13.33 PAN-EUROPEAN MULTI-INSTRUMENTAL RAINFALL COMPOSITE (PERC)

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This study utilizes space-based rainfall estimation of EUMETSAT product Convective Rainfall Rate (CRR) to improve the European rainfall composite map.

The hazards of intense rainfall and severe storms, such as flash floods, urban floods and landslides, are one the largest and growing risk associated with weather phenomena. EUMETNET OPERA radar network is providing key observations for fine-scale precipitation analysis and nowcasting. Ground clutter and beam blocking, radio-frequency interferences, wind farms, occasional malfunction of the radars and simply the areas without radar-coverage introduce uncertainty to the rainfall estimation, and especially, in strong convective rainfall events mis-interpretations or underestimation can be severe. Hence there is a need to quality-controlled OPERA mosaics and to extend the domain of the OPERA precipitation products covering the whole Europe.

To this end we are utilizing the integrated precipitation estimates based on lightning strike density obtained from the Vaisala GLD 360 network and the operational CRR combined with OPERA radar data. The rainfall events during summer months of 2015-2017 are studied covering the Pan-European area. Both the detection skill and quantified estimation of 1h-rainfall accumulation of CRR are compared with the gauge-adjusted radar-based accumulation, and the integrated product is compared to a dense gauge network to provide independent verification.

This study is part of an EU Civil Protection and Prevention project, SMUFF (Seamless probabilistic multi-source forecasting of heavy rainfall hazards for European flood awareness), where the PERC is acting as the initial precipitation field for nowcasting. The objective of SMUFF is to develop improved tools for assessing and forecasting the hazards and risks induced by intense rainfall and severe storms. This is achieved by blending probabilistic multi-instrument precipitation nowcasts based on PERC with the numerical ensemble predictions of ECMWF creating seamless high-resolution hazard and risk tools for lead times from 15 minutes to 5 days.