



Rayleigh Wave Imaging of the Lesser Antilles Subduction Zone from the VOILA Project

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The Volatiles in the Lesser Antilles (VOILA) project is a multidisciplinary experiment to understand the pathway of fluids and volatiles in the Lesser Antilles subduction system, where oceanic lithosphere from the slow-spreading Mid Atlantic Ridge is descending in the mantle. Here we present results for teleseismic Rayleigh wave dispersion from the passive seismic ocean bottom deployment of 33 instruments. We measure dispersion from 18-111 s period, which increases from 3.64 at 18 s period to 4.21 at 111 s. Phase velocity maps show several features that are consistent with the expected geology across the region. At 18-33 s period we observe low velocities beneath the arc across the region, with higher velocities on either side, consistent with thickened crust and possibly a low velocity mantle wedge region beneath the active arc region due to the presence of fluids. At 40-81 s period a N-S trending high velocity region, ~ 100 km wide, is observed, which shifts position westward with increasing period, migrating from the forearc to beneath the arc, which we interpret as the slab. At longer periods (81-111s) the high velocity anomaly persists north of Gaudeloupe, suggesting the slab may persist to greater depths in this region.