NOAA/NCEI

Data Stewardship Maturity Assessment

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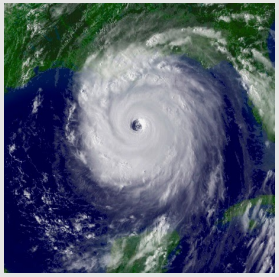
Archive Branch, Chief

NOAA National Centers for Environmental Information

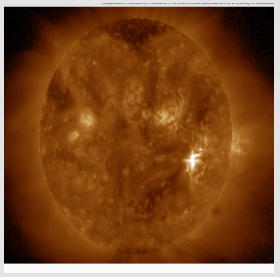
NOAA's National Centers for Environmental Information

- Responsible for preserving and providing access to one of the most collections of environmental data, with comprehensive oceanic, atmospheric, and geophysical data
- From the depths of the ocean to the surface of the sun and from million-year-old sediment records to near real-time satellite images
- Nation's leading authority for environmental information

Monthly U.S. & Global Climate Reports



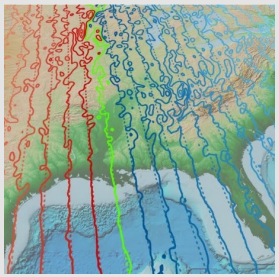
U.S. Billion-Dollar Weather & Climate Disasters report



Space Weather Data

World Ocean Database

U.S. Drought Monitor



Magnetic Model

OneStop

To improve the discovery of, access to, and usability of NOAA's vast and diverse collection of big data

- ***Modern, user-friendly discovery interface***
- ***Open infrastructure***
- ***Standards and Best Practices***

Data Stewardship Maturity Matrix (DSMM)

A Unified Framework for Measuring Stewardship Practices Applied to Individual Digital Earth Sciences Data Products

