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Connection of monthly precipitation with Teleconnection Patterns: an application of Artificial Neural Networks in Cyprus

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Forecasting seasonal precipitation is extremely important for all aspects of human life. Long-term rainfall prediction is a very important input for decision making on issues sensitive to seasonal climate variation in order to respond proactively and mitigate risk with sufficient confidence. Ensemble forecasts from weather prediction models tuned for seasonal forecasting are utilized for this task; deterministic forecasts are presented in terms of the most probable value, whereas, probabilistic forecasts are presented in terms of likelihood of rainfall or temperature in the upper, middle, or lower third of the climatological distributions. Under normal conditions, each category is equally likely to appear (each will occur one-third of the time). Using a different path, a number of researchers have studied the possibility of forecasting rainfall several months in advance using climate indices (Teleconnection Patterns).

The variability of weather is connected to large-scale weather patterns and circulation systems. The term "Teleconnection Pattern" refers to a recurring and persistent, large-scale pattern of pressure and circulation anomalies that spans vast geographical areas with geographically fixed centers (poles). Much effort has been made by scientists to prove the connection of the Eastern Mediterranean Precipitation and various Teleconnection Patterns. Based on the availability of data, we examine the connection, on the one hand, of two surface indices, namely, the NAO (North Atlantic Oscillation) and MO (Mediterranean Oscillation) monthly indices and one upper air index, the NCP (North Caspian Pattern) with the averaged monthly precipitation in Cyprus, on the other hand, using Artificial Neural Networks.