Earthquakes and Tsunami Hazard in Haiti

Data from marine/coastal geology

Bernard MERCIER de LEPINAY, Géoazur, CNRS-Université de Nice Sophia-Antipolis
Caribbean/NOAM plate boundary

Hispaniola: historic seismicity
Data from GPS (Calais et al. 2010)
Mainshock analysis, aftershock distribution and morphotectonics are consistent with the oblique collision regime assumed for the area;

Léogâne Fault
Trois-Baïes Fault
Several « recent » surface landslides have been identified along the northern boundary of the Canal du Sud (south of Gonâve Island) – and only here.

⇒ Possible active uplift identified along the Gonâve island ridge
Enriquillo-Plantain Garden Fault: Jamaica Passage

Rectilinear trace, cross-cutting older basins

Northwestern Peninsula of Haiti

Three youngest terraces ages (Dodge, 1983; Mann et al., 1995)
Three youngest terraces ages (Dodge, 1983; Mann et al., 1995) 137,000 yrs (T3) At 0.37 mm/yr => 1.3 Ma
Northwestern Peninsula of Haiti

No evidence of recent faulting south of SW Peninsula
Windward Passage
Windward Passage
West of Haiti, South of Cuba
Eastern Cayman Trough: potential tsunami source
Cayman Trough: potential tsunami source?
2012- 2014 studies

HAITI-SIS: Bathymetry and multichannel seismic reflexion : (dec. 2012)
Carte tectonique d'Hispaniola 2012-2014 studies

TRANS-HAITI: Offshore – Onshore deep seismic imagery : (May. 2013 -> April 2014)
Several potential sources for a tsunami in Hispaniola

- Underthrusting of Bahamas platform below Hispaniola (convergent component)
- Septentrional Fault (left-lateral component)
- Puerto Rico Trench/ Anegada Passage
- Windward Passage/Oriente Fault
- Muertos thrust/ EPGFZ
- Cayman Trough (northern and southern boundaries)
- Local sources (collapse...)
- ...

We need to enhance the precision of the data (bathymetry, seismic lines, ...) to have a better geometry of the potential sources of earthquake and tsunami hazards.