



## **Indian Summer Monsoon influence on the Arabian Peninsula Summer Climate**

Raju Attada, Hari Prasad Dasari, Knio Omar, and Ibrahim Hoteit

King Abdullah University of Science and Technology (KAUST), Physical Science and Engineering Division, Thuwal 23955-6900, Saudi Arabia (ibrahim.hoteit@kaust.edu)

The Indian Summer Monsoon (ISM) is an integral component of the atmospheric global circulation. During summer, the mid-latitude zone of baroclinic waves in the Middle East region are pushed northward under the influence of ISM. We investigate the impact of ISM on the atmospheric circulation over the Arabian Peninsula on interannual time scale. We analyze various atmospheric variables derived from ECMWF reanalysis. We apply a composite analysis to study the circulation variability over the Middle East during extreme monsoon years. The extreme (strong and weak) monsoon years are identified based on All India Precipitation Index during 1979-2015. Our analysis reveals that ISM is a fundamental driver of the summer circulation over the Middle East. More specifically, during extreme monsoons: (i) the lower tropospheric winds are enhanced and dominated by persistent northerlies along with intensified subsidence due to adiabatic warming, (ii) A prominent baroclinic structure in circulation anomalies are observed, (iii) a meridional shift of the upper tropospheric jet stream (subtropical jet) is noticeable during weak monsoon years; this shift favors a strong Rossby wave response and has a consequent impact on summer circulations over the Middle East, (iv) the upper tropospheric wind anomalies show a well organized train of Rossby waves during strong monsoon years, and (v) Intensification of thermal signal during strong monsoon over West Asia has been noticed. We will present these findings and further discuss the monsoon dynamics controlling the summer Arabian Peninsula circulation.