

## Contribution à l'étude tectonique de la mer Ligure

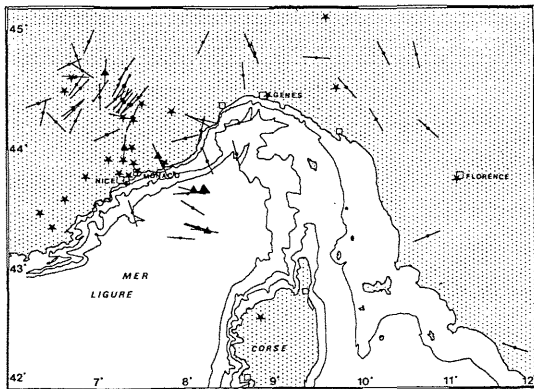
N. BETHOUX\*, P.Y. DELPECH\*, et C. EVA\*\*

\* Centre Scientifique de Monaco, 16 boulevard de Suisse, 98030 Monaco Cedex (Principauté de Monaco)

\*\* Istituto Geofisico, Genova (Italia)

La multiplication des stations sismologiques et la généralisation des enregistrements magnétiques permettent d'obtenir des résultats beaucoup plus précis sur la sismicité d'une région et par conséquent des renseignements complémentaires sur la tectonique.

Des sismogrammes synthétiques correspondant à des événements de la mer Ligure et du sud des Alpes Occidentales ont été calculés par la méthode des nombres d'ondes discrets. Nous montrons qu'à partir d'une assez bonne connaissance de la structure de croûte régionale, il est possible d'obtenir une meilleure précision de la profondeur du séisme que par les méthodes de localisations. Ainsi, au centre du bassin, les foyers des événements étudiés seraient soit dans le manteau soit à la base de la croûte alors qu'au pied du talus, ils seraient en haut de la croûte et nettement superficiels à la côte.



Axes de contrainte répertoriés en mer Ligure et dans les régions avoisinantes.

- > Axes de Pression.
- ★ Stations sismologiques.
- ▲ Séismes modélisés.

Nos nouveaux calculs de mécanismes au foyer complétant ceux décrits dans la littérature montrent une réorientation des contraintes entre le domaine océanique et la marge continentale. Un net régime de compression est observé dans le domaine le plus profond du bassin, où les axes de Pression sont orientés N 80-100; les décrochements respectivement dextres et sénestres observés sur la marge et sur la côte présentent des axes de Pression N 160-180; ils sont interprétés comme l'expression d'un régime compressif global issu d'un raccourcissement local N-S.

Si nous cherchons à inclure ces différents états de contrainte régionaux dans un ensemble plus vaste, nous constatons que la poussée qui s'exerce au niveau des Alpes occidentales peut se décomposer en mouvements secondaires propres à chaque région. Le blocage de la plaque Apulo-Adriatique vers l'ouest contre les massifs cristallins externes suggère la création d'un système de rotation complexe issu de cette poussée.

Le régime compressif mis en évidence en mer Ligure, ainsi que la concentration de la sismicité seraient dus à la situation particulière de cette région, bloquée entre la zone d'influence du poinçonnement alpin et le système de chevauchement crustal stable existant dans la région orientale du golfe de Gênes-Ile d'Elbe (suture Apenninique).

## Structural pattern of the Tuscan-Latium continental shelf (Tyrrhenian Sea)

R. BARTOLE\* and S. CANGIOTTI

\* Istituto di Geologia, Università, Via S. Chiara 27, 61069 Urbino (Italy)

The shallow crustal structure and stratigraphy of the southern Tuscany - northern Latium shelf, comprised between Elba island and Anzio, have been outlined on the basis of an old regional multifold seismic reflection survey. The calibration of the Matilde-1 offshore drilling (Agip, 1977) and the correlation with on-shore wells and outcroppings (C.N.R., 1982), supported by data from the literature, made it possible the distinction of three main seismo-stratigraphic units along with their principal features.

