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The Sedimentary Sequences of the Lesser Antilles Arc South of Guadeloupe From Wide-Angle and Reflection Seismic Data

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The Lesser Antilles Island Arc is a European active subduction zone prone to major earthquakes. Huge sedimentary input by the South American rivers, namely Amazon and Orinoco, has formed one of the largest accretionary complexes in the world. In the framework of the THALES project, several coincident wide-angle and multichannel seismic (MCS) profiles (15.5N and 16.5N) have been collected on the accretionary prism between the Barracuda and Tiburon Ridges in the Lesser Antilles. We present the analysis results of these data in order to construct a structural model. Preliminary results of 7 different MCS profiles are discussed. The data consist of 1 strike and 6 cross lines. The sedimentary layers imaged on deep-penetrating MCS data were used as a priori information for the wide angle modelling. A total of 16 OBH/OBS (Ocean Bottom Hydrophone/Seismometer) was deployed on a 130 km long wide-angle seismic profile. Seismic velocity models were obtained by a forward modelling of refracted and reflected phases. The final velocity model shows the geometry of the Antilles subduction zone with a sediment thickness of up to 2.6 km. The shallowest layer has a fill velocity of 1.8-2.2 km/s, whereas an older more compacted sediment layer in the deeper portion shows velocities ranged from 2.5 to 3.5 km/s with sediment thickness till 4.3 km. The sedimentary succession marked topographic irregularity and different directional fault system. These layers overlie oceanic crust having velocities in excess 6 km/s with depth of \sim 14-15 km. From the coincident MCS seismic profiles, we incorporated the well resolved sedimentary portions into our model.