



Trends in rainfall regime over Israel, 1975-2010, and its relation with the variations in the synoptic systems and large-scale oscillations

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Future predictions for the Mediterranean region anticipate a drastic decline in rainfall, by tens of percents. Such predictions, when combined with the expected rise in temperatures, imply a growing water deficit over this water scarce region. The aim of the study was to assess recent trends in the rainfall regime and to estimate the possible role of natural variations imposed by the occurrence of rain-producing synoptic systems and large-scale oscillations.

The annual rainfall shows a long-term decreasing trend over the majority of Israel, though being significant mainly in its southern (arid) part. The polynomial trend approximation shows that the trend was positive from the mid-seventies toward the beginning of the 90s, then, decreased sharply toward the end of the study period. The climatic borders separating the Mediterranean climatic zone and the semi-arid and arid zones shifted northward during the study period, thus the Mediterranean climate area has been shrinking in favor of the arid and semi-arid parts. The inter-annual variation of the annual rainfall increased slightly, however, for the arid regions, it has increased significantly. The intra-annual distribution changed in a way that the rainy season has become shorter, especially due to the drying trend in the spring season. A significant increase in the average duration of the dry spells was found, while no significant trend was noted in the duration of the rain spells.

The inter-annual variation of the rainfall was found to be significantly correlated with the occurrences of Cyprus lows as well as with the Nino 3_4, the EA-WR and the NCP oscillations. It is shown that there is similarity between the polynomial course of both the EA-WR and that of the annual rainfall over Israel. This suggests that the recent decreasing trend of the rainfall is, at least in part, a reflection of regional natural climatic variations.