Geophysical Research Abstracts, Vol. 8, 07807, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07807

EC-PROMESS1 project: Stratigraphic synthesis and geotechnical characterisation of borehole PRAD2 (Lateglacial-Holocene on the western Adriatic shelf)

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The PROMESS1 PRAD2 site includes two continuous sediment cores (boreholes PRAD2-4 for stratigraphy and PRAD2-5 for geotechnical studies), *in situ* cone penetration measurements (CPTU; boreholes PRAD2-3 and PRAD2-6) and spectral gamma ray downhole logging (borehole PRAD2-4) of a stratigraphic succession on the western flank of the Adriatic continental shelf in 56 m water depth. The sedimentary succession is composed mainly of marine silty clay (0 to 27 mbsf) and alternating fine sand and clay (27 to 32 mbsf). The upper 20 m of sediment show seafloor and subsurface undulations on reflection-seismic profiles, representing sediment deformation features with limited displacement, muddy bedforms or a combination, and whose interpretation justified a set of geotechnical measurements.

The chronology of the sedimentary succession is based on a regional correlation to stratigraphic units identified on reflection-seismic profiles that were dated in other sediment cores with ecobiostratigraphy of planktic and benthic foraminifera, magnetic parameters (including secular variations in inclination and declination of the Earth magnetic field), oxygen isotope stratigraphy, radiocarbon dating, palynology and tephrochronology. The sedimentary record of the borehole represents the deposit of the last sea level highstand (HST, aged 5.5 kyr to present) and part of the previous transgression. Seismic correlation indicates that: 1) the sandy layers at the base correspond to a progradational unit emplaced during the Bolling/Allerod and Younger Dryas periods culminating in a sharp submarine erosional surface at 27 mbsf; 2) the

maximum flood surface (mfs) at the base of the HST is at ca. 21 mbsf; 3) above the mfs there is a seismic unit characterized by discontinuous seismic reflectors at the top, marking a condensed interval between approximately 5.5 and 3.7 kyr; above this condensed unit undulations are present. We show here the result of the direct analysis of the sedimentary succession using integrated stratigraphic techniques and *in-situ* and laboratory geotechnical tests.

Due to the shallow depth of PRAD2 site, we used benthic ecozones to identify the position of the mfs. In particular we noted that from 21 mbsf upwards the benthic association is abundant with frequent *E. granosum* and $B.$ ex gr. *marginata*, some *V. complanata* and *C. laevigata carinata*, while plankton is rare and composed by *G. ruber*, *G. sacculifer*, *Orbulina*, and *G. aequilateralis*. Below 21 mbsf, the presence of benthic species *U. peregrina*, *G. laevigatus*, and *H. balthica* suggests a relatively deeper setting, that corresponds to the peak marine ingression at the base of the HST.

In-situ measurements and geotechnical tests confirm the existence at 20.5 mbsf of a 1-m thick silty clay layer immediately above the mfs, coarser than the surrounding sediment. This level resulted the most sensitive to earthquake loading in triaxial cyclic tests. Calculation of the potential liquefaction of sediment from PRAD2 site under an earthquake shaking (comparable in magnitude with those measured in this area) shows that sediment liquefaction of the silty clay level above the mfs was possible when its burying was less than 5 m. (Work supported by contract EC EVR1-2001-00041).