate contact mainly due to high seismic attenuation in the accretionary wedge. More insight into the geometry of this contact may arise from the processing of a ∼285 km long wide-angle refraction/reflection profile parallel to the convergence that cross our 3D velocity model in its middle and continues across the entire subduction complex. Preliminary tomographic results from this dataset recorded by 45 densely spaced OBS confirm the observations described above. This new 2D line reveals also two high velocity zones interpreted as plutonic formations below the active and eastern remnant arcs that diverge northward from the Martinique Island. Further work using for instance direct modeling of later arrivals may give us considerable information on the interplate contact and on the depth of the Caribbean Moho below the Lesser Antilles volcanic arc.