

Defining the North American – South American Plate boundary at the Antilles Subduction zone.

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The two oceanic plates of North and South America are being subducted at the Lesser Antilles Arc, which delineates the eastern boundary of the Caribbean Plate. Yet, the exact position of the plate boundary zone between the two American plates remains a subject of discussion. This is owed to the complex tectonic evolution of the study area which is, among other factors, strongly shaped by a number of subduction and transform mechanisms. However, as the North and the South American plate originate from different mid-ocean ridges, they are likely to have different fluid contents. Thus, their influence on seismicity in the Lesser Antilles subduction zone is expected to differ.

This internship aims to produce a synthesis of various constraints on the location of the North-South-American oceanic plate boundary zone. Those results will be the base to further investigate the relationship between the seismological behavior of the accretionary wedge and the characteristics of the incoming plate. Improved understanding of this relationship will be an important parameter for future studies on risks of the geological hazard potential in the Antilles region.

Available datasets and tasks to be carried out at Ifremer, Centre de Brest include :

- 1) Analysis of detailed bathymetric maps of previous marine research cruises in the Lesser Antilles, aiming to identify differences in the oceanic crust patterns from north to south.
- 2) Interpretation of key seismic profiles to characterize the accretionary wedge and lateral changes therein.
- 3) Using earthquake locations from global catalogues to image seismicity patterns, especially concerning deep seismicity that is likely related to plate boundary zones.

Part of the internship will take place at the Geomar research institute (Kiel, Germany) and include the modelling of gravity data (shipboard and/or satellite) of selected profiles spanning the Antilles subduction zone. Dedicated software is available at Geomar.

This internship allows familiarization with acquisition, and development of processing and interpretation skills of different marine datasets, as well as an introduction to the tectonic history of the Caribbean region. As active seismicity is expected to be correlated with the position of the plate boundary zone, solving this research question is of high societal interest.