

Modelling and observational aspects of soil-moisture dynamics and its linkage with extremes over the regions of south Asian monsoon

***Milind Mujumdar**

mujum@tropmet.res.in

Indian Institute of Tropical Meteorology (IITM), Pune, India.

Mangesh Goswami, Naresh Ganeshi, R. Krishnan,

Indian Institute of Tropical Meteorology (IITM), Pune, India.

Toru Terao

Faculty of Education, Kagawa University, Kagawa, Japan.

The present study aims to understand the complexity of hydro-climatological characteristics over various regions of south-Asian monsoon (SAM). The availability of high temporal and spatial-scale soil-moisture data is crucial for diagnosis of soil-water dynamics and to get insight into hydro-climatological non-linearity. To begin with we explored the soil-moisture dynamics and its linkage with extremes over Pune region of west-central India. Pune falls into rain shadow region of western Ghats where the average SAM rainfall is about 56 cm, which is 25% of its windward counterpart. The cutting-edge Cosmic-ray technology, developed for monitoring real time high frequency hectore-scale soil-moisture, is implemented at IITM Pune since January 2017. The hydro-meteorological variables, available from IITM site and model simulations, such as soil-moisture, rainfall, surface temperature, ET are analyzed to estimate the daily soil water fluxes in this study. This is useful in exploring daily and seasonal inflow (infiltration), outflow (evapotranspiration and deep drainage), water mass balance. The daily variation of runoff (comparison between infiltration and rainfall on daily scale) is useful in identifying the threshold of extremes over India. Further, it is interesting to explore the sub-surface soil moisture profiles to get better insight into surface and sub-surface processes associated with, wet as well as dry, extremes. Additionally, the soil-moisture sensitivity experiments are being designed to better diagnose its impact on wet and dry extremes. Finally, it is proposed to extend this study over homogenous climatic zones, such as northwest, northern, northeastern, central, western Ghats and rain shadow areas, of Indian sub-continent.