



How historical seismicity in oceans can be deduced from sailors' testimonies and related to modern tectonics

Denis Legrand (1), Daniel Rouland (2), Armando Cisternas (3), Daniel Streng (2), Roopa Gir (4), and Annie Souriau (5)

(1) Universidad Nacional Autonoma de Mexico, Geophysical Institute, Mexico DF, Mexico (denis@geofisica.unam.mx), (2) EOST, Université de Strasbourg, 5, rue Descartes, F-67084 Strasbourg Cedex, France, (3) Departamento de Geofísica, Universidad de Chile, Chile, (4) SCHLUMBERGER, 4903 Mayfair St, Bellaire, TX 77401, USA, (5) CNRS/IRAP, Observatoire Midi-Pyrénées, 14 Av. Edouard Belin, 31400 Toulouse, France

Before seismological catalogs were routinely produced, seafarers experienced major seismic events at sea that were documented in their logs. This article analyzes some of these old records—mostly from eighteenth and nineteenth centuries—in the context of plate tectonics. Large shocks that were felt on ships are related either to earthquakes, sub-marine volcanic eruptions, or to sub-marine sliding of rocks and/or sediments. We analyze various related parameters such as the location and size of the shaking, the duration of the shock, and the associated noise. A total of 396 observations have been retained for this study, mostly located in the Atlantic Ocean, reflecting its intense maritime traffic during the period of interest. Some of the detailed accounts allow us to clearly identify the nature of the shocks, including a possible interpretation in terms of focal mechanism. Our results, when compared to historical catalogs, reveal many previously undetected large events. Macro seismic results for a few large historical events occurring near the coasts confirm the validity of our approach, but also reveal its limitations. The good locations of most of the events allow us to relate them to plate boundaries. The Romanche transform zone has deserved particular interest due to the large number of related testimonies. This study particularly illustrates that historical seismicity may be applied to oceans. The collected testimonies also show how impressive and dangerous these large earthquakes at sea are, despite the absence of S-waves.