

4-2. - FOUNDERING OF THE BALEARIC RISE (WESTERN MEDITERRANEAN) AND ITS  
TECTONICALLY CONTROLLED SEDIMENTATION

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The fan-shaped Balearic Rise (15,000km<sup>2</sup>) southeast of Mallorca and Menorca lies at the base of the Emile Baudot Escarpment at a depth of 1600 to 2600m. A sparker, 3.5khz profiler and coring survey reveals that the Rise is almost entirely tectonic in origin: a youthful (post-Miocene), block-faulted, terrain covered by a thin (generally 200m) unconsolidated sediment cover. Major irregularities include three small seamount groups and a large valley, 150km long, extending from the Balearic Platform south and southwest across the Rise as far as the Balearic Abyssal Plain.

The Neogene evaporites in the abyssal plain east (recorded by drilling at JOIDES leg 13, site 124) and south of the Rise pinch out in the study area. However, a well defined seismic reflector called reflector "M" (possibly Early Pliocene age, and generally covering the evaporite sequence, as noted by Ryan et al. 1970) can be identified on profiles made across the lower sectors of the Rise. This stratigraphic horizon is used as a reference plane to determine the tectono-sedimentary relationships in Plio-Quaternary time.

The submarine valley (herein called Menorca Valley), heading between Mallorca and Menorca, follows in its upper sector a major pre-Pliocene NNW-SSE trending fault. Valley wall gradients range to 5°, and the flat floor is 3 to 4 km wide at the head and 25km wide near the base of the Rise. At present, the upper part of the valley serves as an active funnel for sediment moving downslope and subsequently deposited in the lower valley sector and adjacent fan. The erosive nature of the upper valley is shown by the typical U-shape cross-valley profiles, truncation of strata along the steep walls and a thin (<100m) sediment fill above the reflector "M" horizon. The lower valley is characterized by a thick (ca. 700m) unconsolidated fill indicating that the valley has served as a sediment trap during most of Quaternary time, particularly during periods of low eustatic stands when the Balearic Platform was subaerially exposed.

Sub-bottom profiles show that the straight, steep (to 15°), NE-SW trending Emile Baudot Escarpment is a very young, and possibly still active, fault plane to which the main foundering of the Rise is related. The down-dropping is so recent, in fact, that the pre-Pliocene bedrock on the Rise remains exposed.

Cores (5 to 8m long) show a preponderance of mud over sand and silt layers. Regionally, the ratio of sand turbidites to mud (of turbiditic as well as of hemipelagic origin) varies markedly. On the Rise the ratio approximates 1 to 5, whereas on the adjacent abyssal plain the ratio diminishes to 1 to 100 or less. Although deposited in the Quaternary, much of the unconsolidated material on the Rise (at least the coarse fraction) is older, reworked sediment derived from the upper Balearic Platform. Some of these sediments presumably originated at the proto-Ebro River system to the northwest and were deposited in deltaic and near-shore environments in an area which now lies between Mallorca and Menorca. The Ebro sediment source was cut off as a result of the separation of the Balearic block from the Iberian Peninsula before the deposition of the Miocene evaporites.

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HINZ K - In 1970 we made refraction seismic measurements north and south of Balearic Islands during the "Anna Project". South of the Islands we found crust similar to oceanic crust and to the north we found an abnormal crust and basic material with a velocity of about 7 km/s. We explained this by a separation of the Balearic block from Spain drifting or rifting to the south.