The upper unit characterized by continuous, generally undisturbed reflectors, is constituted by the post-orogenic sedimentary cover of upper Neogene-Quaternary age. This unit unconformably rests on an intermediate, or when absent, a basal unit, both constituted by the tectonized geologic units of the Northern and Central Apennines. The intermediate unit corresponds to the Ligurids and Sicilids allochthonous complexes, while the basal unit may be attributed to the following geologic units: the Tuscan Nappe and/or the Tuscan Autochthon in the shelf sector north of the Tiber river mouth; the Umbro-Sabine units south of the same mouth.

The tectonized substratum of the post-orogenic cover is characterized by numerous elongated, chiefly NW-SE trending depocenters, filled by sediments up to 1700 ms of double time. These narrow basins alternate with areas of structural highs, which in most cases have been interpreted as compressive features. NW-SE trends predominate, but E-W and N-S grains are also present, the former beneath the Latium shelf, the latter beneath the Tuscan one.

Many strike-slip faults, mostly of NE-SW (antiapenninic) trend, seem to cut the tectonized units, related to the differential tangential movements occurred during the compressive phases. Some of them are the prosecutions of onshore transcurrent lineaments described in the literature, such as the Grosseto-Val Marecchia line (auct.), or likely constitute their minor branches. Others are new lineaments separating zones of different structural characters. Among these, two seem connected to sharp variations of the magnetic basement depth (Cassano et al., 1986), so they could represent the shallow expression of deep-seated features. The faults with transcurrent characters are particularly frequent in the Tuscan portion of the shelf where they complicate the structural pattern and give rise to correlation problems.

At least two main diastrophic phases are recognizable from the seismic sections: a former phase, attributable to the early Miocene, is responsible for the last gravitational transport of the allochthonous complexes; a second phase, of compressional type and attributable to the middle-upper Miocene, strongly affected both the allochthonous sheets and their substratum, causing the upbuilding of many prominent features. A semiautochthonous sequence of local extension, comprised between the tectonized units and the post-orogenic cover, account for minor late orogenic compressive pulsations.

The post-orogenic sedimentation filled up depressions mainly inherited from the previous diastrophic phases, so that little to no movement affects the neoautochthonous sediments. An exception is given by a N-S trending deep basin placed in the Elba - Argentario sector, whose origin is mostly due to an E-W stretching of the crust which probably took place in the Messinian.

Two cycles compose the post-orogenic sequence: the lower one, made up of parallel reflectors, is referable to the transgression that affected the western Tuscany and Latium during the lower Pliocene (Ambrosetti et al., 1978); the upper cycle, somewhere characterized by a remarkable progradational configuration, is linked to the middle Pliocene emersion of the same areas, which led to the construction of the present continental shelf.

## References cited:

- AGIP (1977) - Temperature sotterranee. Inventario dei dati raccolti dall'Agip durante la ricerca e la produzione di idrocarburi in Italia. 1390 pp., Milano.
- AMBROSETTI P., CARBONI M.G., CONTI M.A., COSTANTINI A., ESU D., GANDIN A., GIROTTI O., LAZZAROTTO A., MAZZANTI R., NICOSIA U., PARISI G. & SANDRELLI F. (1978) - Evoluzione paleogeografica e tettonica nei bacini toscano-umbro-laziali nel Pliocene e nel Pleistocene inferiore. Mem. Soc. Geol. It., (19), 573-580.
- CASSANO E., FIGHERA R. & ARISI ROTA F. (1986) - Rilievo aeromagnetico d'Italia. Alcuni risultati interpretativi. 5° Convegno C.N.R. Gruppo Nazionale di Geofisica della Terra Solida. Roma 17-19 nov. 1986.
- C.N.R. - Pubblicazione n.429 (1982) - Carta strutturale dell'Appennino settentrionale. Foglio 3, Toscana.