CONTRIBUTION OF SUBMERSIBLE CYANA SP3ooo DEEP DIVES TO THE GEOLOGICAL EXPLORATION OF THE THYRRHENIAN SEA

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RESUME':

Plusieurs affleurements rocheux en correspondance d'escarpements de faille et de montagnes sousmarines de la Tyrrhénienne centrale et méridionale ont étè explorés en plongée profonde par le submersible CYANA dans le but d'en connaître la stratigraphie et de prélever des échantillons bien localisés.

The french submersible CYANA SP3ooo has been used to collect samples of outcropping roches and to study directly underwater the stratigraphy and setting of some fault escarpements and seamounts in the Central and Southern Thyrrhenian Sea. The cruise, organized by the Groupe d'Etude de la Marge Continentale de l'Universitée P. & M. Curie, Paris, in cooperation with the Istituto di Geologia Marina, C.N.R., Bologna, has been carried out on board of the R/V LE SUROIT from August 14th to September 11th, 1984. Scientists spent more than 95 hours on the seafloor down to the maximum depth of 3000 m observing, sampling and obtaining about 3500 still photographs and a complete continuous TV records. The selected dive sites were located on the Central Fault and on the De Marchi, Vavilov, Flavio Gioia and Issel seamounts, where a large amount of data were previously collected by classical geological and geophisical surveys from the surface.

These surface data allowed to advance hypothesis on the origin and evolution of the Thyrrhenian Sea but there are still

many doubtful points and generally no sufficient details. Samples are reather scarce and their location, for example, is often doubful. Moreover it is always very difficult to clarify the geometric relationship amoung sampled terrains. By diving scientists have therefore tried to observe and verify with full details stratigraphy and fracture patterns. Data of maximum interest regarding the outcropping basement and the sedimentary cover have been so collected. Results are still worked out by many specialists.

Regarding the use and the great interest of this deep sea vehicle, we have to note that some important limits exist, due both to the submersible itself and the thyrrhenian deep environment. For what is concerning the submersible we observe: 1) that visual field is very narrow and for their position scientific observer, pilot, photographic and television systems dont see exactly the same points, and 2) the mechanical arm has pliers in general not able to detach pieces of compact rocks from an outcrop. Just about this problem we have nevertheless to emphasize that many vain attempt of sampling are due to the characteristics of outcrops: at depth between 2ooo and 3ooo m rocks, and above all the steep slopes, are frequently covered by dense colonies of dead white corals (Desmophyllum) coated by a black manganese film; moreover a few tens of centimeters thick, very hard calcareous crust carpets the outcrops and cements all elements, often forming compact breccias. Very rare are loose debris at the foot of escarpements.

These facts arouse a kind of frustration sense in the observer, who frequently is obliged to give up the sampling and only can describe and photograph the object of his study.

In spite of these limitations, diving remains an irreplaceable chance offered to scientist who can personally ascertain and not only think out and interpret fenomena. There is the taste of new finding, also if, in the present state of the art of our knowledge of deep sea environments, divers meet more new problems than resolutions .