A Preliminary Study of a Standing Internal Wave in the Western Approaches to the Strait of Gibraltar

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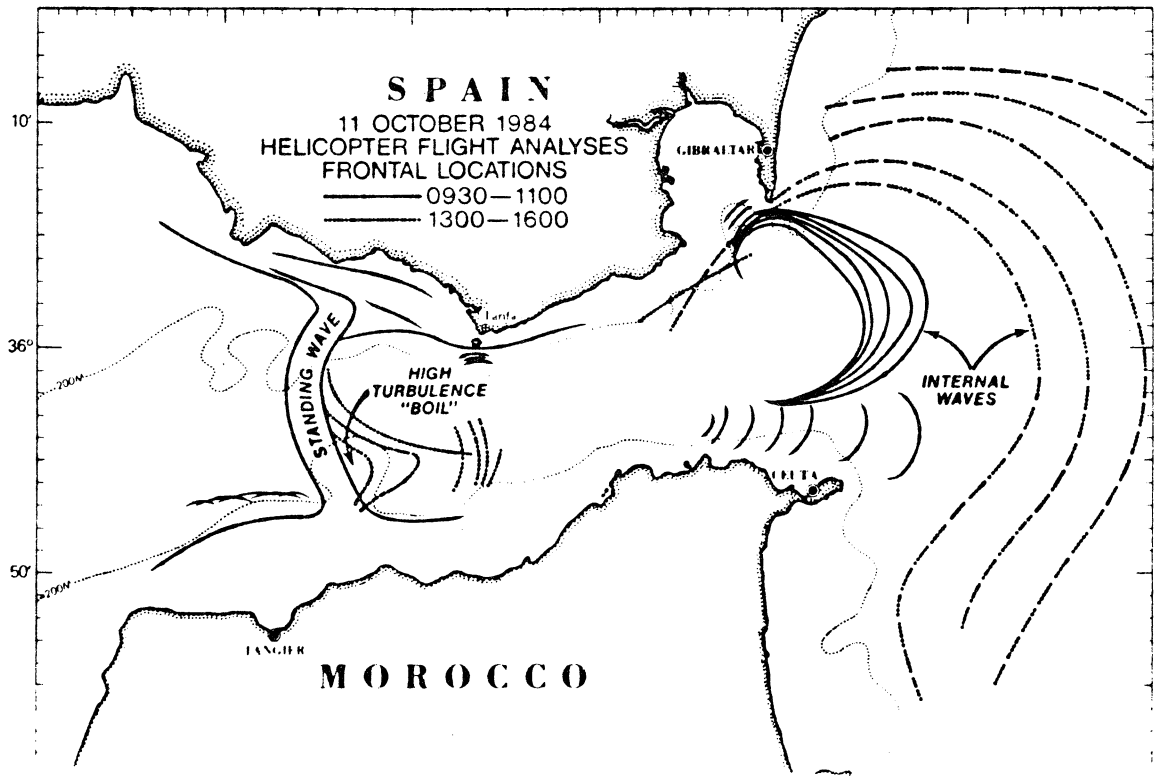
Aircraft flights during the period 6-11 October 1984 provided data which indicate a standing internal wave was continuously present west of the Strait of Gibraltar at 5°50' West. Although the wave appeared to essentially remain at one location-stretching from Spain to Morrocco, its surface appearance--visually and in the aircraft radar and infrared scanner imagery--showed considerable changes in strength that took place within several hours. The surface feature of the wave



varied in appearance. However, it normally was shown to have a main portion that consisted of a central 1 kilometer-wide ridge of rapidly moving water with almost no waves. On each side of this central region, the waters were usually agitated with a strong chop. On one occassion the sea state in this region caused a wave to go over the 20 meter high afterbridge of a 100 meter long freighter at the point that the freighter left the center comparitively calm area and entered the chop.

AXBT's data showed that horizontal changes of 3°C were present across the feature and that vertical disturbances in temperature extended at least to the depth of the AXBTs (350 meters). Examination of the regional bathymetric charts shows the standing internal wave was associated with the main sill of the Strait of Gibraltar and was evidently a manifestation of the Mediterranean intermediate water flowing westward at depth over the sill into the Atlantic.

Unlike the eastward-moving tidal-induced internal waves normally found in the strait that displayed eastward-oriented bows as their surface configuration, the standing internal surface wave appearance was that of a large westward-oriented bow. On two occasions, eastward-propagating sets of tidal-induced internal waves were found originating from a position south of the center of the standing wave. Although numerous eastward-moving internal waves were seen in the straits during the flights none was noted west of the standing wave.