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Long-term temporal and spatial distributions of the seismicity along the North Mid-Atlantic Ridge observed with a regional autonomous hydrophone array

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The seismicity of the North Atlantic Ocean has been monitored by an array of four autonomous hydrophones moored within the SOFAR channel on the flanks of the Mid-Atlantic Ridge (MAR). The instruments were deployed north of the Azores Plateau between latitudes $40°20'$N and $5°30'$N from May 2002 to September 2003. Due to the low-attenuation properties of the SOFAR channel, acoustic signals generated by earthquakes (the "T-waves") can travel to long distances to very distant hydrophones (up to several thousand kilometres). Using hydrophone arrays results in a major reduction of the detection threshold, from a magnitude completeness level (Mc) of ~ 4.7 for MAR events recorded by land-based seismic networks to a Mc $\simeq 3.0$. Hydrophone arrays thus allow us to record and locate from 20 to 30 times more numerous ridge earthquakes than do land-based networks.

Three large earthquakes with a magnitude greater than 5 occurred within the SIRENA array within the sixteen-month period of its operation (on 11 November 2002, 7 May 2003 and 27 August 2003) and are listed in the NEIC catalog. Sequences of events following these three large earthquakes have been clearly observed on the hydrophone data set.

A Modified Omori Law (MOL) was fitted to each individual sequence. Preliminary results show that two sequences can be fitted by a MOL, suggesting a "mainshock-aftershock" distribution of events, which would be the result of a tectonic process. The obtained MOL are consistent with similar studies made by Bohnenstiehl *et al.* (2002) on events occurring on the MAR south of the Azores. As it cannot be fitted by

a MOL, the last sequence is more likely to be due to magmatic processes.

Bohnenstiehl *et al.*, Aftershock sequences in the mid-ocean ridge environment: an analysis using hydroacoustic data, *Tectonophys.*, 354, 49-70, 2002.