M. Tugrul Yilmaz

Estimation of Radar-Based High Resolution Precipitation Product over Turkey

tuyilmaz@metu.edu.tr

Authors

 M. Tugrul Yilmaz, Orta Dogu Teknik Universitesi,
Kurtulus Ozturk, Turkish State Meteorological Service,
Ismail Yucel, Orta Dogu Teknik Universitesi,
Koray K. Yilmaz, Orta Dogu Teknik Universitesi,

Precipitation is one of the most critical variables in many hydrometeorological applications such as drought and flood monitoring, climate change impact studies and water resources management. Particularly flood analysis and prediction type applications carried out over regions with heterogeneous precipitation pattern require high spatial resolution precipitation estimates. Accurate precipitation estimates can be obtained using various platforms, like ground-based stations, numerical weather prediction models, satellites, and radars. Despite being used for the verification of precipitation estimates obtained via other platforms, the observations made at stations contain representation errors since they provide point data while the density of gauge networks is often hampered by the maintenance and installation difficulties. Although satellite and weather prediction models provide homogeneous and consistent data, their spatial resolution is still not sufficient for many applications. On the other hand, radars can provide very high spatial resolution (330 m) precipitation information that station-, satellite-, and model-based estimates cannot offer. Radars do not measure the precipitation directly; instead they calculate it using several statistically derived empirical equations or algorithms. Even though radar-based precipitation estimates contain errors for many reasons, radars can provide the adequate estimates after applying number of corrections via post-processing. General Directorate of Meteorology of Turkey has already installed 16 meteorology radars over different regions of Turkey between 2000 and 2016. These radars have been collecting observations since 2000, while 4 of these radars are not providing operational data but only collecting data for initial assessments. In addition to these 16 radars, 4 radars are planned to be installed before end of 2017. Considering the substantial amount of radar data already collected, the goals of this study are to initially correct (post-process) the climatology of radar-based estimates with respect to station-based estimates and later merge all radar-based estimates to create homogenous radar-based precipitation estimates over Turkey. The spatial gaps will be filled with interpolated station-based estimates. A final product of radar-based precipitation estimates is expected to reveal highly critical results for the operational prediction of flash floods.