M.S.110. HARISH, C.M.–Mass transport in the equatorial Indian Ocean–1989–Dr. G.S. Sharma

Ocean currents play pivotal role in the creation and annihilation of heterogenity in the hydrosphere. The equatorial parts of the oceans which derive maximum energy and also have a higher storage capacity compared to the land mass act as the sources and sinks for the atmospheric circulation which in turn controls the oceanic circulation.

The Indian ocean, particularly the region north of 10°S, is unique in many respects because of its closed boundary in the north; while the other two major oceans are connected both to the north and south polar regions. This uniqueness results in a peculiar nature of the semiannual variation of the atmospheric circulation called the monsoons. Hence even a normal study of the equatorial Indian Ocean is by itself an interesting one, because any numerical model that is to be simulated should satisfy all the conditions particularly the time variability. To a certain extent attempts have been made to study the current system in the equatorial region of the Indian ocean particularly in the western region. But there is very little work that is carried out about the current system south of the equator as a whole, and there is not any serious attempt to study the mass transport in this part of the world oceans, in spite of the fact that it is the mass transport which gives an estimate of the transport of heat energy, but not simply the currents alone. Moreover, the estimates of mass transport, specifically its marked temporal variability induced by the monsoonal wind reversal, serve not only in the validation of the ocean atmosphere coupled models but can also be easily parameterised to be incorporated in the models which would help in turn in further refining them. In the present thesis, in view of the significance of the study of mass transport, it is proposed to study the mass transport covering the area between 50°E and 110°E, and between 5°N and 20°S.

Although the title is mentioned as mass transport in the equatorial Indian ocean, in view of the South Equatorial Countercurrent present between 10°S and 15°S, the study is extended upto 20°S in order to cover the mass transport carried out by the South Equatorial Countercurrent. While computing the mass transport, the method of Montgomery and Strop (1962) is adopted. This technique has a special advantage in that the characteristics of the waters can be delineated. To substantiate further, meridional sections covering the area, wherein the distribution of temperature, salinity, and thermosteric anomaly are also included.

The thesis is divided into six chapters with sections and subsections as given below:

I Section (i): Introduction and description of the study area
  Section (ii): Methodology and choice of data
II Transequatorial vertical sections of temperature

III Transequatorial vertical sections of salinity
IV Transequatorial vertical sections of thermosteric anomaly
V Zonal transports and vertical sections of geostrophic velocity
VI Summary and conclusion.