M.S.33. BASIL MATHEW–Studies on upwelling and sinking in the seas around India–1983–DR–Dr. G.S. Sharma

Upwelling is the process by which subsurface waters of the sea are brought to the surface layers, while the reverse process is called sinking. Upwelling is a common feature in the coastal areas where the prevailing winds drive waters offshore. Upwelling also occurs in regions of diverging horizontal currents and in the equatorial regions. The cool nutrient rich upwelled waters promote higher

productivity and modify the local climate.

The thesis addresses the problem of coastal upwelling off the east and west coast of India. The inference on upwelling is made basically from the analysis of temprature data collected once in a month at typical locations off the coasts of India. Further supporting evidence is obtained from the analysis of density field, surface divergence surface wind stress and sea level variations on a monthly mean basis. The analysis and interpretaion of results is presented in five chapters followed by summary and conclusions.

The process upwelling generally starts off the southwest coast of India by March with the reversal of surface currents to southerly. The cool subsurface waters of the thermocline generally reaches the surface with the onset of the southwest monsoon. Near the coast the surface water cools to as low as 22 C by August. However, the intensity of upwelling is found to be less towards north with a time lag of about one month (off Goa compared to that off Cochin) in the occurence of coldest water at the surface. It is also found that the local northwesterly winds during summer monsoon plays a major role in producing this upwelling. The intensity of upwelling is less towards north where the wind system gradully changes to westerly and even southwesterly (off Bombay) during this period. The reverse process of sinking generally occur by end October/early November off Cochin. From the monthly displacement of isotherms it is estimated that the velocity of upwelling is of the order of 10^{-3} during summer monsoon.

Off the east coast of India upwelling starts in February and continues till July/August while sinking persists during the remaining preiod. The southwesterly local winds from February/March promotes upwelling especially off Waltair. The intensity of upwelling off the east coast of India is generally lower than off the southwest coast of India is probably in association with greater stratification due to massive river discharges. Further upwelling is found to be stronger off Waltair compared to off Madras. It appears that the orientation of the coast also favours stronger upwelling off Waltair.

Summary of the results and conclusions is presented in Chapter six including proposals for future investigations.