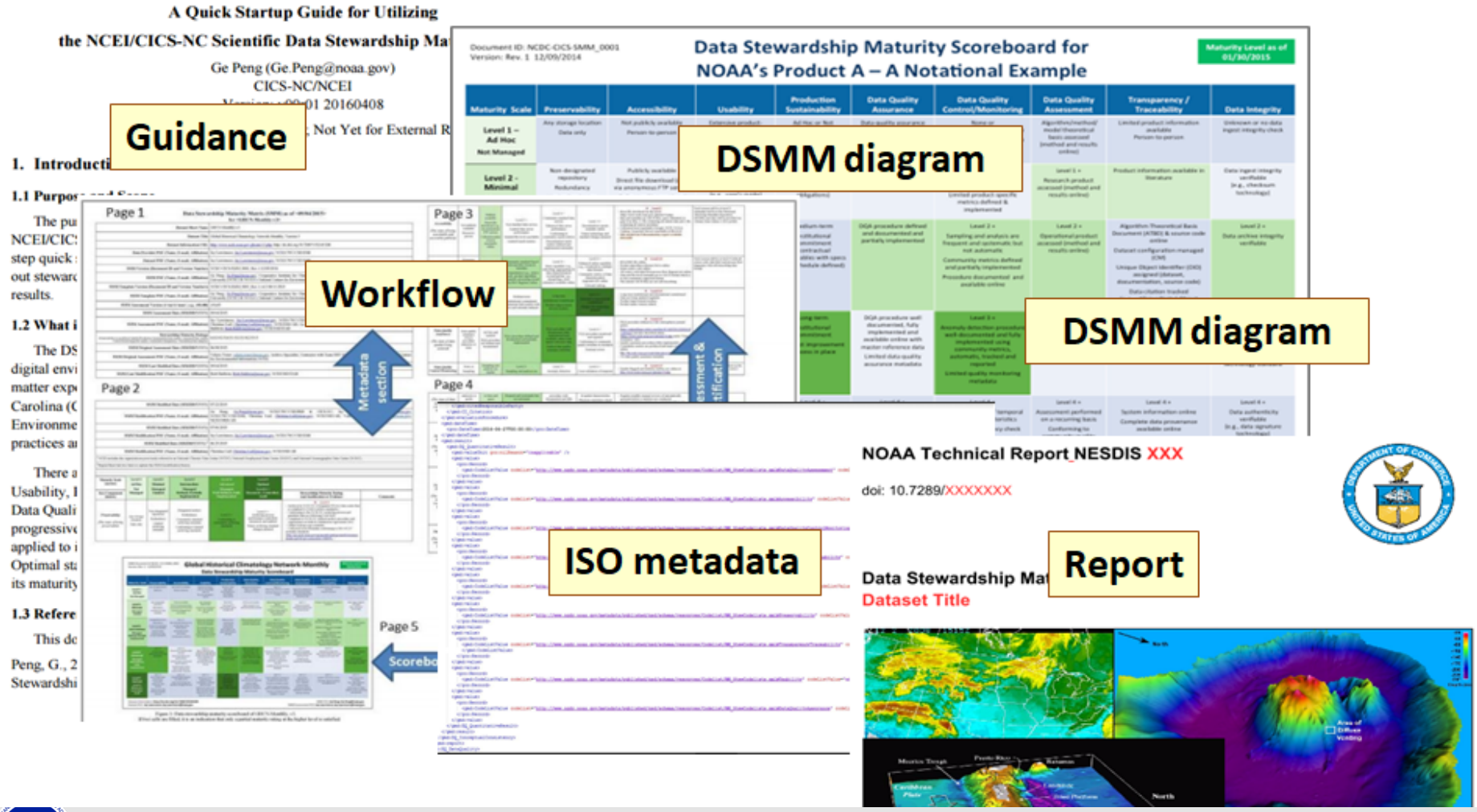
http://tinyurl.com/DSMMintro

DSMM Evaluates Stewardship Maturity in Nine Key Components

- Consistent framework for assessing and reporting quantifiable stewardship practices
- Allows for greater stewardship quality transparency, builds trust among user community and contributes to the reproducibility of NOAA's data products.
- Developed jointly by domain experts leveraging institutional knowledge and community best practices and standards
- Vetted through use case studies with diverse datasets managed by different organizations, in collaboration with NC State University, NCEI Data Stewardship Division, and U.S. and international data stewardship groups.

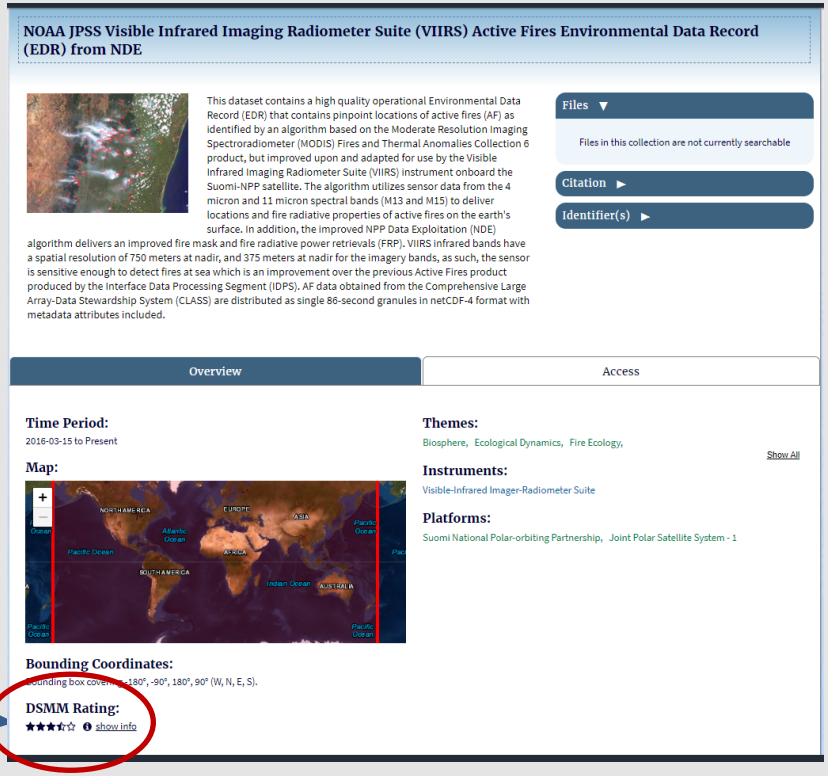
Maturity Scale / Key Component	Level 1 - Ad Hoc Not Managed	Level 2 - Minimal Managed Limited	Level 3 - Intermediate Managed Defined, Partially Implemented	Level 4 - Advanced Managed Well-Defined, Fully Implemented	Level 5 - Optimal Level 4 + Measured, Controlled, Audit
Preservability	*The state of dataset being preservable*				
Accessibility	*The state of dataset being publicly searchable and accessible*				
Usability	*The state of data product being easy to understand and use*				
Production Sustainability	*The state of data production being sustainable and extendable*				
Data Quality Assurance	*The state of data product quality being assured/screened*				
Data Quality Control /Monitoring	*The state of data product quality being controlled and monitored*				
Data Quality Assessment	*The state of data product quality being assessed*				
Transparency /Traceability	*The state of data product being transparent, trackable, and traceable*				
Data Integrity	*The state of data integrity being verifiable*				

