

## CHARACTERISTIC MIXING TRIANGLES IN THE BAY OF BENGAL<sup>+</sup>

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The processes of evolution of T-S characteristics in different regions in the Bay of Bengal are studied using historical data (Varkey, 1986) collected during many cruises. Six areas in the Bay are identified, namely, (1) head of the Bay around 18°N and 89°E; (2) West Bay around 14°N and 83°E; (3) Andaman Sea around 13°N and 96°E; (4) Southwest boundary around 7°N and 85°E; (5) Southeast boundary around 5°N and 94°E; and (6) Equatorial Indian Ocean around 0 and 95°E to represent various water structures.

The tropospheric water masses in the Bay of Bengal are, (1) Bay of Bengal Low Salinity Water (BBLSW) around 20.8 sigma-t, (2) Arabian Sea High Salinity Water (ASHSW) around 23.92 sigma-t, (3) Water Mass E around 23.94 sigma-t (4) Persian Gulf Water (PGW) around 26.81 sigma-t, (5) Red Sea Water (RSW) around 27.19 sigma-t, and (6) Equatorial Surface Water (ESW) around 22.5 sigma-t. A close study of T-S structures in the inner Bay (regions 1-3) showed (Varkey, 1986) that the complete mixing processes in the upper Bay, less than about 600 m, can be characterised by a mixing triangle (Fig. 1) constituted by three characteristic water types (A, B & C) with properties as marked. B represents BBLSW. Even though salinities less than 33 ppt are observed off river mouths and along outflows from coastal areas, they are not considered here as significant, since, the whole inner Bay and outer Bay upto Equator are together studied. This effect of run off is clearly brought out in Fig. 3 and can be seen to be of negligible significance. Vertex A is fixed as a representative point for the intermediate high salinity core observed in the Bay as a mixture of RSW and PGW or individually, as their distribution is non-uniform in the Bay. C is a hypothetical point which exists only as a mixture of B, A and ESW. The actual salinities and temperatures of this mixed type would be distributed around C, mostly in the lower domain. Fig. 2 characterises the mixing processes in the outer Bay. A is same as in Fig. 1. B is assigned a value of 34 ppt, one unit over that of B in Fig. 1, since, the surface salinity increases gradually from inner Bay to outer Bay. In the outer Bay, surface salinity is always greater than or equal to 33 ppt (Varkey, 1986). C<sup>1</sup> is a characteristic point identifying various mixtures of BBLSW, Water Mass E and ESW, the mixing greatly influenced by pycnocline.

Fig. 3 clearly shows that the important mixing processes in the inner and outer Bays are between BBLSW, ESW, Water Mass E, PGW and RSW. In the Bay of Bengal high current shear and high vertical eddy coefficients are observed just

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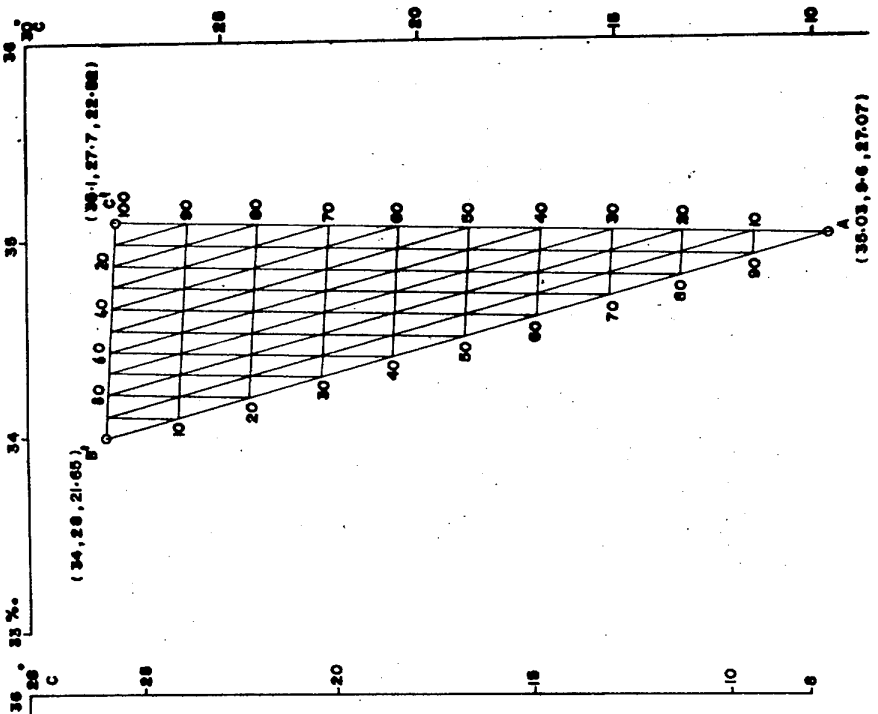


Fig. 1. Mixing triangle for Bay of Bengal.

