Extreme weather events in southern Germany – Climatological risk and development of a nowcasting procedure

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Extreme weather events such as thunderstorms, hail and heavy rain or snowfall can pose a threat to human life and to considerable tangible assets. Yet there is a lack of knowledge about present day climatological risk and its economic effects, and its changes due to rising greenhouse gas concentrations. Therefore, parts of economy particularly sensitive to extreme weather events such as insurance companies and airports require regional risk-analyses, early warning and prediction systems to cope with such events. Such an attempt is made for southern Germany, in close cooperation with stakeholders. The study will also develop an optimized nowcasting procedure, which will initially tested at Munich Airport.

Threshold values need to be defined to identify extreme precipitation events. These thresholds are created locally, thus taking into account their spatial variation within southern Germany. This approach also allows to intercompare station and model data in spite of their different characteristics. Events found in the ERA40 reanalysis and in station data that are exceeding the defined thresholds are compared with impact records. These data are provided by the Munich Re and Munich Airport. Based on this comparison the most suitable percentile is chosen to identify local extreme weather events.

Evaluation results from the comparison of ERA40 reanalysis with station data will be used to estimate the skill of the regional climate model CLM concerning the sim-

ulation of frequency and intensity of the extreme weather events. Data of the A1B scenario (2000-2050) will be examined for a possible climate change signal.

For nowcasting and short range forecasts output from the operational COSMO-DE model produced by the German Weather Service is used for computing the Dynamic State Index (DSI). This novel parameter can be especially applied for prediction of heavy precipitation events and lightning occurrence.