Geophysical Research Abstracts, Vol. 8, 04868, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04868

Imaging of a new province of seabed cold seeps in the northern Ionian Sea (Calabrian Arc) – towards ecosystems mapping

S. Ceramicola (1), D. Praeg (1), X. Monteys (2), V. Unnithan (3), N.Wardell (1), A. Cova (1), S. Garziglia (4), OGS Explora Scientific Party (1)

(1) Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Trieste, Italy, (2) Geological Survey of Ireland (GSI), Dublin, Ireland, (3) International University Bremen (IUB), Germany, (4) Geosciences Azur, Villefranche sur Mer, France

(sceramicola@ogs.trieste.it / Phone: +39 040 213 0341)

In summer 2005 the Italian research vessel OGS Explora discovered a new province of deep-water cold seeps in the northern Ionian Sea offshore Calabria (Italy). The purpose of the HERMES-HYDRAMED IONIO campaign was to investigate shallow fluid/gas escape processes on the Calabrian Arc, which has been formed during the subduction of the African plate beneath the European plate over the last <5 Ma and was thought likely to contain cold seep features by analogy with the larger accretionary prism of the Mediterranean Ridge to the east. The full geophysical and geological dataset is still under investigation, but here we present a preliminary summary of the results being obtained from multibeam data (bathymetry, backscatter, Chirp profiles), seismic reflection data (2D & 3D), gravity measurements and gravity cores.

The new province includes a variety of seabed features, which were investigated in detail in two areas: the Explora Mounds on the inner Arc (in the Spartivento Basin) and the Pythagoras Mounds on the outer Arc (60 km south). The Explora mounds include mud cones, whereas the Pythagoras mounds include a large mud pie. The Explora mounds lie within a fault-bounded seabed depression and include a pair of seabed cones referred to as the Gemelli, each up to 1.5 km wide and 200 m high, that seismic data show to comprise unstratified lenses up to 300 ms thick that interfinger with the flanking Plio-Quaternary succession. The Pythagoras mounds are dominated by a circular mud pie up to 8 km wide and 250 m high, referred to as the Ciccione, the top of

an inverted sediment cone that extends at least 2 seconds below seabed above inward dipping reflectors. Gravity cores from both the Gemelli and the Ciccione proved grey mud breccias (diamicts containing angular sedimentary clasts to cobble size) to lie at or near seabed, while gas was observed escaping from some cores, suggesting active mud volcanism.

One week of the campaign was dedicated to the acquisition of a shallow 3D-seismic volume across the Gemelli (see accompanying poster by Praeg et al.). A grid of 109 short-offset (600 m) multichannel profiles were acquired at a nominal spacing of 25 m across an area of 2.8 x 4.5 km. These data will be used to examine the geometry and rooting structure of the mud volcanoes and their relation to geophysical indicators of shallow gas and/or fluids. Future work will include analysis of the gravity data to better constrain the character of the mud volcanoes.

ACKNOWLEDGEMENTS: HERMES (Hotspot Ecosystem Research on the Margins of European Seas, http://www.eu-hermes.net/) is an EC FP6 Integrated Project (Contract No. GOCE-CT-2005-511234-1). The HYDRAMED project is funded by a Marie Curie Intra-European Fellowship within the European Community 6^{th} Framework Programme (EC FP6 contract MEIF-CT-2003-501814).