4.23 RAINFREQ: RAINFALL FREQUENCY ANALYSIS FROM REMOTE SENSING RAINFALL ESTIMATES

F. MARRA[1], N. PELEG[2], E.I. ANAGNOSTOU[3], E. MORIN[1]

[1] Institute of Earth Sciences, Hebrew University of Jerusalem, Israel

[2] Institute of Environmental Engineering, Hydrology and Water Resources Management, ETH Zurich, Switzerland

[3] Department of Civil and Environmental Engineering, University of Connecticut, Storrs, CT, USA

f.marra@mail.huji.ac.il

IntensityDurationFrequency (IDF) curves are used to provide a direct link between the characteristics of a rainfall event and the probability of its occurrence, and have wide applications in hydrological design and flood risk management. The standard approach relies on rain gauge data and applies to point rainfall, raising two issues: (i) usual applications require catchment-scale information; (ii) no data is available for ungauged areas or regions where rain gauges have been deployed only recently, moreover rain gauge representativeness decreases with distance, especially in presence of climatological gradients. A number of contributions aimed to issue (i), but generally relying on rain gauge records and, as such, making the second issue even more important.

Crucial objective of present-day research is to address issue (ii) by means of remote sensing rainfall estimates. This would allow exploring the spatial distribution of rainfall extremes with increased detail over wide areas, providing new perspectives for studying precipitation regimes, and promising theoretical and practical implications. Research on the topic, so far, used concepts and techniques developed for rain gauge data (i.e. point or multiple-point) and have been validated against gauge-derived analyses. These procedures add further sources of uncertainty and prevent from isolating between data and methodological uncertainties and from fully exploiting the available information. Aim of this project is to advance knowledge on the use of remote sensing rainfall estimates for rainfall frequency analysis stepping out of gauge-centred concept and identifying new methods for improved estimates of high quantiles from short data records. We present results from this project placing them in the context of present-day research on the topic. Specific results include: (a) derivation of IDF curves for the eastern Mediterranean area from the longest weather radar record worldwide; (b) quantification of the impact of small-scale variability of rainfall extremes on the estimation of IDF curves from rain gauges and remote sensing estimates; and (c) direct comparison of IDF curves from weather radar and satellite based products on corresponding spatial and temporal scales.