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Anomalous Temperature of Bottom Water in the Panama Basin¹

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In studies of basins along the western rim of the Pacific, Wyrcki (1961 a, b) found no significant differences in bottom potential temperature within individual basins. In the Panama Basin, however, bottom potential temperatures vary about 0.1°C (Fig. 1); bottom water in the western part of the basin is warmer than that to the east. In Fig. 2 it is evident that this trend exists up to a level of about 3000 m.

From a consideration of oceanographic properties and bottom topography, the Panama Basin seems to be filled from a level of about 2500 m through a pass near the coast of Ecuador. A proposed circulation pattern for the basin consistent with topographic features and available temperature data is shown in Fig. 1.

Temperature variation in the bottom water may result from the topographic isolation of the basin and local heating along the path of flow. Uniformly high geothermal flux has been measured in this area; 15 values averaged $3.2 \mu\text{g cal/cm}^2/\text{sec}$ (P. Grim, personal communication). An alternate explanation for the warmer bottom water in the west is that the western side of the basin is filled from a higher level than the eastern side and that an uncharted topographic barrier separates the two areas below about 3000 m.

Available salinity and oxygen data generally are not precise enough to conclusively resolve this question. Within the limits of the data, it appears that the salinity structure is the same in the eastern and western parts of the basin. This uniformity would indicate a single source of bottom water. A few precise temperature, salinity, and oxygen measurements, with a limited bathymetric survey, are needed to determine the mechanism responsible for these anomalous bottom temperatures.

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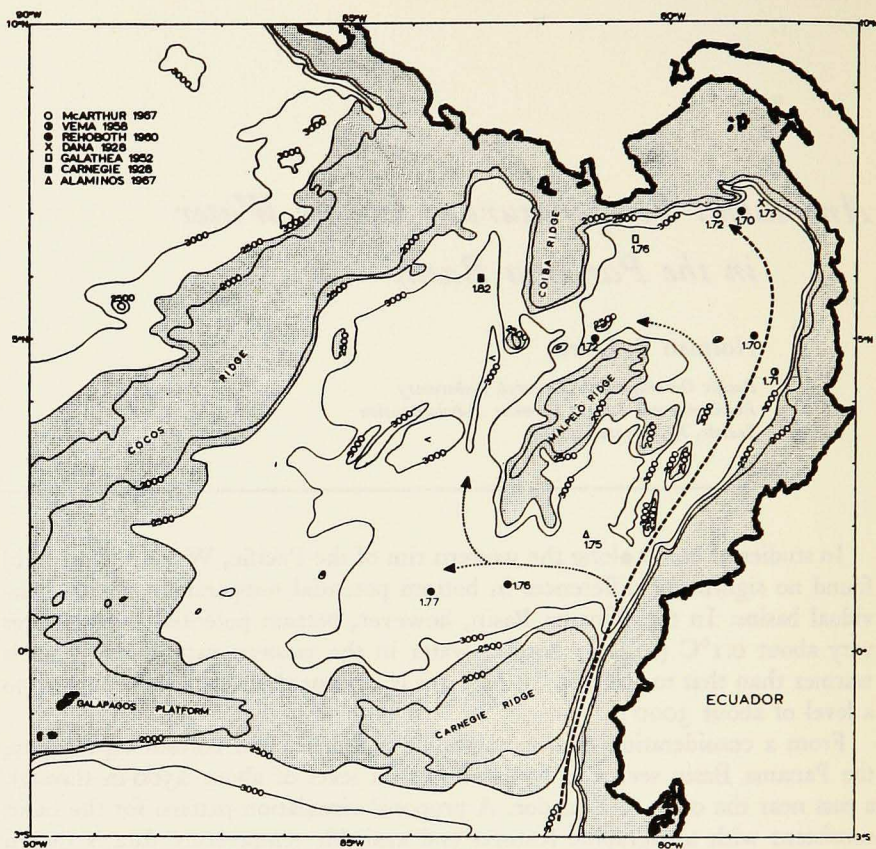


Figure 1. Potential temperature distribution at depths greater than 3000 m and within 200 m of the bottom. Bottom topography is after Chase (1968); shaded areas are less than 2500 m.

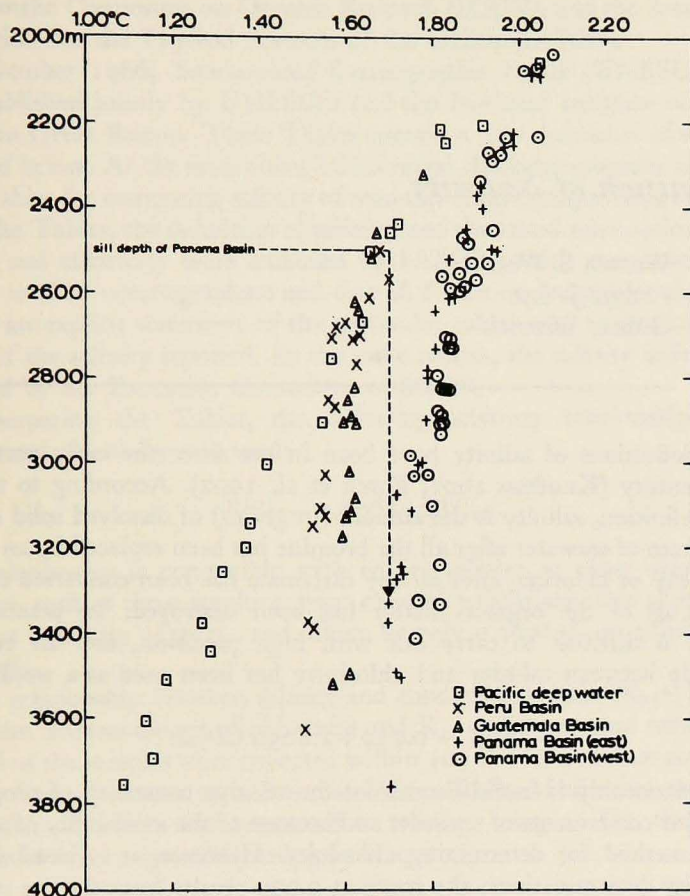


Figure 2. Observed potential temperature in the Panama Basin and adjacent waters.

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