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RECENT MASS WASTING PROCESSES ON THE PROVENCAL MARGIN (WESTERN MEDITERRANEAN)°

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— On October 19, 1979 off Nice, the upper continental shelf has been affected by a catastrophic event (Gennesseaux et al., 1980).

(a) At 2 p.m. (approximate time), following a lowering of the sea level, a tsunami of several meters amplitude reached the coast line south of Antibes. This was followed during 4 hours by several oscillations of decreasing amplitude, that were felt on a shore length of about 100 km.

(b) About the same time, an embanked area 300 m long and wide, collapsed in a few seconds ; after the event the sea-floor in that area was found at a depth of 50 meters.

(c) At 17h45 TU and 22h00 TU, two telephone cables have been broken 80 and 110 km off Nice respectively (fig. 1).

(d) No earthquake was registered by the Monaco Observatory during this time period.

After this event, we surveyed the area with Sea-Beam and observed the walls and canyons floors with the submersible Cyana. —

The Sea-Beam map (Pautot, in press ; fig. 2) shows several morphological units : the Cap Ferrat, Antibes and Nice ridges, the Var and Paillon canyons (fig. 3) and an innerfan related to the Var and Paillon rivers.

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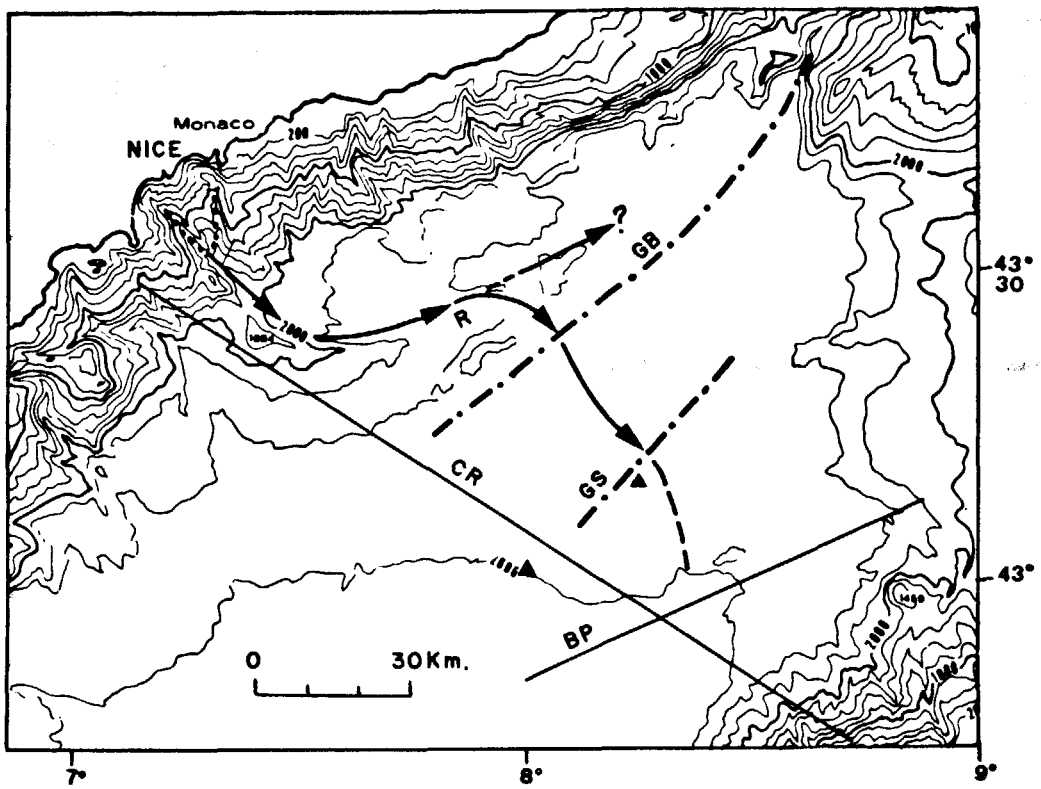

Fig. 1 : Path of inferred turbidity current (black arrow). G B and G S : broken cables. BP and CR : not affected cables. R : Antibes ridge.

The main characteristics of the area are the narrow shelf and steep continental slope (average about 5°). The fan and sedimentary ridges sediments consist of a 1 000 m thick section of plioquaternary conglomerate, mud and marly ooze (Gennesseaux et Le Calvez, 1960 ; Pautot, 1968), that overlie a continental erosion surface of upper Miocene (Messinian) age (Olivet et al., 1971). The present morphology appears as the end product of erosive processes that have affected a large Pliocene deep sea fan, since the beginning of the Quaternary.

