



Composition and deep structure of island arc crust in the central Lesser Antilles: Insights for the formation of continental crust.

Heidrun Kopp (1), Wolfgang Weinzierl (1), Mireille Laigle (2), Ernst R. Flueh (1), Alfred Hirn (2), Dirk Klaeschen (1), Cord Papenberg (1), Trail Team (1), and Thales Team (2)

(1) IFM-GEOMAR, FB 4, Kiel, Germany (hkopp@ifm-geomar.de), (2) IPG Institut de Physique du Globe, Paris, France

Oceanic island arcs are sites of high magma production and contribute to the formation of continental crust. Geophysical studies may provide information on the configuration and composition of island arc crust, however, to date only few seismic profiles exist across active island arcs, limiting our knowledge on the deep structure and processes related to the production of arc crust. We acquired active-source wide-angle seismic data crossing the central Lesser Antilles island arc north of Dominica where the oceanic Tiburon Ridge subducts obliquely beneath the forearc. Tomographic imaging reveals three distinct layers composing the island arc crust. A three kilometer thick upper crust of volcanogenic sedimentary rocks and volcaniclastics is underlain by intermediate to felsic middle crust and plutonic lower crust. The island arc crust may comprise inherited elements of oceanic plateau material contributing to the observed crustal thickness. A high density ultramafic cumulates layer is not detected, which is an important observation for models of continental crust formation. The upper plate Moho is found at a depth of 24 kilometers below the sea floor. Upper mantle velocities are close to the global average. Our study provides important information on the composition of the island arc crust and its deep structure, ranging from intermediate to felsic and mafic conditions.