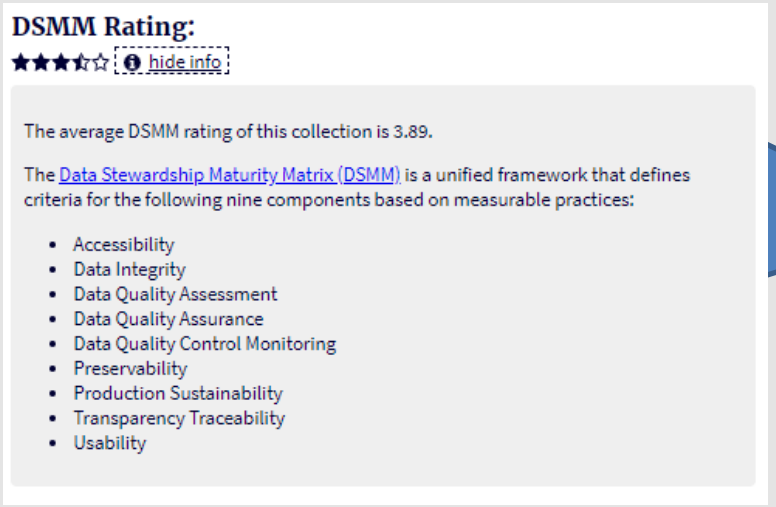
Guidance, Templates, Tools



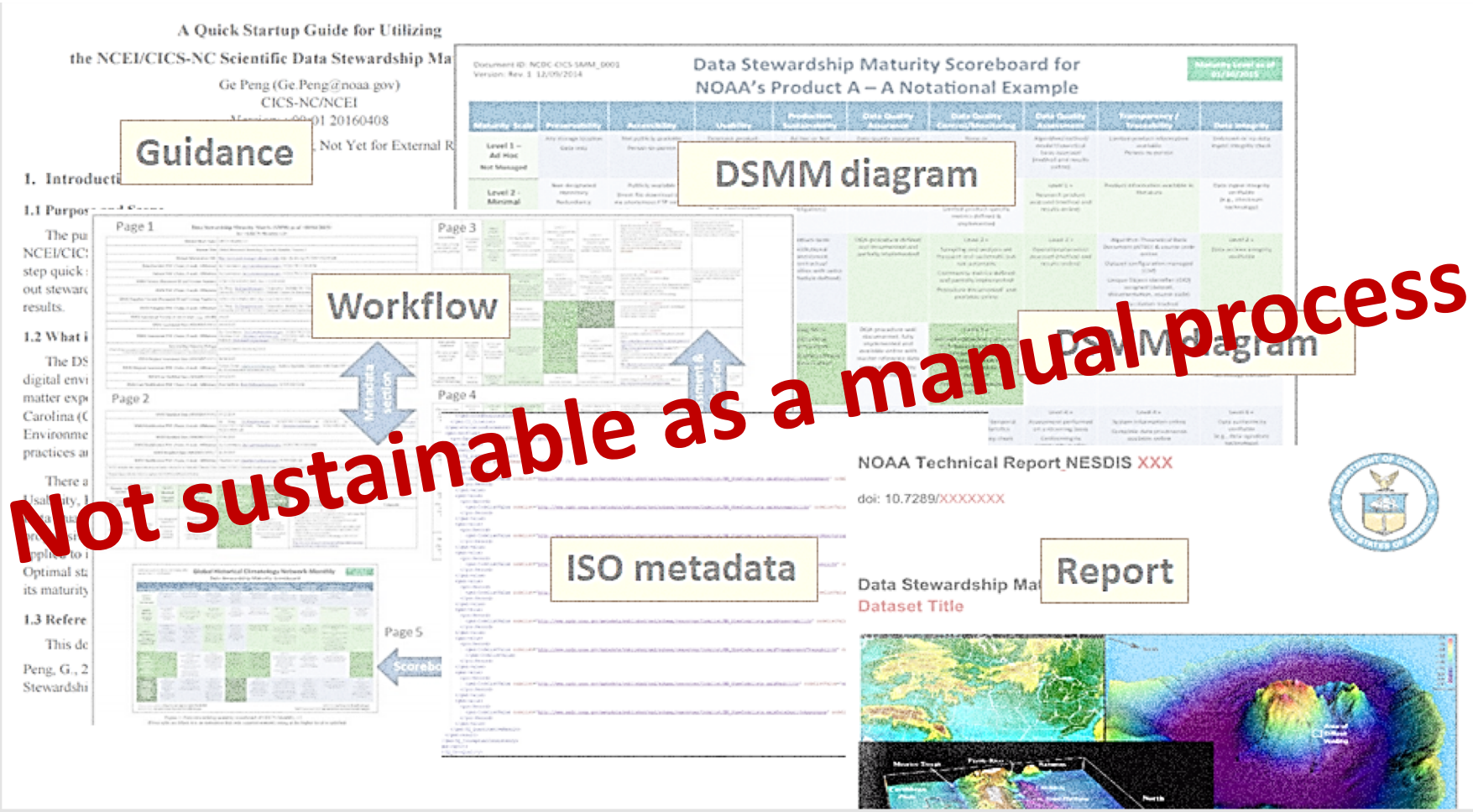
DSMM in *OneStop*

Overall rating is inserted into the collection metadata which is indexed by *OneStop* and displayed on the dataset landing page





Guidance, Templates, Tools



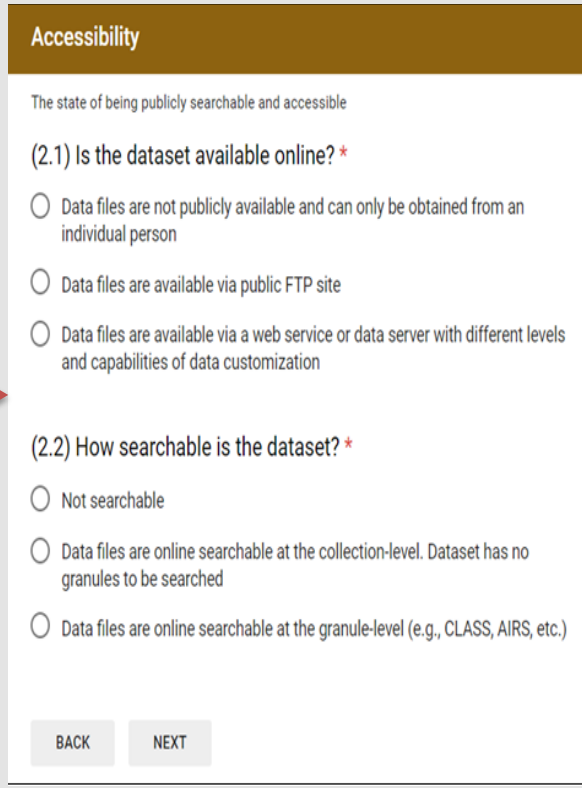
Streamlined Assessment Process

Data Stewardship Maturity Questionnaire (DSMQ)

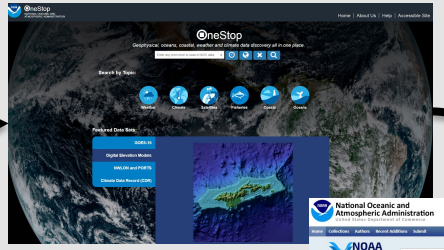
User-friendly questions within the Collection Manager Enterprise Tool (CoMET)

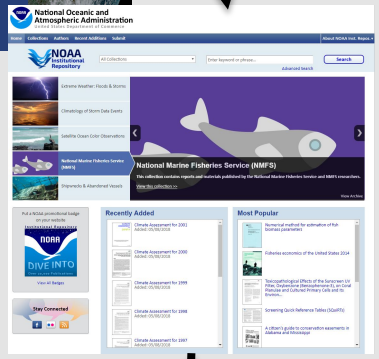
CoMET User's Manual

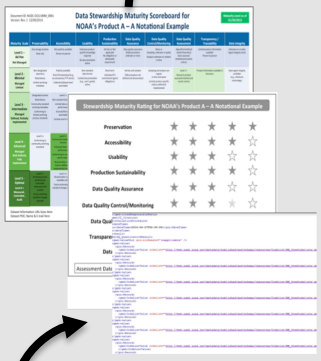
Maturity Scale	Accessibility
Level 1 – Ad Hoc **Not Managed**	Not publicly available Person-to-person
Level 2 - Minimal **Managed Limited**	Publicly available Direct file download (e.g., via anonymous FTP server) Collection/dataset level searchable
Level 3 - Intermediate **Managed Defined, Partially Implemented**	Level 2 + Non-standard data service Limited data server performance Granule/file level searchable Limited search metrics
Level 4 - Advanced **Managed Well-Defined, Fully Implemented**	Level 3 + Community-standard data services Enhanced data server performance Conforming to community search metrics Dissemination report metrics defined and implemented internally
Level 5 - Optimal **Level 4 + Measured ,**	Level 4 + Dissemination reports available online Future technology and standard changes planned

