Geophysical Research Abstracts
Vol. 17, EGU2015-10617, 2015
EGU General Assembly 2015

Real-Time Moment Tensor Inversion for Tsunami Warning in the Western Iberian Peninsula

Jaime Convers (1), Dina Vales (2), Fernando Carrilho (2), and Susana Custodio (1)

(1) University of Lisbon, Faculdade de Ciências, Instituto Dom Luiz, Lisboa, Portugal (susanacustodio@campus.ul.pt), (2) Instituto Português do Mar e da Atmosfera, Lisboa, Portugal

The recent increase in the number of broadband seismic stations and real-time data accessibility in Portugal, western Iberia, now allows the implementation of early moment tensor inversion for moderate to large earthquakes occurring in Portugal and offshore the western Iberian peninsula. In this presentation, we report on the implementation of real-time algorithms to infer earthquake source at IPMA (Instituto Português do Mar e da Atmosfera), the Portuguese institution responsible for seismic monitoring. These methods automatically take the information contained in full seismic waveforms to infer earthquake depth, centroid, moment magnitude and focal magnitude, amongst others. The results obtained will later be fed into a tsunami warning system under development.

Given the long recurrence times of moderate to large earthquakes in Portugal, which results in a lack of data to properly calibrate algorithms, and given the challenging regional geographical setting (which results in a large azimuthal gap), we use a result-redundancy approach, in which three previously developed tools for moment tensor inversion are implemented (PYTDMT, KIWI, SCISOLA). The simultaneous use of the three codes allows us to test their performance for earthquakes in our dataset and region of interest, as well as to assess network reliability, station data quality, and result consistency.

One of the main issues with real-time earthquake studies nowadays, where large amounts of data are available, is the automatic selection of high-quality data and exclusion of poor-quality data. Therefore, we develop automated quality control procedures for data selection, and assess their impact in the stability of the inversions as well as their contribution in the improvement of the latency in real-time results. Assessing the reliability of the network, available source inversion methods, and automatically selecting high-quality data for the inversions is of paramount importance, not only for our real-time monitoring system, but also for other regions with similar restricted regional station coverage aiming at the automatic computation of moment tensor inversions.