Eastern Mediterranean Centre for Oceanography and Limnology
Doğu Akdeniz Oşinografi ve Limnoloji Araştırmaları Merkezi
İstanbul Technical University

İstanbul, 28 November 2015

Dr. Christian Hensen
Chair of the COST Action: ES1301
GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel
Wischhofstr. 1-3
24148 Kiel, Germany

Reference Number: COST-STSM-ES1301-30321
Period: 2015-11-15 00:00:00 to 2015-11-20 00:00:00
COST Action: ES1301
STSM type: Regular (from Turkey to France)

Report on Short Term Scientific Mission (STSM) between ITU-EMCOL (Istanbul, Turkey) and CEREGE (Aix-en-Provence, France) during 15-20 November 2015

The main objective of the ongoing collaborative studies between ITU-EMCOL (Istanbul, Turkey) and CEREGE (Aix-en-Provence, France) is to date the past earthquake, mass transport, tsunami and fluid expulsion events, and determine slip rates on different segments of the North Anatolian Fault (NAF) by determining ages for some key seismic reflectors by establishing a reliable chronostratigraphy of cores and correlating it with seismic sections. The studied cores were recovered from the Sea of Marmara on board the Ifremer vessel RV "Pourquoi Pas?" during the Marsite cruise held from October 28th to 17th November, 2014 (Fig. 1). The cores is estimated to extend a few hundred thousand years before present. The results of the collaborative studies between ITU and CEREGE will have important implications for seismic risk assessment for the different segments of NAF, and for deciphering the relations between earthquakes and fluid activity. This Cost short-term scientific mission 30321 was carried during 15-20 November, 2015 at CEREGE to contribute mainly to the ongoing core chronostratigraphic studies at ITU and CEREGE.

Two sets of cores in Istanbul and Aix-en Provence are being studied by the ITU-EMCOL and CEREGE groups involving one PhD student (Julia Kende) in CEREGE and one PhD (Nurbike Sağdıç) and one MSc (Nurettin Yakupoğlu) students in ITU. The STSM study at CEREGE involved lithostratigraphic description of up to 23 m-long cores MRS-CS-22, MRS-CS-23 and MRS-CS-26 and their correlation with the cores MRS-CS-18, MRS-CS-19 and MRS-CS-27 in Istanbul, using lithology (tephra, sapropels) and physical properties (MSCL magnetic susceptibility and gamma density). Some cores (e.g., MRS-CS-19, MRS-CS-22) extend back to Marine Isotope Stage 5 (MIS-5) while the base of others (e.g., MRS-CS-18)

are possibly as old as MIS-7. The study group involved Namik Çağatay, Pierre Henry, Kadir Kürşad Eriş and Julia Kende. The core studies were made mainly for the PhD thesis work of Julia Kende and her training in core description, including the identification of key stratigraphic marker horizons (e.g., marine/ and lacustrine transitions, tephra, sapropels), early sediment diagenesis and diagenetic structures (e.g., redox fronts, carbonate nodules, Fe-monosulfide bands, spots and patches) and other sedimentary structures (e.g., soft sediment deformation, gas escape, turbidites) (Fig. 2).

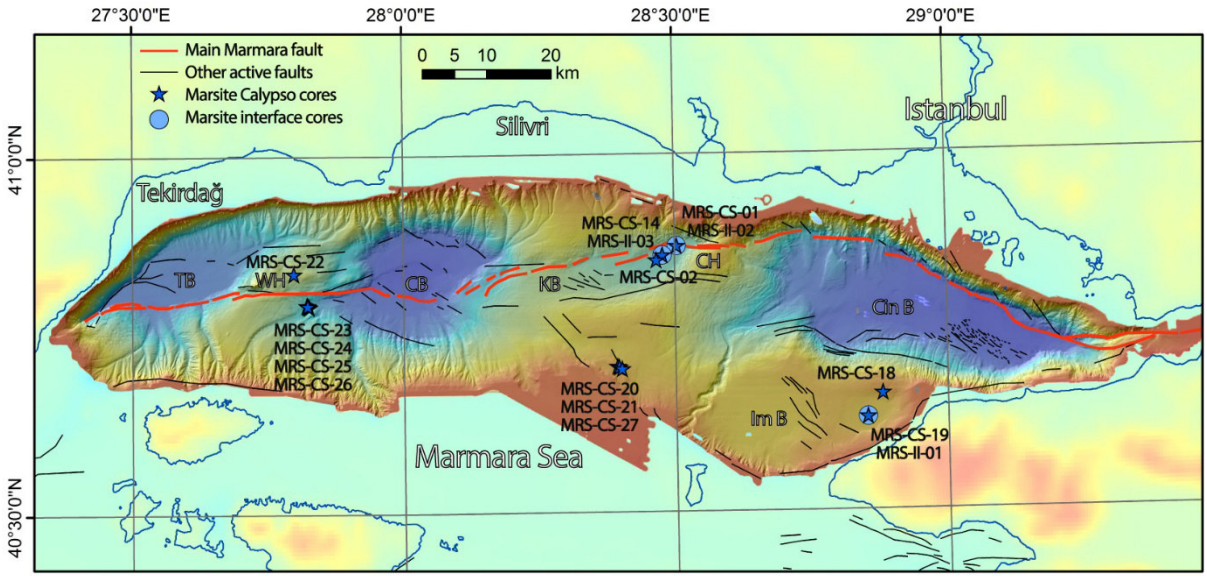

Figure 1: Multibeam map of the Sea of Marmara, with northern branch of NAF (red lines) and location of Calypso and Interface cores recovered during MARSITECRUISE in Oct.-Nov. 2014 (cores MRS-CS 17 to 21 in Imali Basin (Im B) in the east and MRS-CS-01, MRS-CS02, all cores in Kumburgaz Basin (KB) are at ITU-EMCOL; cores MRS-CS-22 to 26 on the Western High (WH) are at CEREGE).

