M.S.59. MADHUSOODANAN, P.–Water characteristics and Current structure of the intermediate waters in the Arabian Sea–1986–Dr. G.S. Sharma.

Circulation and water characteristics of the intermediate waters in the Arabina Sea are influenced by the high saline waters (Red Sea and Persian Gulf) from the north and low saline waters from the south of equator. The interaction of these waters which greately differ in characteristics is less understood compared to that at the upper layers. Hence, an attempt is made in the present investigation to study the water characteristics and current structure of the intermediate waters in the Arabian Sea. The study is carried out by presenting the topography of different isanosteric surfaces of the intermediate waters and the distribution of acceleration potential and salinity on these surfaces, besides presenting the vertical sections along different latitudes and longitudes in the Arabian Sea. The water characteristics are also studied by working out the different representative areas in the Arabian Sea. An attempt is also made to present the potential vorticity between different steric levels to understand the circulation and mixing processes. Data collected during the International Indian Ocean Expedition and

subsequently in the Arabina Sea are used for the study. The area covered north of the equator upto the border of Asian Continent, excluding the Red Sea and Persian Gulf is considered.

Constant potential thermosteric anomaly surfaces of 100, 80, 60 and 40-cl/t, covering the intermediate waters are chosen for the study. The topography, acceleration potential and salinity maps are prepared for the above surfaces. The geostrophic flow along the isanosteric surfaces was deduced from the gradient of acceleration potential using 2,000 db as the reference pressure. Five zonal and two meridional sections of potential temperature and salinity and 10 scatter diagrams of potential temperature against salinity are presented. Potential vorticity is computed using a novel method, introduced by McDowell et al. (1982), from the hydrographic measurements of the potential density alone.

The distribution of properties on potential thermosteric anomaly surfaces showed zonal flow near the equator, meridional flow along the Somali Coast and off the southwest coast of India on the upper three surfaces, whereas meridional flow predominates on the lower surface. An important feature revealed on the distribution of acceleration potential is a westward flowing undercurrent near the equator between 45° and 75° called as Intermediate Equatorial Current. Another remarkable result is the presence of southward undercurrent along the Somali Coast. The striking feature on the topography as well as on the distribution of acceleration potential is the occurence of lows and highs indicating cyclonic and anticyclonic eddies. Some of these closed eddy type circulation are formed due to the manifestation of baroclinic instability prevailing in these areas as evident from the distribution of potential vorticity between different steric surfaces.

An interesting feature is the rapid decrease of salinity from the central Arabian Sea towards south and southeast on 100 and 80-cl/t surfaces suggests the horizontal advection of Red Sea Water. The influence of Pacific Ocean Water is observed in the western region of the equatorial section as a week salinity minimum. Horizontal mixing is predominant, in the central western and eastern Arabian Sea whereas the prominance of vertical mixing is indicated in the southeastern and northern Arabian Sea. The advection of Red Sea Water, Persian Gulf Water and the northward flow of low saline water from south are evident from the distribution of properties on the isanosteric surfaces, vertical section with the waters of the others except in the south, probably, a consequence of closed boundary on its northen border. There is less renewal of water other than horizontal and vertical mixing confined to the same region unlike in the other regions of the world oceans at similar latitudes. To identify the step structure and Western and Eastern Boundary currents which are conspicuous characteristics of the intermediate waters, further studies at closer network with moored buoy stations for current measurements and STD that provides continuous profiles to study the finer structure are required.