



## Seismicity And Accretion Processes Along The Mid-Atlantic Ridge south of the Azores using data from the MARCHE Autonomous Hydrophone Array

Julie Perrot (1), Melis Cevatoglu (2), Mathilde Cannat (3), Javier Escartin (3), Marcia Maia (1), Chantal Tisseau (1), Robert Dziak (4), and Jean Goslin (1)

(1) Laboratoire Domaines océaniques, IUEM-UBO/CNRS, place Nicolas Copernic, 29280 plouzané, France (julie.perrot@univ-brest.fr), (2) National Oceanography Centre, University of Southampton, Waterfront Campus, European Way, Southampton, UK, (3) Géosciences Marines, IPGP, 1 rue Jussieu, 75238 Paris Cedex 05, France, (4) PMEL/NOAA, Hatfield Marine Science Center, Newport, OR 97365, USA

The seismicity of the South Atlantic Ocean has been recorded by the MARCHE network of 4 autonomous underwater hydrophones (AUH) moored within the SOFAR channel on the flanks of the Mid-Atlantic Ridge (MAR). The instruments were deployed south of the Azores Plateau between 32° and 39°N from July 2005 to August 2008. The low attenuation properties of the SOFAR channel for earthquake T-wave propagation result in a detection threshold reduction from a magnitude completeness level ( $M_c$ ) of  $\sim 4.3$  for MAR events recorded by the land-based seismic networks to  $M_c=2.1$  using this hydrophone array. A spatio-temporal analysis has been performed among the 5600 events recorded inside the MARCHE array. Most events are distributed along the ridge between lat. 39°N on the Azores Platform and the Rainbow (36°N) segment.

In the hydrophone catalogue, acoustic magnitude (Source Level, SL) is used as a measure of earthquake size. The source level above which the data set is complete is  $SL_c=205$  dB. We look for seismic swarms using the cluster software of the SEISAN package. The criterion used are a minimum SL of 210 to detect a possible mainshock, and a radius of 30 km and a time window of 40 days after this mainshock (Cevatoglu, 2010, Goslin et al., 2012). 7 swarms with more than 15 events are identified using this approach between 32° et 39°N of latitude. The maximum number of earthquake in a swarm is 57 events. This result differs from the study of Simao et al. (2010) as we processed a further year of data and selected sequences with fewer events. Looking at the distribution of the SL as a function of time after the mainshock, we discuss the possible mechanism of these earthquakes : tectonic events with a "mainshock-aftershock" distribution fitting a modified Omori law or volcanic events showing more constant SL values. We also present the geophysical setting of these 7 swarms, using gravity, bathymetry, and available local geological data. This study illustrates the potential of hydrophone data to monitor segment-scale ridges processes in the vicinity of the Lucky Strike seafloor observatory (lat. 37°20'N), the Azores node of the EMSO (European Multidisciplinary Subsea Observatory) system.

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