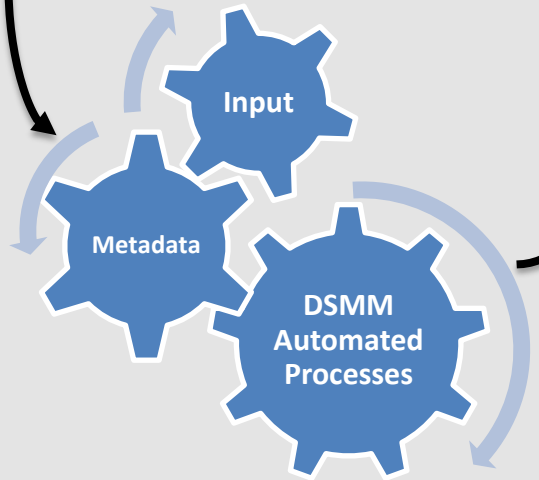


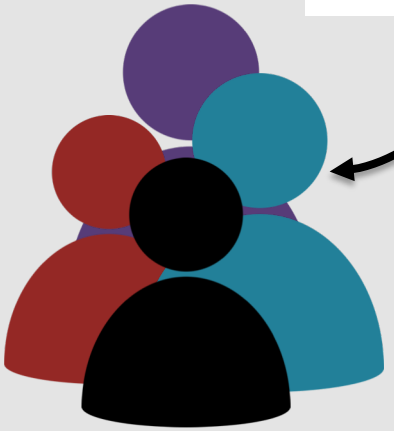
DSMQ Workflow (Future)











Happy Users

Keys to success

- User involvement
- Agile approach

NOAA/NCEI

Questions?

www.ncei.noaa.gov
www.climate.gov

NCEI Climate Facebook: http://www.facebook.com/NOAANCEIclimate
NCEI Ocean & Geophysics Facebook: http://www.facebook.com/NOAANCEIoceangeo
NCEI Climate Twitter (@NOAANCEIclimate): http://www.twitter.com/NOAANCEIclimate
NCEI Ocean & Geophysics Twitter (@NOAANCEIocngeo): http://www.twitter.com/NOAANCEIocngeo

Additional Details

DSMM Resources

DSMM paper: tinyurl.com/DSMMpaper

DSMM Introduction Slides: tinyurl.com/DSMMintro

A DSMM Self-Evaluation Template: tinyurl.com/DSMMtemplate

OneStop DSMM ISO Metadata Example

Conceptual Consistency

Template Content

Measure Name: Data Stewardship Maturity Assessment
Measure ID: MM-Stew
Measure Description: The Data Stewardship Maturity Matrix (DSMM) is a unified framework that defines criteria for each of nine components based on measurable practices, which can be used to apply a progressive, 6-level rating to an individual dataset, representing stewardship maturity stages rated as Not Assessed or Not Available (Level 0), adHoc (Level 1), minimum (Level 2), intermediate (Level 3), advanced (Level 4), and optimal (Level 5).
Evaluation Description: Data Stewardship Maturity Assessment was evaluated by the metadata content editor for the NOAA OneStop project using the Scientific Data Stewardship Maturity Assessment Model Template v4.0.
Procedure Reference: Peng, Ge. The Scientific Data Stewardship Maturity Assessment Model Template. 2015-06-23. doi:10.6084/m9.figshare.1211954

Example of DSMM Results in ISO Metadata

Conceptual Consistency

Date of Measurement: 2016-06-22

Quantitative Result:

- Data Quality Assessment: minimal
- Accessibility: advanced
- Data Quality Control Monitoring: minimal
- Production Sustainability: advanced
- Data Integrity: intermediate
- Preservability: advanced
- Transparency Traceability: intermediate
- Usability: advanced
- Data Quality Assurance: advanced

Results

Conformance Result

Explanation: Data Stewardship Maturity Assessment was (etc…) **Pass:** (inapplicable)

Reference: Ionin, R., G. Peng, and K. Saha (2016), Data stewardship maturity report for GHRSST Level 4 AVHRR_AMSR_OI Global Blended Sea Surface Temperature Analysis (GDS Version 1), NOAA/NESDIS Technical Report XXX, NOAA National Centers for Environmental Information, doi: 10.7289/XXXXXX.

Results