PRELIMINARY RESULTS FROM SEAMARC I, SEABEAM AND PHOTOGRAPHIC SURVEYS ALONG THE MARGINS OF THE MEDITERRANEAN RIDGE

by

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SUMMARY: High resolution side-scan sonar, bathymetric and photographic surveys have been conducted at four sites on the perimeter of the Mediterranean Ridge. Sites were chosen to compare the deformation style of the northern (concave) side of the Ridge versus the southern (convex) side, and the eastern (strike-slip?) end of the Ridge versus the western (convergent?) end.

RESUME: Des études bathymétriques et photographiques, des analyses à l'aide d'un sonar latéral à haute résolution ont été réalisées sur le périmètre de la chaîne méditerranéenne. Les sites furent choisis en vue de comparer la déformation du versant concave (nord) et la déformation du versant convexe (sud) de la chaîne. Furent également étudiées les extrêmités est (strike slip ?) et ouest (convergent ?) de la chaîne.

We conducted high-resolution surveys along the edge of the Mediterranean Ridge where the Ridge contacts the Sirte Abyssal Plain, the Herodotus Abyssal Plain, the Pliny-Strabo Trench system and the Matapan Trench, and at Victor Hensen Seahill. Survey Tools were the SeaBeam multi-beam echo sounder, the L-DGO camera system, and the SeaMARC I deep-towed swathmapping system.

After a brief cruise report, this talk will focus on results from the contact between the Sirte Abyssal Plain and the Mediterranean Ridge. This contact forms an extremely abrupt "deformation front." Along the outermost edge of the Ridge, within 10-15km of the abyssal plain, surficial sediments have been deformed into ridges and troughs which we tentatively interpret as folds. These folds(?) have wavelengths of .5-2 km and waveheights of 20-150m. In plan view, the ridge and trough fabric generally parallels the NW-SE trending

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regional contours, suggesting the folds(?) formed in response to compression orthogonal to the Mediterranean Ridge. The outermost ridge is shedding a debris apron out onto the abyssal plain, implying that uplift and deformation are ongoing.

Higher on the Ridge, at distances greater than 15km from the deformation front and heights of more than 500m above the abyssal plain, a second style of deformation is superimposed on the ridge and trough terrain. Sharp-edged, fine-grained side-scan lineations with very little vertical relief trend ENE and NNW across the ridges and troughs. We tentatively interpret these lineations as the traces of conjugate strike slip faults formed in the same compressional regime which formed the NE/SW trending folds.

Out in the Sirte abyssal plain, 10km south of the deformation front, we encountered an isolated NNE/SSW trending ridge 8km long, 1.5 km wide, and 150m high. The morphology and trend pf this feature are reminiscent of Victor Hensen Seahill in the Messina Abyssal Plain. Victor Hensen Seahill appears to be old (at least pre-Messinian) and positively magnetized. We suggest that both Victor Hensen and the newly discovered "seahill" in the Sirte Abyssal are fracture zone ridges formed at transform faults active during sea-floor spreading of the Ionian Sea. This hypothesis is easily tested by drilling because fracture zone ridges have a distinct petrologic makeup. If true, this inference will provide a much-needed constraint on tectonic reconstructions of the opening of Tethys since fracture zones form small circules about the pole of plate rotation.