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Reconstructing a High-resolution Precipitation Climatography in the Eastern Mediterranean Area Using the WRF-FDDA System

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Mesoscale orography and land-surface heterogeneities, including land-water contrasts, vegetation variations and soil-property differences can greatly affect precipitation development and produce very rich temporal-spatial structures, as observed in individual precipitation events as well as in observed precipitation climatographies. The granularities of precipitation structures are very important for hydrological applications. Unfortunately, precipitation observations and available coarse-resolution global models that produce precipitation analyses and forecasts are incapable of simulating these scales and thus can not provide the valuable mesoscale and smaller precipitation distributions.

In this paper, the US National Center for Atmospheric Research WRF FDDA (Weather Research and Forecasting model with a Four-Dimensional Data Assimilation scheme) is used to produce a high-resolution (2 - 3 km) precipitation climatography over a complex terrain area that affects hydrological processes associated with the Sea of Galilee. The WRF model is configured with detailed terrain, land use and soil data, and run for precipitation events during the last 5 – 20 years with multiple nested domains driven by global analyses and all available observations. The WRF precipitation outputs are processed to produce monthly and seasonal mesoscale climaographies. Available rain observations are used for model precipitation verification and calibrations. Preliminary results based on 5-year model runs for winter seasons will be presented.