



## **Maturity Matrices for Quality of Model- and Observation-Based Climate Data Records**

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In the field of Software Engineering the Capability Maturity Model is used to evaluate and improve software development processes. The application of a Maturity Matrix is a method to assess the degree of software maturity. This method was adapted to the maturity of Earth System data in scientific archives.

The application of such an approach to Climate Data Records was first proposed in the context of satellite-based climate products and applied by NOAA and NASA. The European FP7 project CORE-CLIMAX suggested and tested extensions of the approach in order to allow the applicability to additional climate datasets, e.g. based on in-situ observations as well as model-based reanalysis. Within that project the concept was applied to products of satellite- and in-situ based datasets. Examples are national ground-based data from Germany as an example for typical products of a national meteorological service, the EUMETSAT Satellite Application Facility Network, the ESA Climate Change Initiative, European Reanalysis activities (ERA-CLIM) and international in situ-based climatologies such as GPCC, ECA&D, BSRN, HadSST.

Climate models and their related output have some additional characteristics that need specific consideration in such an approach. Here we use examples from the World Data Centre for Climate (WDCC) to discuss the applicability. The WDCC focuses on climate data products, specifically those resulting from climate simulations.

Based on these already existing Maturity Matrix models, WDCC developed a generic Quality Assessment System for Earth System data. A self-assessment is performed using a maturity matrix evaluating the data quality for five maturity levels with respect to the criteria data and metadata consistency, completeness, accessibility and accuracy.

The classical goals of a quality assessment system in a data processing workflow are:

- (1) to encourage data creators to improve quality to reach the next quality level,
- (2) enable data consumers to decide, whether a dataset has a quality that is sufficient for usage in their target application, i.e. to appraise the data usability for their own purpose and
- (3) make different quality assessments of projects comparable and transparent.

The use of the Maturity Model in a quality assessment process helps to approximate all three of these aims.