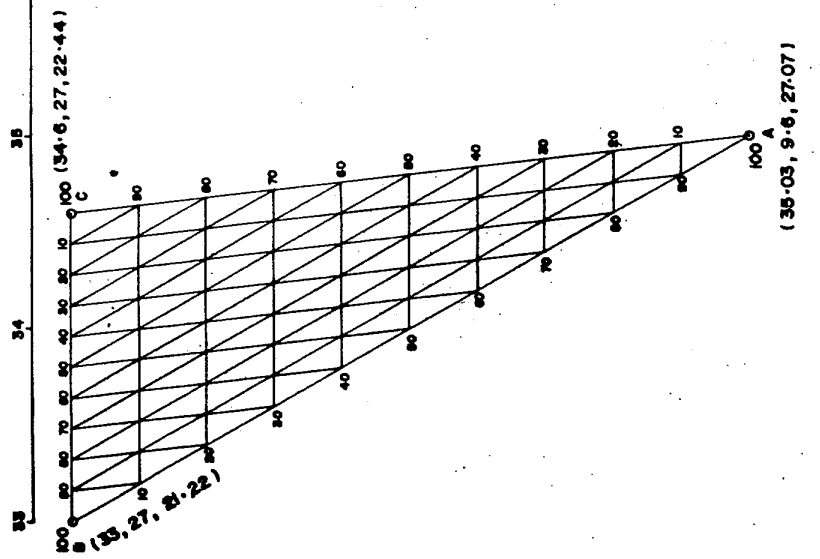


Fig. 2. Mixing triangle for Bay mouth and outer bay.

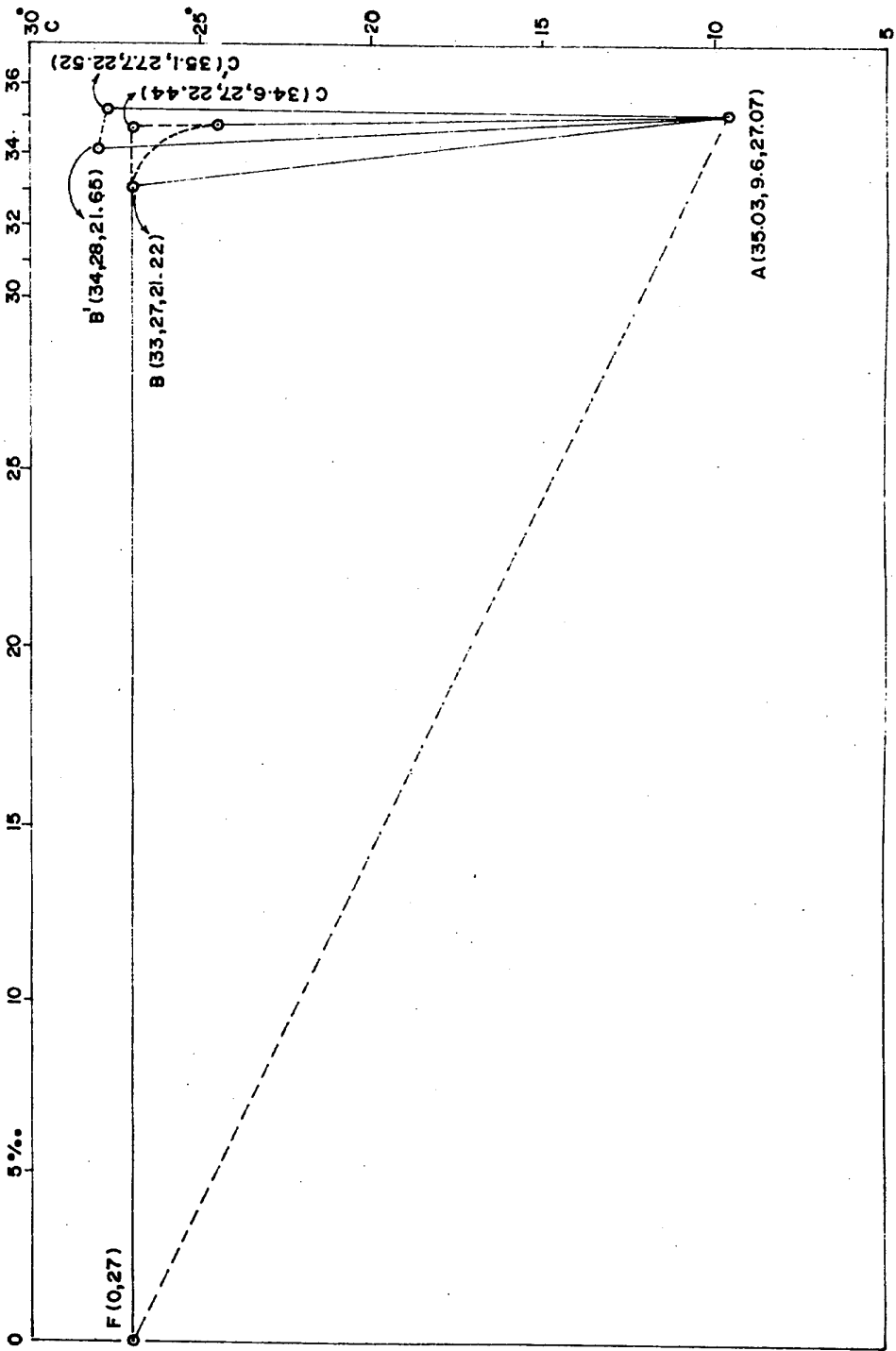


Fig. 3. Composite diagram for the whole range of mixing processes.

above pycnocline. Just below the pycnocline, horizontal eddy coefficients are also found to be large. These two features cause large vertical mixing in the Bay of Bengal, even though, the pycnocline with salinities and temperatures around C and C<sup>1</sup> is sharp (Varkey, 1986).

#### REFERENCE

Varkey, M.J. (1986). Salt Balance and Mixing in the Bay of Bengal, Ph.D. Thesis, University of Kerala, Trivandrum.