6 Novembre - Après-midi

Séance présidée par le Pr. SELLI

6-1. - ON THE SEISMICITY BENEATH THE LIGURIAN SEA

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The establishment of 10 (short-period) seismological stations, made a few years ago by our Institute in West Liguria and in South Piemonte, allowed us an accurate determination of the foci of shocks from beneath the Ligurian Sea.

The main data of earthquakes of magnitude greater than 2.2 which took place from January 1967 to August 1972, (15 undersea shocks and 3 shocks of the neighbouring continental areas) were investisgated.

Firstly, we emphasize that ten of the undersea epicenters are falling nearly on a straight line, from the Voltri area towards SSW (azimuth = 198°), crossing in its extension also the epicenters of the shocks of July 19, 1963. This axis can be assumed as the main axis of displacement, in correspondence to a fault-system roughly parallel to it. Therefore it can be inferred that from the inner part of the Genoa Gulf towards SSW there is an instable structural singularity of the upper crust, about 100 km long or more.

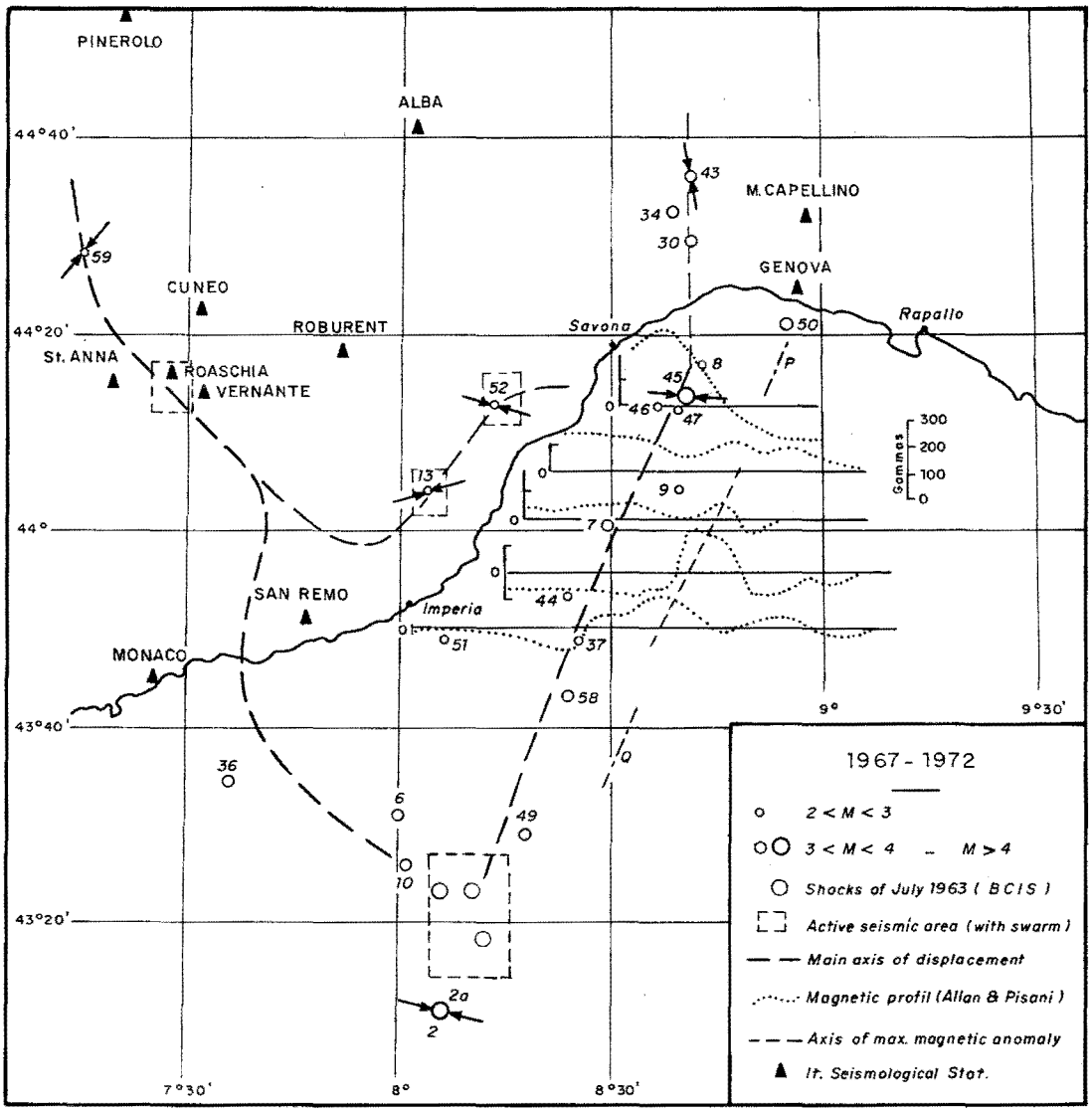
The vertical behaviour of the singularity can be approached taking into account the depth of the focus. From a profil along the above-derived axis of seismicity, it appears that at least eight shocks were emitted from depths increasing almost linearly from 2.5 km near the coast to about 10 km out to sea. But the depth of the shocks of July 19, 1963 was nearly 30 km.

The seismicity axis appears to be parallel with an axis of highest positive geomagnetic anomaly in the Ligurian Sea between the latitudes of 43°40' and 44°07'N. Since this geomagnetic anomaly lies eastward of the main axis of displacement, it seems reasonably to assume that the fault system should dip towards west. Possibly an inclinated tectonic element appears responsible of the seismicity of the central Ligurian Sea.

Together with the focus coordinates we have also deduced the travel-time for the P and S waves of all investigated shocks; the derived mean velocities are roughly constant along the same path. Shocks in the western part of the Ligurian Sea have given a Pn mean velocity of 7.6 km/s, whereas the direct waves show a mean velocity falling between 6.4 and 6.9 km/s which should be due to an intermediate layer. The Pn do not seem to exist at distances less than 60 km for shocks that are close to the coast, where besides the refracted Pb (6.4 - 6.9 km/s) waves, also true Pg are present (5.7 - 6.1 km/s). The loss of Pn waves near the coast between Imperia and Monaco should be explained not only by the reduced focal depth, but chiefly on account of the deepening of the Moho there.

The focal mechanism of six shocks was determined taking into account the direction of the first motion of the P waves; for these shocks we have obtained a quadrant model that can be explained with an acting couple in the focus; nodal planes are in good agreement with the direction of the derived displacement band. It follows that the compressional axes are prevailingly in the ESE-WNW direction, i.e. nearly perpendicular to the main displacement axis of the crustal structure of the Western Ligurian belt.

Even if the data are still scanty, these results may be interpreted from the dynamical point of view as due to a push from ESE to WNW with a stress concentration in the Western part of Liguria, were the seismic activity is remarkable.



Intervention à la suite de la communication 6-1. - de Bossolasco et al.

FERNEX - Peut on préciser le sens des compressions ?

Réponse : De part et d'autre les forces sont convergentes, c'est-à-dire vers l'ESE et l'WNW. Il y a deux possibilités dont la meilleure serait vers l'ESE.