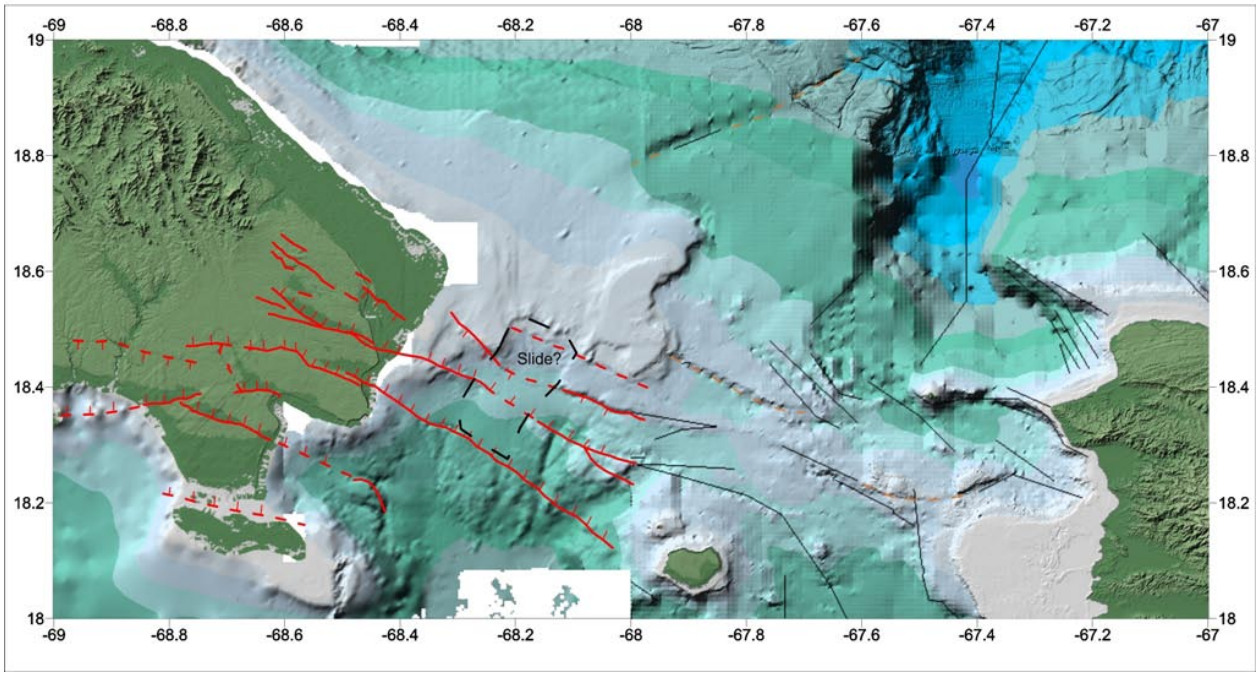

Preliminary map of active faults in the Eastern Dominican Republic and Mona Passage. Active faults east of 68° W, shown by black, straight lines, are from Gardner, et al., (1980), McCann (1998), and Grindlay et al., (2005). Active faults west of 68°W are from McCann (unpublished data, 2009) are shown in red, with tick marks. Ticks are on the downthrown side of the fault. Faults offshore clearly continue on land in the eastern part of the Dominican Republic and as far west of Catalina Islands, just south of La Romana. The predominate fabric of faulting is WNW with the more southerly faults dipping north, and the northerly faults dipping south. Faults have vertical throws of at least 10's to 100 meters. Faults lengths are 75 km or more suggesting the potential to generate earthquakes of magnitude 7-7.25. Slide? indicates location submarine landslide covering part of the faults scarps. When this feature developed it was probably accompanied by a large tsunami.

Summary of Scientific Technique used to identify the faults:

An extensive tract of limestone of mostly Pleistocene-Recent age covers the Eastern part of the Dominican Republic. Numerous distinctive marine terraces outcrop along the southern and eastern coast, the lowest of which has been dated at about 125,000 years. In the eastern area, the highest terrace is very variable in elevation, but correlates with a terrace along the southern coast. Manipulation of gridded Shuttle Radar Topography Mission (SRTM) and marine relief data reveals the location of the upper marine terrace as well as numerous scarps with 10's of meters of relief tending WNW across the region. The relief grid 2nd derivative is used to objectively locate the upper terrace, which is compared to the elevation grid to develop an along escarpment profiles of terrace elevation. If undisturbed, this feature should be contour parallel, that is, all at the same elevation. Systematic elevation changes along profile suggest tilting, and numerous abrupt vertical (~30-50m) and at least one horizontal offset (375m) of this feature. Terrace displacing scarps can be traced many kilometers from offshore, across the coast parallel marine terraces, and continuing inland as linear features that most easily interpreted as active normal faults cutting the limestone platform. Five systems of normal faults have been identified in this manner, the longest of which may be capable of generating earthquakes of about magnitude 7 - 7 ¼. If the age of the upper terrace is roughly about 250Ka, then the observed horizontal displacements of about 375 meters suggest fault motion rates on the order of mm's/yr for each of the5 faults. This total rate of deformation of several mm/yr is similar to the rate of deformation between the Hispaniola and Puerto Rico microplates calculated from GPS studies, suggesting that much of the inter-microplate motion is not contained to the offshore regions of the Mona Passage, but rather passes onshore in the eastern part of the Dominican Republic.