

7-15 - POSSIBILITIES OF STRATIGRAPHIC CONTRIBUTIONS FOR THE SOLUTION OF
GEODYNAMIC PROBLEMS IN THE MEDITERRANEAN AREA -

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Outcrops of Upper Cenozoic deposits occur all over Crete; they cover about one third of the surface of the island.

From an unknown time level in the Oligocene until the Middle Miocene, following the main Alpine orogenic movements, Crete was part of a large, relatively stable block that was connected with some European mainland to the North. Submerged parts of this landmass have to be looked for in the Southern Aegean Sea in the North, off the eastern coast of the Sitia district in the East, and in the Libyan Sea in the area adjoining the Cretan south coast. There are no indications for any direct land connection to Africa and to Asia Minor.

Numerous smaller blocks delimited by predominantly N - S and E - W faults started to move in a vertical sense relatively to one another during the Middle Miocene. Movements continued to some time before the end of the Tortonian, constantly renewing the relief that determined the complex erosion and sedimentation pattern. The sea gradually invaded the lower areas causing terrestrial sedimentation to come to an end. During this time the land connection of the Cretan highs with the European mainland became interrupted.

From approximately the Tortonian - Messinian boundary to the end of the Middle Pliocene the marine calcareous deposits show that the Cretan area underwent further relative sinking as a whole. The beginning of this period of submergence seems to have been rather sudden and probably the same is true for the end. Rare outcrops of terrigenous-clastic Upper Pliocene marine deposits demonstrate that Crete had started to emerge again.

The Quaternary shows an overall rise and northward tilt of the island, renewed fragmentation and strong differential vertical movements of smaller blocks. The N - S and E - W trending fault systems played a role again. In addition a new set of NW - SE and SE - NE became active, determining much of the relief and terrestrial sedimentation in the interior of the island.

Troughout the Neogene history of Crete the tectonic movements all give evidence of tension and gravitational accommodation of the sedimentary cover to differential movements of subsurface blocks. Even the wide anticlinal warping of the Neogene in the central part of Iraklion Province seems to represent no more than draping over older structures in the pre-Neogene basement.

Since displacements along the N - S and E - W faults usually have a predominant vertical component, it is likely that these fractures are older than the Neogene and that they possibly may be due to some earlier rotational strain system traversing the pre-Neogene basement up to its surface. Whether the NW - SE and SW - NE directed faults are equally reactivated older fractures is open to doubt. Fault planes, also in the pre-Neogene, seem to be of normal downthrow character and the separate blocks in between are commonly distinctly tilted.

The more recently active NW - SE and SW - NE fracture systems may be followed over great distances outside Crete in the Late Pliocene - Quaternary sediments. Regarding today's topography the NW - SE direction prevails in the Peleponnisos and on the Ionian islands, whereas the SW - NE direction dominates to the northeast of Crete, up to Rhodos. Actually, the NW - SE system is more important in western Crete, the SW - NE direction in eastern Crete.

This arrangement of the younger faults is even pronounced in the submarine topography south of Crete.

Interventions à la suite du 7-15 -

GLANGEAUD - On peut relier les excellentes descriptions des auteurs à d'autres secteurs de la Méditerranée orientale et occidentale. Les phénomènes d'affaissement avaient été indiqués dès 1926 - 30 par BOURCART, DUCLOS et moi-même.

On peut avoir un synchronisme entre les deux parties de la Méditerranée, en particulier au Messinien mais la Méditerranée occidentale se distingue par une tectonique de fossé subsident avec de fortes épaisseurs d'évaporites et peu d'effondrements locaux. On peut établir des corrélations à distance si l'on possède une bonne chronologie, comme vous l'avez fait.

Réponse : In general correlations people have to be very careful. Non marine correlations are difficult: case of Hipparion going to early Quaternary ; case of Pliocene, etc..

GLANGEAUD - Je parlais surtout de chronologie radiométrique avec connaissance des marges d'erreurs. Vous nous avez rappelé utilement que la stratigraphie est un outil indispensable de la tectonique.