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Revisiting the 1761 Transatlantic Tsunami

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The tsunami catalogs of the Atlantic include two transatlantic tsunamis in the 18th century the well known 1st November 1755 and the 31st March 1761.
The 31st March 1761 earthquake struck Portugal, Spain, and Morocco. The earthquake occurred around noontime in Lisbon alarming the inhabitants and throwing down ruins of the past 1st November 1755 earthquake. According to several sources, the earthquake was followed by a tsunami observed as far as Cornwall (United Kingdom), Cork (Ireland) and Barbados (Caribbean). The analysis of macroseismic information and its compatibility with tsunami travel time information led to a source area close to the Ampere Seamount with an estimated epicenter circa 34.5ºN 13ºW. The estimated magnitude of the earthquake was 8.5.
In this study, we revisit the tsunami observations, and we include a report from Cadiz not used before. We use the results of the compilation of the multi-beam bathymetric data, that covers the area between 34ºN - 38ºN and 12.5ºW - 5.5ºW and use the recent tectonic map published for the Southwest Iberian Margin to select among possible source scenarios. Finally, we use a non-linear shallow water model that includes the discretization and explicit leap-frog finite difference scheme to solve the shallow water equations in the spherical or Cartesian coordinate to compute tsunami waveforms and tsunami inundation and check the results against the historical descriptions to infer the source of the event.
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