



POLARA - an environment and software framework to develop nowcasting systems

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Monitoring the atmosphere is an important task to improve the understanding of meteorological processes and to protect the population and critical infrastructure against natural threats. Especially extreme weather phenomena can lead to malfunctioning of infrastructures with several consequences for economy, society and environment.

In Germany it is the responsibility of the national meteorological service, Deutscher Wetterdienst (DWD), to warn about dangerous weather phenomena and provide meteorological services like nowcasting. POLARA (Polarimetric Radar Algorithms) is one of the nowcasting systems operated by the DWD to monitor the atmosphere. Originally POLARA was designed as operational system and development environment to analyse radar data. In particular, the developments focused on the quality assurance of the radar data, which are processed to locate precipitation and estimate its type and motion. Subsequently, extending the data management enabled to also process further types of data. With the rising complexity and versatility of the system a modular software-architecture was designed as framework to create different, but comparable systems for various nowcasting tasks. Thus algorithm developers can avoid redundant work, as they can benefit from already designed structures, established procedures and written code in POLARA. Therefore the code has been restructured into modules with specific tasks, e.g. the storage of data, perform an algorithm or organise multiple algorithms in a job chain. Each module defines a certain minimal standard on how to implement that specific task. It can be expanded or reduced depending on the subsystem's need. These modules represent a main part of POLARA and make use of the programming language C++. Additionally, POLARA supports the development process. Hence, it also offers procedures how to test and document code or to handle its version control. A plugin for the Eclipse IDE is provided to generate code to expand each module with new building blocks.

To promote cooperation between research institutions and the German weather service, DWD attempts to perform external development within POLARA. Thereby the benefit from current researches would be significantly increased, as these new developments would be much easier to integrate into the DWD infrastructure.

This contribution will present POLARA with focus on its modular software-architecture and its use as framework to derive new nowcasting systems.