



Using satellite-rainfall data to identify flood prone areas over the Saudi Arabian Peninsula

Nikolaos Bartsotas (1), Efthymios I. Nikolopoulos (2), Emmanouil N. Anagnostou (2), Stavros Solomos (1), Jumaan Al Qahtani (3), Elyas Alaa (3), Ioannis Alexiou (3), and George Kallos (1)

(1) University of Athens, School of Physics, Division of Environmental Physics - Meteorology, Athens, Greece , (2) University of Connecticut, Department of Civil and Environmental Engineering, Connecticut, USA, (3) Saudi Aramco, Environmental Protection Department, Dhahran, Saudi Arabia

One of the main advantages of space-based remote sensors is their ability to provide information over areas such as tropical forests and arid lands, where few or no in-situ observations are available. In addition, long-records (> 10 yrs) of quasi-global high-resolution precipitation products that now exist provide a valuable source of information and allow us to derive important climatologic variables.

This study focuses on the characterization of flood prone areas over Saudi Arabia using a 14-year record (1998-2011) of high-resolution satellite rainfall data from the TRMM Multi-satellite Precipitation Analysis (TMPA). Specifically the 3B42 version 7 product, with $0.25^{\circ} \times 0.25^{\circ}$ spatial and 3-hourly temporal scale was statistically analyzed to characterize rainfall spatiotemporal distribution over the area. Analysis was initially focused on identifying significant rainfall patterns which, given the land surface characteristics of the area, are directly associated with flood prone areas. Quantile analysis of rainfall time series in combination with annual rainfall maps dictated areas with significant annual rainfall amounts that were additionally an outcome of a small number of events, thus clearly indicating cases of high rainfall intensity. The most severe episodes were further checked with available rain gauge data for their validity. Finally, the spatial distribution of the maximum rainfall accumulation over a limited time-window gave important information on the typical duration of a flood induce storm event in the region.