Physical Research Laboratory

Tuesday Seminar

Effect of Monsoon Intra-seasonal Oscillation on the rain isotope variability in northern Bay of Bengal

Abstract

Monsoon Intra Seasonal Oscillation (MISO) represents semi-periodic occurrence of rainfall spells over India during summer associated with large-scale movement of wind and clouds connecting convection and circulation, identified by northward propagation of Outgoing Long wave Radiation flux anomaly. The connection of MISO with the hydrological cycle has been explored here through stable oxygen and hydrogen isotope ratios in rainwater samples collected from two stations located near North Bay of Bengal during 2004-2014. The $\delta^{18}O$ and δD values of the samples (total 202) have wide ranges: -18.2 to 2.8‰ and -132 to 28‰ (rel. to VSMOW) respectively. Out of 66 samples associated with 15 MISO events during this period, 46 have significantly low isotope ratios. These ratios are well correlated with the MISO propagation speed and cumulative rainfall over the Bay of Bengal. In addition, the isotope values also show a significant anti correlation (r2=0.88) with satellite derived stratiform rain fraction.

The isotopic results were compared with the results obtained using an Isotope Enabled Global Spectral Model (IsoGSM). The model simulation reproduces the amplitude of variation in the observed values, but on average, the model values are higher in $\delta^{18}O$ and δD by about 2‰ and 11‰ respectively and lower in d-excess by about 4.5‰ on average. It is proposed that the discrepancies in $\delta^{18}O$, δD and d-excess arise due to an overestimation (on average by 13%) of raindrop evaporation effect in the model.

Speaker: **Prof. S.K. Bhattacharya**
Visiting Professor, IIT- Kharagpur

Date	Time	Venue
28-January-2020	16:00 hrs	Ground Floor Lecture Hall

All are invited to attend and participate in discussion

Tea at 15:30 Hrs

A .K. Sudheer, Geosciences Division