Geophysical Research Abstracts
Vol. 13, EGU2011-13082, 2011
EGU General Assembly 2011

The earthquake sedimentary record of the Marmara Sea, Turkey

Laureen Drab, Aurélia Hubert Ferrari, Sabine Schmidt, Julie Carlut, Elisabeth Michel, Philippe Martinez, and Jean-Luc Schneider

France (drab@geologie.ens.fr)

The North Anatolian Fault (NAF) is a 1500km long dextral strike-slip fault that accommodates the extrusion of the Anatolian Plate away from the Arabia/Eurasia collision zone at a rate of 20-25mm/yr. The NAF is a very significant hazard for the 12 million people living in the mega city of Istanbul (Turkey) particularly since the submerged portion of the fault was bought further near the failure by the 1999 Izmit earthquake and is considered as a seismic gap. Our project, named SEISMARM, seeks to provide a spatio-temporal understanding of earthquakes in the Marmara Sea allowing greater insight into long-term fault behavior and seismic interaction by integrating historical and new paleosismological data.

We have studied seven 4m long Kullenberg piston cores collected during Marmarascarps Cruise (MSC) in autumn 2002. These cores sample the Tekirdag (KLG05 and KLG08), the Central (KLG02), the Çınarcık (KLG03 and KLG04) and the Western High (KLG06, KLG07) Marmara sea basins. The KLG05 (Tekirdag Basin) and KLG02 (Central Basin) cores can be readily correlated to the 1.1 m long C8 and the 3.5 m long C4 cores studied in McHugh (2006). The sedimentary records in all KLG cores can be linked because there is a clear transition between the upper terrigenous sediments and the lower sapropelic sediments characterized by low magnetic susceptibility. The Marmarascarps Cruise cores show numerous seismic sedimentary events, first documented in the preliminary works of Ferger (2005) and Van Welden (2007).
We characterized earthquake-related sedimentary events by combining X-ray imagery, magnetic susceptibility, granulometry, TOC and XRF measurements. Major sedimentary events can be traced from Tekirdag Basin (KLG05 and KLG08) to the Western High (KLG06, KLG07), and between the two cores of the Çınarcık Basin. We also aim at establishing a reliable and robust chronology of the KLG cores combining radiocarbon dating and recorded magnetic variations (remanence, saturation of magnetization, magnetic mineralogy, paleodirection and paleointensity). Downcore changes in magnetic properties suggest taking into account possible delays in the acquisition of magnetization. The obtained age model will also provide more robust constraints on the reservoir effect in the Marmara Sea.

References:
Van Welden PhD manuscript 2007
Ferger Etude multi echelle de la sédimentation co-sismique en Mer de Marmara (Turquie) Reports Master ENVHOL 2005
C.McHugh L.Seeber, MH.Cormier, J.Dutton, N.Çagatay, A.Polonia, W.B.F.Ryan, N.Gorur EPSL 248 (2006) 661–684