DISTRIBUTION OF MUD DIAPIRISM AND OTHER GEOLOGICAL STRUCTURES FROM LONG-RANGE SIDE-SCAN SONAR (GLORIA) DATA, IN THE EASTERN MEDITERRANEAN SEA

Nicoletta FUSI[1] & Neil H. KENYON[2]

[1] Dipartimento di Scienze della Terra, Universita' degli Studi di Milano, via Mangiagalli 34, 20133 Milano, Italy

[2] Institute of Oceanographic Sciences, Wormley, Surrey, GU85UB, United-Kingdom

Extensive long range sidescan sonar coverage, obtained with the GLORIA system in the eastern Mediterranean eea, has been reinterpreted in the light of subsequent "ground truth" data. Several types of high back-scattering patches are recognized.

About 150 circular to sub-circular patches have been identified on the shallower and inner part of the Mediterranean Ridge accretionary complex. Some can occur in groups or in ridge parallel alignments, associated with deep-seated structures (KENYON *et al.*, 1982). On the basis of core stratigraphy they have been interpreted as mud volcanoes and mud ridges, with surface or near surface mud breccia (CAMERLENGHI *et al.*, 1992). It seems that mud volcanoes are not imaged by the 6.5 kHz GLORIA system if there is a cover of more than about 2 m of pelagic sediments. Few high back-scattering patches are present in these external parts of the Calabrian and Cyprus arcs that have been surveyed. It is thus confirmed that mud diapirism is more common where the covering Messinian salt is thinner; this occurs on the crest and inner part of the Mediterranean Ridge (CAMERLENGHI *et al.*, in press).

Larger, more elongated patches, up to 80 km long and usually associated with steep slopes, are found in the Hellenic Trough System; they are attributed to hard rock outcrops (HUCHON *et al.*, 1982). Similar shaped patches, associated with lower relief, found near the eastern and western ends of the Mediterranean Ridge, are attributed to dissolved evaporites at the top of salt diapirs which leave a rough, karst like surface topography. Other elongate patches of high backscatter at the foot of the Nile Cone may be due to differences in grain size and/or to chemical crusts; they are on diapiric fold crests that are probably due to salt mobilisation (SMITH, 1976). A few small circular patches, found at the foot of scarps on the Nile Cone, are attributed to debris flow deposits.

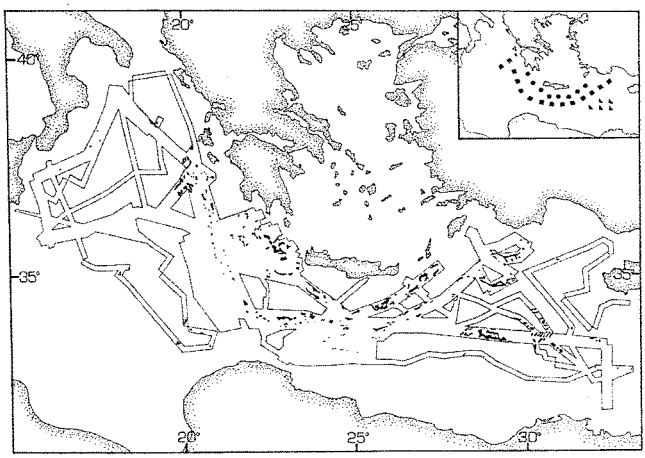

Fig. 1 - Distribution of high back-scattering patches within the GLORIA coverage. Inset: dots = Hellenic Trough, squares = Mediterranean Ridge, triangles = Nile Cone.

G

REFERENCES

CAMERLENGHI A., CITA M. B., HIEKE W. and RICCHIUTO T., 1992. Geological evidence for mud diapirism on the Mediterranean Ridge accretionary complex. *Earth Planet. Sc. Letters,* 109 : 493-504.

CAMERLENGHI A., CITA M. B., DELLA VEDOVA B., FUSI N., MIRABILE L. and PELLIS G., in press. Geological evidence for mud diapirism on the Mediterranean Ridge accretionary complex. *Mar. Geophys. res.*

HUCHON P., LYBERIS N., ANGELIER J., LE PICHON X. and RENARD V., 1992. Tectonics of the Hellenic Trough : a synthesis of sea-bream and submersible observations. *Tectonophysics,* 86 : 69-112.

KENYON N. H., BELDERSON R. H. and STRIDE A. H., 1982. Detailed tectonic trends on the central part of the Hellenic Outer Ridge and in the Hellenic Trough system. *In* : J. K. Legett (Ed.), Trough forearc geology : sedimentation and tectonics on modern and ancient active plate margins. Spec. Publ. Geol. Soc. London, 10 : 335-343.

SMITH S. G., 1976. Diapiric structures in the eastern Mediterranean Herodotu basin. *Earth Plant. Sci. Letters,* 32 62-68.