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# On the Anomalous Deep Water South of the Aleutian Islands<sup>1</sup>

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Several oceanographers have concluded that Pacific deep water enters the North Pacific from the southern hemisphere and is warmed along its northerly path of flow. The deep water near the Aleutian Trench, however, is noticeably colder than the water lying between it and 30°N in the region east of 170°E. Knauss (1962) attributed this condition to the rising of colder water from below; Gordon and Gerard (1970) were unable to find a path of flow into the northern region.

Reed (1969), however, showed that, near the Aleutians, water very near the bottom (and at the 5-km level) has a colder potential temperature than that immediately south of it; thus the cold *bottom* water cannot be explained as a result of rising water. Reed has therefore suggested that a "younger" water flows northward along the western side of the extensive rise along 170°E

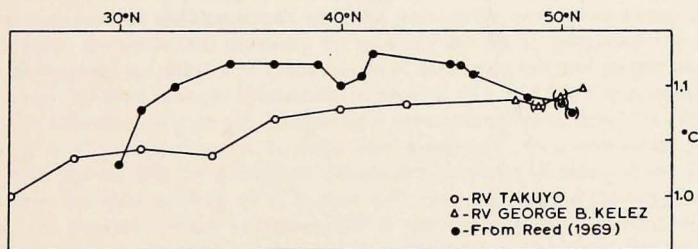


Figure 1. Comparison of potential temperature (computed according to Fofonoff 1962) at 5 km along 165°E (RV TAKUYO, August 1967, Preliminary Data Report of Cooperative Studies of the Kuroshio, No. 105), between 164°E and 168°E (RV GEORGE B. KELEZ, March 1966, Preliminary Data Report of Cooperative Studies of the Kuroshio, No. 34), and between 170°W and 180°W (from Reed 1969). Data points in parentheses indicate average values from stations at the same latitude.

(Emperor Seamount Chain) and enters the area south of the Aleutians through breaks in the Chain north of  $45^{\circ}\text{N}$ . At that time insufficient data were available to demonstrate this hypothesis, but observations recently obtained by the RV TAKUYO (Preliminary Data Report of Cooperative Studies of the Kuroshio, No. 105) support such a path of flow.

The TAKUYO data (Fig. 1) show a northward increase in potential temperature that is consonant with a northward flow of deep water and its modification by mixing with warmer water from above.<sup>2</sup> It is notable that the anomalously cold water near the Aleutians east of the Emperor Seamount Chain is essentially identical to the culminating temperature of the section west of the Chain. Thus the only logical source of the water near the Aleutians is the water west of  $170^{\circ}\text{E}$ .

2. Salinity and dissolved oxygen distributions are in agreement with that of temperature, but the data 'scatter' is somewhat greater.

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