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New Bathymetric and Seismic Reflection Data along the Northern Haiti Margin: Preliminary Results on the Active Geological Processes

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The convergence of the North American plate with Caribbean plate occurs at a rate of 20.0 ± 0.4 mm/yr towards 254 ± 1º. This results in a highly oblique convergence (20-10º), which is accommodated in the Hispaniola Island by means of strain partitioning, represented in its northern margin by the Northern Hispaniola Deformed Belt (NHDB), accommodating the normal shortening, and the Septentrional Fault Zone (SFZ), which accommodates the along-strike convergence component. Here, we show the preliminary results of an integrated multiscale analysis based on new data acquired at the end of 2025, during the GEOMARHIS marine geophysical cruise, onboard the RRS James Cook. These new data include swath bathymetry data and a dense set of 2D seismic reflection profiles comprising medium, high and ultra high-resolution data. The integration and combined interpretation allow for an identification of the along-strike variability of fault geometry and sediment deformation along the northern Haiti margin. New data reveal active N-verging thrusts and fault-propagation folds in the NHDB, sub-vertical faults associated with the SFZ that produce seafloor scarps, and an extensive field of irregular-shaped seafloor depressions. These features suggest a complex interaction between tectonic, gravitational, and oceanographic processes. This continuous multi-scale approach will advance our understanding of active tectonic and sedimentary processes, which will help future studies assess seismic and tsunami risks in the region.

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