



# NOAA Maturity Matrix for CDRs

Bates, J. J. and Privette, J. L. (2012) A maturity model for assessing the completeness of climate data records, *Eos Trans. AGU*, **93**(44): 441. DOI: [10.1029/2012E0440006](https://doi.org/10.1029/2012E0440006)

## Level 1

### Key points:

- ◆ Systematic approach to determining the maturity of a CDR
- ◆ Considers scientific and preservation maturity, and societal impact
- ◆ Sets general CDR expectations and can be tailored to specific needs

### Website:

Examples of completed MMs can be found at: <http://www.ncdc.noaa.gov/cdr/operationalcdrs.html>

## Executive summary

A maturity matrix (MM) offers a systematic means of assessing a Climate Data Record's (CDR's) 'usability' for long term monitoring of the climate. The proposed method combines best practice in each area (scientific, archiving and software) ensuring an efficient system, and enables review of individual datasets as well as collective reviews of all. The MM extends, to climate data, a tried-and-tested system which has been used by systems and software industries for decades.

The concept of a maturity matrix for Climate Data Records (CDRs) has been championed by scientists at NOAA and NASA, and considered by other agencies such as ESA. It has been developed to enable a systematic assessment of CDRs

of all records, highlighting areas for development and improvement. In general, it will provide information on all aspects of the data record, including, but not limited to: metadata, methodology, product validation, documentation and accessibility.

This work has been brought about by the relative difficulty in defining a CDR and the level of variability that may be distinguished from it, as well as being able to compare the 'fitness-for-purpose' of different sensors' products.

The authors developed a system whereby the maturity of a CDR was assessed according to three attributes: scientific and preservation maturity, and societal impact. Furthermore, the authors go on to suggest relative metrics for six levels involved under each attribute. Level 1 means research grade, whereas level 6 applies to products which may distinguish centennial variability.

Optimum Interpolation 1/4 Degree Daily Sea Surface Temperature Analysis OISST							
Maturity	Climate Data Record (CDR) Maturity Matrix						
	Software Readiness	Metadata	Documentation	Product Validation	Public Access	Utility	
1	Conceptual development	Little or none	Algorithm Theoretical Basis Document (C-ATBD); paper on	Little or None	Restricted to a select few	Little or none	
2	Significant code changes expected	Research grade	Peer-reviewed paper on algorithm reviewed	Minimal	availability to develop familiarity	Limited or ongoing	
3	Moderate code changes expected	Meets intl standards: ISO or FGDC for collection; netCDF for file	Public C-ATBD; Peer-reviewed publication on algorithm	Uncertainty estimated for select locations/times	Data and source code archived and available; caveats required for use.	Assessments have demonstrated positive value.	
4	Some code changes expected	Collection level. Stable. Allows provenance tracking and reproducibility of dataset. Meets inspection review.	Operational Algorithm Description (OAD); Peer-reviewed publication on algorithm; paper on	over widely distributed times/location by multiple investigators; Differences	Data and source code archived and publicly available; uncertainty estimates provided; Known issues public	May be used in applications; assessments demonstrating positive value.	
5	Minimal code changes expected; Stable, portable and reproducible	Stable. Allows provenance tracking and reproducibility of dataset. Meets international	Public C-ATBD, Review version of OAD, Peer-reviewed publications on algorithm and product	uncertainties estimated over most environmental conditions by multiple investigators	publicly available with associated uncertainty estimate; Known issues public. Periodically updated.	applications by other investigators; assessments demonstrating positive value	
6	No code changes expected; Stable and reproducible; portable and operationally efficient	complete at file and collection level. Stable. Allows provenance tracking and reproducibility of dataset. Meets current	Public C-ATBD and OAD; Multiple peer-reviewed publications on algorithm and product	observation strategy designed to reveal systematic errors through independent cross-checks, open inspection, and continuous	Record is publicly available from Long-Term archive; Regularly updated	Used in published applications; may be used by industry; assessments demonstrating positive value	
	Validated using publicly accessible documentation						CDRP-MTX-0008 V4.0 (12/20/2011)
	Validated by SME, documents not public						
	Not Validated (insufficient documentation)						

**Figure 1.** Example MM; maturity level given in green.

For more information on the Maturity Matrix please contact John Bates ([John.J.Bates@noaa.gov](mailto:John.J.Bates@noaa.gov))

which will provide general information to the community concerning the status of individual datasets, as well as collective information on the state