M.S.66. SANTHADEVI, M.R.–Studies on energy exchange in the Arabian sea–1986–Dr. G.S. Sharma

An attempt is made to identify the major characteristics of the ocean atmosphere system in the Arabian Sea in order to explore the complex role of interaction of ocean with atmosphere. Because of the interdependence between the ocean and the atmosphere every process taking place in the atmosphere has its reflections on the ocean and vice versa.

The mean monthly fluxes of sensible heat, latent heat and momentum computed using the bulk aerodynamic formulae for each 2° latitude logitude grid for the Arabian Sea forms the basis of the present study. The computations offer a valuable means of finding the regions of maximum interaction and determining the local predominating process operating in the atmosphere and the ocean.

The distribution of the fluxes portray anomalous amplitude in energy exchange

during the course of an year. The general trend of the sensible heat, latent heat and momentum transfer is related to the strengthening and weakening of the two monsoons.

It is interesting to note that the momentum transfer is invariably in phase with the sensible heat transfer. The momentum transfer is mostly associated with regions of convergence and divergence which are again related to heat sources and sinks. Sensible heat transfer is almost a gain throughout the year in the western region of the Arabian Sea agreeing well with the momentum transfer. The area off Somalia is highly divergent during southwest monsoon. Because of the strong horizontal gradient in sea surface temperature the sea has variable effect on the stability of the lower atmosphere and in its uptake of moisture. Thus in the western Arabian Sea several factors operate simultaneously and in many cases are dependent on each other.

Although high wind speed persists throughout the monsoon the latent heat becomes suppressed in the later part of the season by very low vapour pressure gradient between sea and air in response to the strong negative sea air temperature difference. Very low latent heat loss and comparatively high sensible heat gain and high momentum gain characterize the area as an energy sink.

There is a sharp increase of loss fluxes to a pronounced maximum in the eastern Arabian Sea during June. The large positive Sea air temperature difference cause large vapour pressure difference. These along with strong southwesterlies cause the observed maximum in the fluxes.

During northeast monsoon, in the northern Arabian Sea the sensible heat at momentum transfers are out of phase, whereas sensible heat transfer is in phase with latent heat transfer. The area is divergent and so the momentum transfer is from the atmosphere to the sea. However, the air temperature is still less so that the sensible heat and latent heat are transferred from the sea to the atmosphere.

There are cases when latent heat and momentum are in phase where the ocean loses latent heat at well as momentum but it gains sensible heat. Such a situation prevails in August along the eastern Arabian Sea. The southwesterlies are conergent in the eastern Arabian Sea resulting in loss of momentum to the sea.

As expected for the equatorial region, the annual variation of fluxes are comparatively modest except immediately adjacent to Somalia.