

**Stewardship Maturity Matrix (SMM) as of <11/13/2015>
for <OISST_CDR_Daily_v2>**

Dataset Title	NOAA Daily 0.25° Optimum Interpolation Sea Surface Temperature (OISST) CDR
Dataset Information URL	https://www.ncdc.noaa.gov/cdr/oceanic/sea-surface-temperature-optimum-interpolation ; http://doi.org/doi:10.7289/V5SQ8XB5 ; http://doi.org/10.5067/GHAAO-4BC01 ;
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SMM Version (Document ID and Version Number)	NCDC-CICS-SMM_0001_Rev.1 12/09/2014
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SMM Template Version (Document ID and Version Numbers)	NCDC-CICS-SMM_0001_Rev.1 v4.0 06/23/2015
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SMM Assessment Version (v<nn>r<mm>, e.g., v01r00)	v01r00
SMM Assessment Date (MM/DD/YYYY)	11/13/2015
SMM Assessment POC (Name; E-mail; Affiliation)	Viva Banzon; Viva.Banzon@noaa.gov ; NCEI; Ge Peng; Ge.Peng@noaa.gov ; CICS-NC/NCEI
Stewardship Maturity Ratings (each key component) (kc1/kc2/kc3/kc4/kc5/kc6/kc7/kc8/kc9)	4.0/2.5/3.5/4.0/3.0/3.5/3.0/3.0/3.5
SMM Original Assessment Date (MM/DD/YYYY)	8/10/2015
SMM Original Assessment POC (Name; E-mail; Affiliation)	Ge Peng; Ge.Peng@noaa.gov ; CICS-NC/NCEI
SMM Last Modified Date (MM/DD/YYYY)	2/5/2015
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SMM Modified Date (MM/DD/YYYY)	

SMM Modification POC (Name; E-mail; Affiliation)							
Maturity Scale (across)	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		
Key Component (below)						Stewardship Maturity Rating And Justification or Evidence	Comments
Preservability <i>(The state of being preservable)</i>	Any storage location Data only	Non-designated repository Redundancy Limited archiving metadata	Designated archive Redundancy Community-standard archiving metadata Conforming to limited archiving standards	Level 3 + Conforming to community archiving standards	Level 4 + Archiving process performance controlled, measured, and audited Future archiving standard changes planned	❖ Level 4 - Compliant to the NOAA CDR R2O process and guideline (https://www.ncdc.noaa.gov/cdr/development-guidelines) - Archived by NCEI-NC which is a NOAA designated archive compliant to NARA standards - Compliant to OIAS RM - Following GHRSSST community-standard and ISO 19115 archiving metadata standard	-
Accessibility <i>(The state of being searchable and accessible publicly)</i>	Not publicly available Person-to-person	Publicly available Direct file download (e.g., via anonymous FTP server) Collection/dataset level searchable online	Level 2 + Non-standard data service Limited data server performance Granule/file level searchable Limited search metrics	Level 3 + Community-standard data service Enhanced data server performance Conforming to community search metrics Dissemination report metrics defined and implemented internally	Level 4 + Dissemination reports available online Future technology and standard changes planned	❖ Level 2.5 - Collection level searchable online - Direct file download available: (ftp://eclipse.ncdc.noaa.gov/pub/OI-daily-v2/NetCDF/ ; http://monitor.cicsnc.org/obs4MIPs/ ; http://podaac.jpl.nasa.gov/dataset/NCDC-L4LRblend-GLOB-AVHRR_OI) - THREDDS (http://www.ncdc.noaa.gov/thredds/catalog/oisst-catalog.html?dataset=OISSST-V2-AVHRR_agg_combined) - Community-standard data service (http://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:GHRSSST-NCDC-L4LRblend-GLOB-AVHRR_OI) - Not granular searchable	- Data format for the new version will be NetCDF 4 and CF compliant with file attributes compliant to NOAA CDR and GHRSSST guidelines
Usability <i>(The state of being easy to use)</i>	Extensive product-specific knowledge required No documentation online	Non-standard data format Limited documentation (e.g., user's guide) online	Community standard-based interoperable format & metadata Documentation (e.g., source code, product algorithm document, processing or/and data flow diagram) online	Level 3 + Basic capability (e.g., subsetting, aggregating) & data characterization (overall/global, e.g., climatology, error estimates) available online	Level 4 + Enhanced online capability (e.g., visualization, multiple data formats) Community metrics of data characterization (regional/cell) online External ranking	❖ Level 3.5 - NetCDF data format (CF compliant for the Obs4MIPs version) - Climate Algorithm Theoretical Basis Document (C-ATBD) available and online (http://www1.ncdc.noaa.gov/pub/data/sds/cdr/CDRs/Sea_Surface_Temperature_Optimum_Interpolation/AlgorithmDescription.pdf) - Data flow diagram is available and online (http://www1.ncdc.noaa.gov/pub/data/sds/cdr/CDRs/Sea_Surface_Temperature_Optimum_Interpolation/DataFlowDiagram.pdf) - Climatology (doi:10.1175/JCLI-D-14-00293.1). - Error flags are at cell level (ice mask, input uncertainty, processing uncertainty) - Data paper has been submitted to Earth System Science Data and	- Data format for the new version will be NetCDF 4 and CF compliant with file attributes compliant to NOAA CDR and GHRSSST guidelines

