Project: **1245**

Project title: **Weather and climate modules of the AI-based early warning system DAKI-FWS**

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Abstract

"*An early warning system (EWS) is a climate change adaptation measure that uses integrated communication systems to help communities prepare for dangerous climate-related events. A successful EWS saves lives and jobs, land and infrastructure, and supports long-term sustainability. An EWS helps public agencies and administrations plan, saves money in the long run, and protects the economy*." This definition of the United Nations Climate Action also corresponds to the goal of this project: to protect and support lives and jobs, land and infrastructures with the help of a scientifically correct and innovative warning system with a seasonal time horizon. The weather and climate modules of the DAKI-FWS (BMWi joint-project Data and AI-supported early warning system to stabilise the German economy; German: Daten- und KI-gestütztes Frühwarnsystem zur Stabilisierung der deutschen Wirtschaft) use the international state-of-the-art seasonal forecasts for Germany and apply innovative AI-approaches to correct seasonal simulations (bias corrected) and bring them to a very high spatial resolution on a local to regional scale. These initial results will be introduced into the various climate-related practical applications of the overall project, DAKI-FWS, such as pandemics or subtropical/tropical diseases, and contribute to the estimation of the outbreak and evolution of health crises. Weather and climate extremes, such as heat waves, storms or droughts, but also the simultaneous occurrence of extremes are objectively identified from the large pool of meteorological and climatological reference data sets, seasonal forecasts as well as event lists. This allows the optimal recognition of features and patterns and enables the determination and consideration of their dependencies in spatio-temporal high resolution. The innovative project work is complemented by the further development and AI enhancement of the European Flood Awareness System model, LISFLOOD and forecasting system. The model developed by the Joint Research Centre (JRC) with European and global application will be adapted and fully calibrated to a very high spatial resolution for the German territory. The AI-enhanced model is combined together with the high-end output of the seasonal forecast and provides with AI applications a high-resolution, accurate flood risk for the regions concerned. The final output of the seasonal forecast hazard maps not only supports adaptation, but also improves preparedness with its time horizon of several months, thus increasing the resilience of economic sectors to the worsening conditions caused by ongoing anthropogenic climate change. The sub-project will inform stakeholders, political decision-makers and the public about the probability of occurrence, intensity and spatial and temporal extent of extreme events. These are extremely important for the German economy as well as for disaster control.