EMS Annual Meeting Abstracts
Vol. 12, EMS2015-394-1, 2015
15th EMS / 12th ECAM

Rainfall Characteristics and Trends for the Palestinian Territories, 1951–2010

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Precipitation is an important part of the hydrological cycle impacting many natural and human systems, e.g., water management, agriculture, forestry, industrial sector, and human health. Some effects of rainfall on these sectors are direct, such as the shortage or excess of water, while others are more indirect, e. g., impacts of precipitation on the land fertility. The study area covering the Palestinian territories and surrounding areas is located in the subtropical dryland zone that is characterized by a rainy season (October to May) and a dry season (June to September). The analysis of changes in the precipitation totals and their timing within the year is of immense importance for the Palestine economy and particularly the agricultural management. Palestine faces a chronic water shortage and (rain fed) agriculture is an important economic sector.
The regional rainfall characteristics and their changes within the period 1951–2010 are studied using the two gridded data sets VASClimO (monthly resolution, 1951–2000) and E-OBS (daily resolution). The annual precipitation totals in the study area range from below 100 mm in the arid South to more than 550 mm in semi-arid North. The magnitude of the values depends on the chosen data set. VASClimO delivering delivers higher annual precipitation totals in the North and lower values in the South of the study area. The general characterization of the moisture status of the months and years, respectively, is well comparable in most years. The timing of drought and wet events is compared and the spatial structure of rainfall is analysed using the Rainfall Anomaly Index. The spatial patterns of the E-OBS data set are generally a bit more variable and patchy than those of VASClimO. There are mainly small changes in annual precipitation totals – except for the southern parts of the study area where distinct precipitation decreases emerge in the E-OBS data set. Intra-annual precipitation changes are more pronounced with increasing precipitation in October (using E-OBS also in September) and decreases in April and December (using E-OBS also in May and November). The relative trends of May and September are sometimes very high, which is explained by the very low precipitation totals in these months (below 2 % of the annual precipitation total).