

**E1-06 : RELATION BETWEEN OUTGOING LONG-WAVE RADIATION (OLR), LOW LEVEL WIND AND VERTICALLY INTEGRATED MOISTURE**

*W L Sumathipala; Dept. of Physics, Open University, Nawala.*

From temperature (T) and relative humidity (r) of the First GARP (Global Atmospheric Research Programme) Global Experiment (FGGE) level III b data set the mixing ratio (g) was calculated as follows:

$$g = 0.622 r (e_s/P)$$
$$\text{and } \ln e_s = 21.6 - (5410/T)$$

where  $e_s$  and  $p$  are saturation vapour pressure and pressure respectively at a given pressure level.

The vertically integrated moisture values  $Q$  were then calculated as

$$\bar{Q} = \frac{1}{g} \int_{p_t}^{p_s} q dp$$

Time series plots, cross correlation and lag correlations were done for three variables (OLR,  $Q$ , and 850 hPa zonal wind) at different locations:

During summer over the Asian monsoon region,  $\overline{OLR}$  and  $\bar{Q}$  very closely resemble each other. The correlation coefficient is 0.9 they show a linear relation when  $\bar{Q}$  values are high. Low values of  $\bar{Q}$  do not correlate well with  $\overline{OLR}$ . When  $\bar{Q}$  is below a certain critical value, clouds are not formed and  $\overline{OLR}$  represents the surface temperature and hence no correlation.

Although similar variations are seen between  $\overline{OLR}$  and low level zonal wind  $\bar{U}$ ,  $\overline{OLR}$  leads  $\bar{U}$  field by several days. Correlation between the two variables is 0.57 at 99% significant level. Time series plot with 6 days time lag shows better coincidence of the two variables correlation coefficient increasing to 0.59. This is attributed to the systematic northward migration of the monsoon system. Over Mexican region where the summer monsoon is weak and northward propagation of monsoon system is less pronounced the lag is only 3-4 days.

Numerical studies have suggested 2-3 days delayed response of low level westerly winds to a heat source in the equatorial region.