

DESCRIPTION FOR THE GENERAL PUBLIC

Quantitative Precipitation Estimates at high spatial and temporal resolutions are of an increasing importance for water resource management, for improving the understanding and prediction of precipitation in the numerical weather prediction (NWP) models, and for monitoring the seasonal to inter-annual climate variability.

Recognition of the atmospheric surface precipitation type (SPT), the temporal and spatial structure of precipitation is to a considerable extent difficult when using the standard network of meteorological measurements. The non-linear structure of the spatial distribution of an accumulated precipitation conditioned by numerous environmental factors makes the precise determination of the scope of occurrence of the phenomenon possible only when using remote sensing techniques or the coupling of mutually complementary research methods. A common problem of retrieval algorithms is that the knowledge about the vertical distribution of precipitation is very important, but not well known.

The project aims primarily at development of techniques and algorithms utilizing comprehensive set of high resolution meteorological data to determine the SPT. Meteosat satellite data (SEVIRI radiometer) are characterized by relatively high spatial resolution, but visible and infrared spectral channels are not satisfactory for investigation of internal structure of precipitation field. For this aim active microwave, i.e. radar measurements, are necessary. Such data are available from GPM satellite starting on 2014. The highest resolution of 1 km can be obtained from weather radar measurements.

The project involves the following research works:

- (a) The classification into SPT classes will be based on scheme based on fuzzy logic and will be related to predefined number of precipitation types as hydrometeors that can be detected by proposed measurement techniques and models.
- (b) In the further stage of this project new algorithms will be developed to use mathematical functions to weight the relative importance of the polarimetric variables and correlate them in order to identify each cloud (cloud water and cloud ice) and precipitation (snow, ice pellets, hail, and rain) types.
- (c) Verification of the formulas on wide dataset from ground meteorological stations and volumetric data will allow us to estimate uncertainty of the determined SPT.