A meeting involving a series of seminars was held on Wednesday afternoon, 18th November 2015, with participation of Pierre Henry, Edouard Bard, Laurence Vidal, Kazuyo Tachikawa, Julia Kende, Namık Çağatay and Kadir Kürşad Eriş. Seminar presentations were delivered and discussions were held on the results of the ongoing studies on the cores in CEREGE and İstanbul. Plans for feature studies were discussed especially regarding Julia Kende's PhD thesis work. In addition to developing stratigraphic age models based on analyses of especially core MRS-CS-22 and core MRS CS-01 recovered in the Kumburgaz Basin for the seismoturbidite studies, Julia will do µ-XRF analysis of the cores and calibrate total organic carbon analysis with µ-XRF Br and µ-XRF Ca with ICP-MS Ca. Friday, 20th November 2015 was devoted to smear slide study of samples prepared from the described cores to identify lithology, tephra and nannofossils.

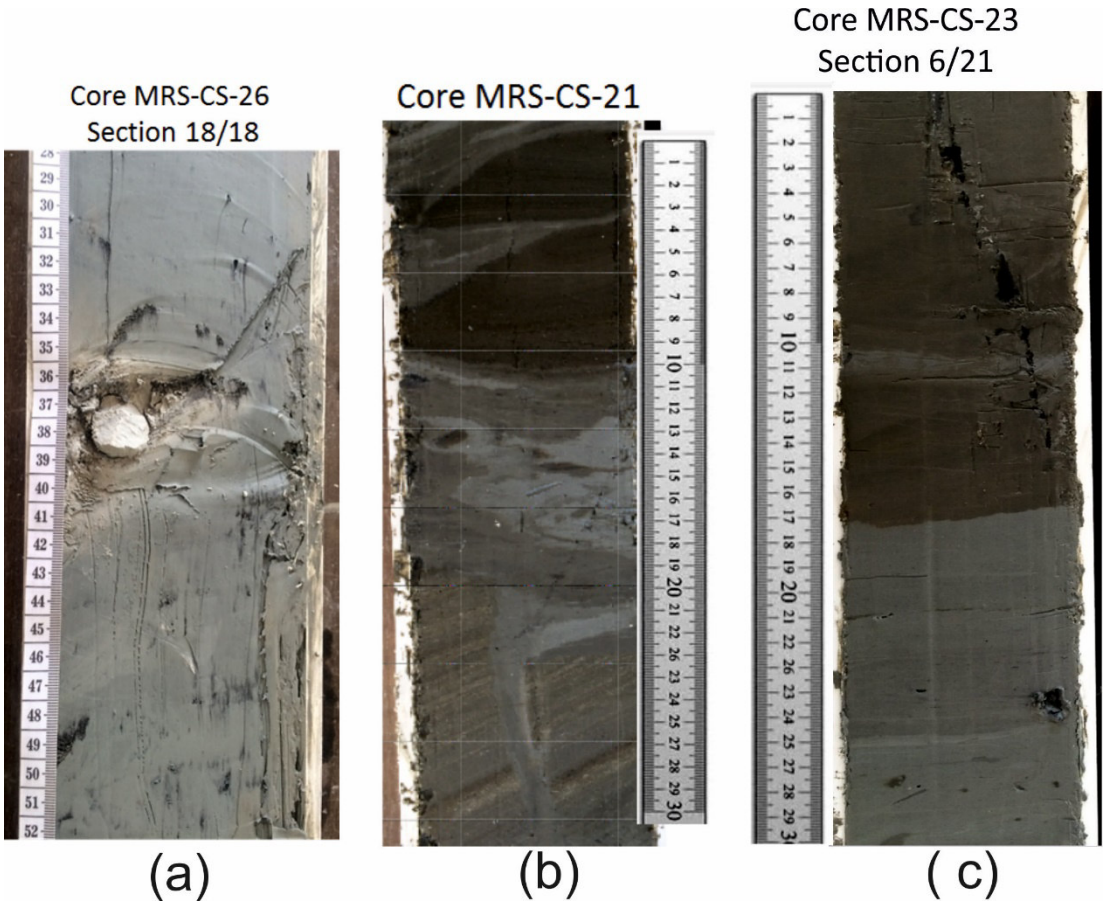

Figure 2: (a) A diagenetic carbonate nodule surrounded by a beige carbonate rich zone in lacustrine mud, possibly formed at methane/sulphate boundary. Note also the 4-5 mm-thick dark elongated sand pipes. (b) A vertical fluid vent, which is infilled with grey mud, cuts through tilted laminated sapropel. It is overlain by deformed grey mud possibly supplied by the pipe, which is in turn overlaid by deformed marine and lacustrine sediments. The whole sequence is part of a slumped sedimentary succession. (c) Grey lacustrine mud is overlain by the dark green sapropel that is dissected by a gas escape structure which is partially filled with coarse silt-sand and black sulphide globules. This interval is characterized by high magnetic susceptibility and density.

This STSM helped the effective coordination of the studies and discussion of the results obtained by the two groups at ITU and CEREGE. It was also important for the training of Julia Kende at CEREGE and planning of future work.

M. Namık Çağatay

EMCOL, İTÜ Maden Fakültesi, 34469 Maslak, İstanbul
Tel: 90-212-2856211, Fax: 90-212-2856080