Evaluation of the Effects of the Madden Julian Oscillation on the Occurrence of Wet or Dry Spell in Southern Iran and Eastern Parts of Oman

Nazemosadat, M. J., and H. Ghaedamini

The Oceanic and Atmospheric Research Center, Department of Water Engineering, College of Agriculture, Shiraz University, Shiraz, Iran mjnazemosadat@yahoo.com

The Madden-Julian Oscillation (MJO) is a tropical atmospheric phenomenon, associated with periods of active convection in (predominantly) the eastern hemisphere tropics. With a timescale ranging from about 30 to 60 days, there are six to 12 MJO events per year. In its active stage, the MJO is associated with increased convective activity over the equatorial eastern Indian and western Pacific Oceans. Two indices, namely RMM1 and RMM2, developed by the Australian Bureau of Meteorology Research Centre (BMRC) were used as the indicator of MJO status over the Indian and Pacific Ocean. The indices define 8 different phases for the MJO, beginning with Phase 1 off the Indian Ocean coast of Africa, through to Phase 8 in the Pacific before it fades out. The relationships between the MJO indices and daily precipitation data in some stations spread over various parts of southern of Iran and eastern districts of Oman were analyzed for the period 1979-2005.

For the phases that RMM1 series were negative (phases 1, 2, 7 and 8), rainfall amount and the occurrence probability of wet periods were greater than the spells that this index was positive (phases 3, 4, 5 and 6). Furthermore, during the periods that RMM1 was negative, the greater probability for rainfall events was, respectively, associated with the phases 1, 7, 8, and 2. In contrast, least probability of rainfall events was related to phase 4 and after that for phases 3, 5 and 6, respectively. In the other words, while the highest probability of clear sky days is expected for phase 4, most of rainy days are anticipated during phase 1.