



## **The Winter Atmospheric Circulation Patterns and their relationship with precipitation variability in Iran**

e. fattahi and A Sedaghatkerdar

Atmospheric Science and Meteorological Research Center (ASMERC), Tehran, Iran, ebfat2002@yahoo.com

To classify the atmospheric circulation patterns over Iran the sea level pressure and 500 hpa geopotential height for December-February of 1961-2003 was retrieved from NCEP/NCAR and used as input variables. By applying the S-mode principle component analysis (PCA) on daily composite of 500 hpa we reduced the data matrix (3880\*408) to 11 components. The identified components were then rotated using varimax method in order to obtain simpler structure. The ward clustering algorithm was then used to classify studied days based on time variability of PC scores. So, by applying Ward clustering on resultant PC scores we grouped all days into 8 weather types. The relationship between frequency of various weather types and precipitation variability over Iran was investigated using correlation analysis. Moreover, the occurrences of precipitation during warm, cold and neutral phases of ENSO were also linked to the identified weather types. The results reveal that the Mediterranean low, Sub-polar low, Eastern high pressure, North high pressure and East European high pressure and also the combination of Siberian and European high pressures have the highest frequencies during El Nino periods, Whereas the Siberian high pressure and central high pressure systems are more frequent in La Nina periods.

Keywords: Atmospheric circulation Patterns, principal component analysis, cluster analysis, ENSO, Iran.