4–8 November 2019, Kraków, Poland
ECSS2019-116

Determination of movement vectors field for scale-dependent precipitation layers: case study.

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In the last years nowcasting models are becoming more sophisticated and its output is used as an input to rainfall-runoff models, risk management, road management and also are used in other fields of industry and economy.

Their main idea is to forecast precipitation field on basis of logical separation of forecast on advective (extrapolation) and evolution components.

One of such nowcasting models developed at IMGW-PIB is SNAR - Spectral Nowcasting with Autoregression. Its main idea is to decompose precipitation field on spatial scale dependent layers to take into account different phenomena such as convective or large-scale precipitation. For this purpose the FFT is used. For each of such layer or group of layers, depending on model configuration, motion vectors are determined by means of method based on TREC algorithm. In the next step autoregressive model is used to account for field evolution.

Accurate determination of atmospheric motion vectors is crucial for reliability of precipitation nowcasting since it gives basis for prediction of advection dependent component of forecast.

In this presentation we analyse score of TREC based algorithm for each layer (all layers) on basis of severe storm case that had place on 11-12 VIII 2017 and caused a lot of damage. The storms over the weekend killed six people, including two girl scouts who were crushed by a falling tree. Tens of thousands of trees have been brought down and also thousands of homes were damaged (losses are estimated at over 58 thousand euros).

Since TREC method is highly configurable, we select the most appropriate set of parameters for each layer (or group of layers), thus nowcasting models in operational setting have high demands on its performance times. This factor is also taken into account in our analysis.