Geophysical Research Abstracts, Vol. 8, 04028, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04028

Turbidite sequences in the deep basins offshore SW Iberia, as possible paleoseismological markers

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The Gulf of Cadiz (SW Iberia) is a tectonically complex area at the Africa - Eurasia plate boundary. Recent geological and geophysical data indicate a small east dipping subduction beneath the Gulf of Cadiz and the Gibraltar arc (Gutscher, 2004). In this tectonic setting, a great earthquake (M=8.7) struck the region on 1 November 1755 and generated a large tsunami, destroying the city of Lisbon and the coast of SW Spain and NW Morocco. Gravity cores and box cores collected in Horseshoe and Tagus abyssal plains (offshore SW Iberia) show turbidite deposits (Lebreiro et al., 1997). The uppermost turbidite sequence in both deep basins corresponds to the 1755 event (Weaver and Thomson, 1994) and indicates that great earthquakes trigger large submarine landslides, recorded in the deep marine sedimentation. In the Horseshoe Basin, 20 turbidite sequences were identified, spanning the last 35 ky (Lebreiro et al., 1997).

The assessment of seismic risk in SW Iberia is based on the relatively short period of instrumentally and historically recorded earthquakes. Only a paleoseismological approach, based on the deep-marine sedimentary record, can enable us to identify prior tectonic activity of major faults and thus determine the earthquake recurrence rate (seismic cycle). During the Delsis cruise (April 2005), we collected 5 gravity cores, located in the proximal part of Horseshoe and Seine abyssal plains in order to sample gravity deposits generated by great earthquakes. The objectives were to locate the 1755 active fault and to better constrain the seismic cycle of great earthquakes. Two cores in the eastern Seine basin and one in the eastern Horseshoe abyssal plain show a succession of turbidite sequences and offer good perspectives of dating the main

sedimentary events and correlating them with the sequences observed in other basins. Such correlations can indicate the synchronous triggering of submarine landslides in morphologically disconnected basins and sub-basins and thus demonstrate the seismic origin of turbidites. This information will allow us to determine the mean length and the variability of the recurrence interval between great earthquakes. Finally, it can help confirm or eliminate proposed candidate sources for the great 1755 earthquake.

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