The canyon walls present morphological features of different scales (fig. 4). First order features (at the hectometric scale) are represented by sedimentary aprons (I1) that are affected by second order erosional features giving an "herring bone" aspect to the slopes. The same type of morphology has been often observed in Mediterranean canyons (Vanney et al., 1979). The direction of major aprons is generally perpendicular to the canyon floor axis. This landscape recalls us of the so-called "bad-lands" topography. In some place local mass wasting at a decimetric to a metric scale affects the slope sediments (I2).

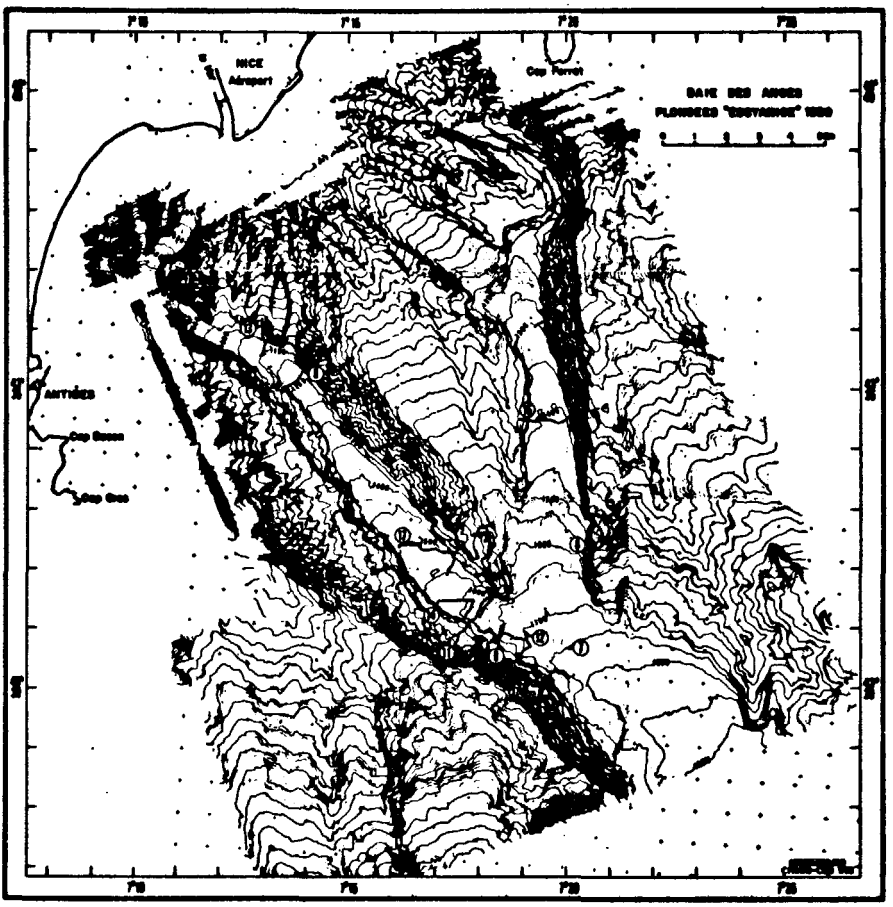

Fig. 2 : Sea-Beam map and dives location.

Erosional and depositional features have been observed on the canyon floor : erosional features consist of depressions with step like walls of metric amplitude (II1a). The vertical outcrops show interbedded mud and conglomerates of probable Pliocene age. Down canyon we observed limestones and yellowish conglomerates of probable Messinian age (Olivet et al., 1971). sometime in over-hanging wall (II1b).

Accumulation features consist of pebbles levees, 2 to 3 meters high, aligned parallel to the canyon axis (II2a). They present most often a dissymetric cross-section. Other accumulations include angulous blocks (II2b). Down canyon, the levees were predominantly observed on the western side of the inner channel.

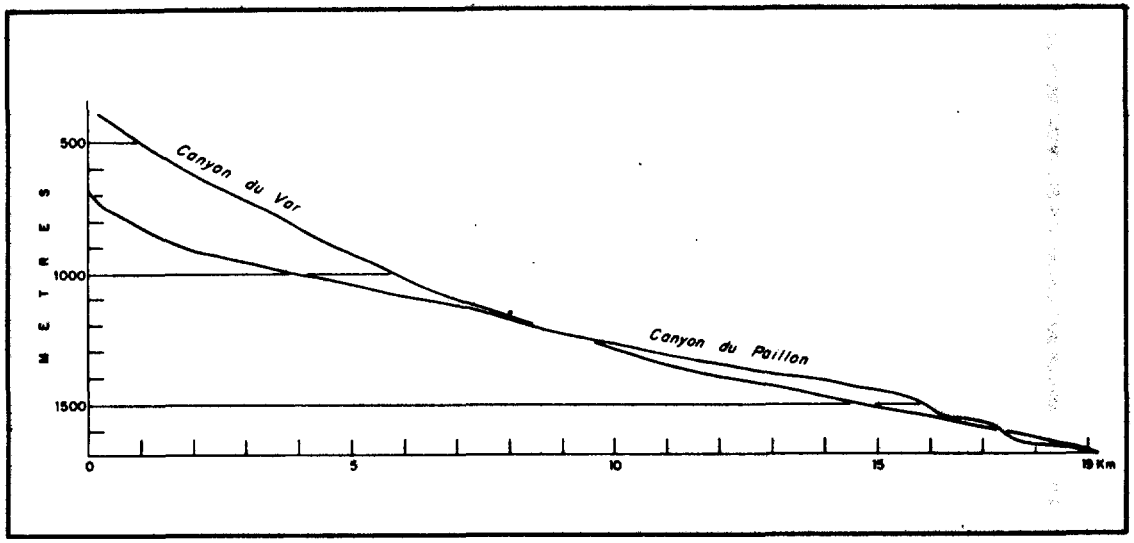

Fig. 3 : Longitudinal profiles of Var and Paillon canyons.

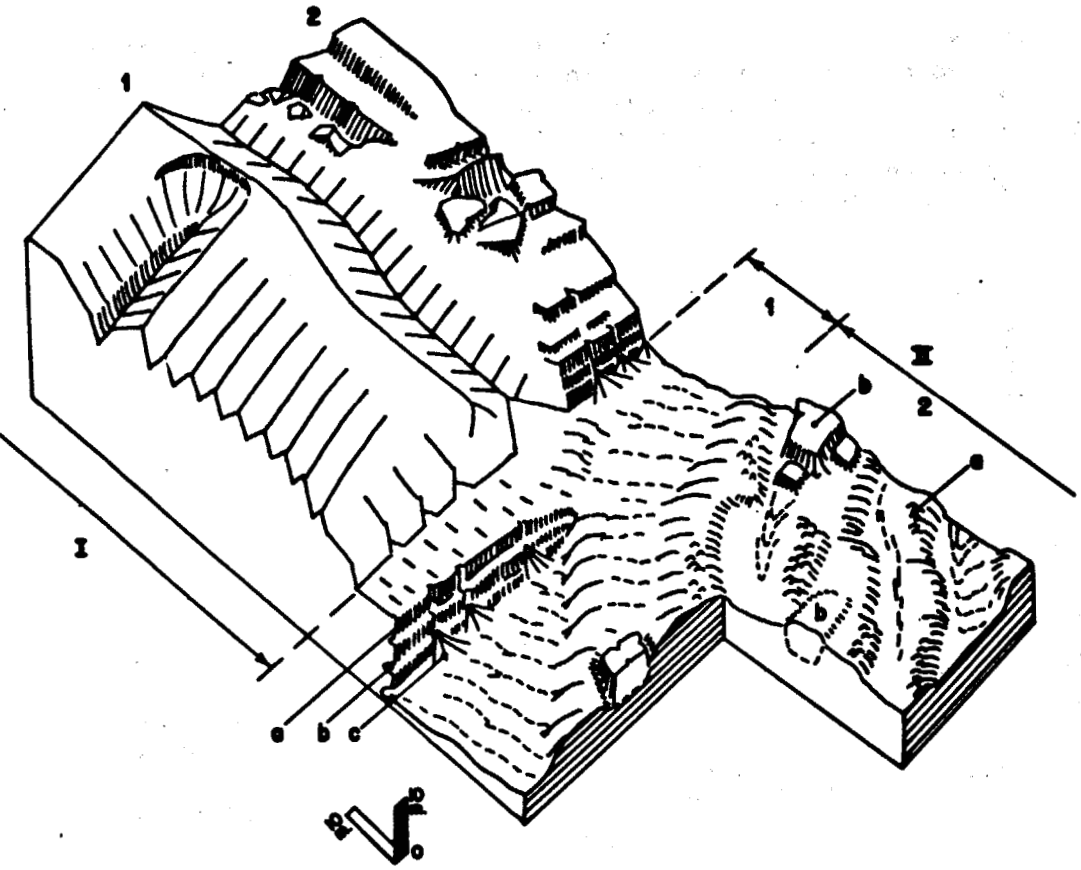

Fig. 4 : Synthetic morphological diagram from in situ observations. See text for explanations.

The Sea-Beam map and in situ observations during the dives provide us with valuable information. These and other data will be used for the reconstitution of the gravity movements that may have operated in that area.

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