						has been accepted as the discussion paper (doi:10.5194/essd-2015-44)	
Production Sustainability <i>(The state of data production being sustainable and extendable)</i>	Ad Hoc or Not applicable No obligation or deliverable requirement	Short-term Individual PI's commitment (grant obligations)	Medium-term Institutional commitment (contractual deliverables with specs and schedule defined)	Long-term Institutional commitment Product improvement process in place	Level 4 + National or international commitment Changes for technology planned	❖ Level 4 - Long-term institutional commitment - Product improvement process in place	
Data Quality Assurance <i>(The state of data quality being assured)</i>	Data quality assurance (DQA) procedure unknown or none	Ad Hoc and random DQA procedure not defined and documented	DQA procedure defined and documented and partially implemented	DQA procedure well documented, fully implemented and available online with master reference data Limited data quality assurance metadata	Level 4 + DQA procedure monitored and reported Conforming to community quality metadata & standards External review	❖ Level 3 - Coverage & outlier check for AVHRR (not run) and sea ice input (warning) - In situ outliers check - Land and lake point check - Ice point check (>50%) - Community-standard based data quality assurance metrics (http://journals.ametsoc.org/doi/abs/10.1175/1520-0442(2002)015%3C1609%3AAIISAS%3E2.0.CO%3B2 ; http://www.ncdc.noaa.gov/sites/default/files/attachments/Reynolds2009_oisst_daily_v02r00_version2-features.pdf ; http://journals.ametsoc.org/doi/abs/10.1175/1520-0442-16.10.1495)	
Data Quality Control/Monitoring <i>(The state of data quality being controlled and monitored)</i>	None or Sampling unknown or spotty Analysis unknown or random in time	Sampling and analysis are regular in time and space Limited product-specific metrics defined & implemented	Level 2+ Sampling and analysis are frequent and systematic but not automatic Community metrics defined and partially implemented Procedure documented and available online	Level 3 + Anomaly detection procedure well-documented and fully implemented using community metrics, automatic, tracked and reported Limited quality monitoring metadata	Level 4 + Cross-validation of temporal & spatial characteristics Physical consistency check Conforming to community quality metadata & standards Dynamic providers/users feedback in place	❖ Level 3.5 - Product quality monitoring is done via the comparison tool by STAR (http://www.star.nesdis.noaa.gov/sod/sst/squam/L4/index.html) - UK Met Off SST Monitoring (http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/daily/ens/) - Detection for outliers and ranges is implemented (http://journals.ametsoc.org/doi/abs/10.1175/1520-0442-16.10.1495)	Checksum is not provided at public ftp site (eclipse) but can request Operations to do so
Data Quality Assessment <i>(The state of data quality being assessed)</i>	Algorithm/method/model theoretical basis assessed (methods and results online)	Level 1 + Research product assessed (methods and results online)	Level 2 + Operational product assessed (methods and results online)	Level 3 + Quality metadata assessed Limited quality assessment metadata	Level 4 + Assessment performed on a recurring basis Conforming to community quality metadata & standards External ranking	❖ Level 3 - Product algorithm is well validated (doi:10.1175/JCLI-D-14-00293.1; http://www.ncdc.noaa.gov/sites/default/files/attachments/Reynolds2009_oisst_daily_v02r00_version2-features.pdf ; - Research product assessed (http://www1.ncdc.noaa.gov/pub/data/sds/cdr/CDRs/Sea_Surface_Temperature_Optimum_Interpolation/AlgorithmDescription.pdf ; doi:10.1175/2010JCLI3294.1; - Assessment carried out as the NCEI CDR R2O process - CDR IOC - Product MM is available and online	Additional paper on spatial fidelity: Reynolds, R. W., D. B. Chelton, J. Roberts-Jones, M. J. Martin, D. Menemenlis, and C. J. Merchant, 2013: Objective determination of feature resolution in two sea surface temperature analyses. <i>Journal of Climate</i> , 26 , 2514–2533, doi:10.1175/JCLI-D-12-00787.1 (link is external).

						http://www1.ncdc.noaa.gov/pub/data/sds/cdr/CDRs/Sea_Surface_Temperature_Optimum_Interpolation/MaturityMatrix.pdf - Science paper for OISST version 1.0 (http://journals.ametsoc.org/doi/abs/10.1175/2007JCLI1824.1) - What's new for version 2.0 (http://www.ncdc.noaa.gov/sites/default/files/attachments/Reynolds2009_oisst_daily_v02r00_version2-features.pdf) - No data quality metadata - Quality metadata not assessed	
Transparency /Traceability <i>(The state of being transparent, trackable, and traceable)</i>	Limited product information available Person-to-person	Product information available in literature	Algorithm Theoretical Basis Document (ATBD) & source code online Dataset configuration managed (CM) Unique Object Identifier (OID) assigned (dataset, documentation, source code) Data citation tracked (e.g., utilizing Digital Object Identifier (DOI) system)	Level 3 + Operational Algorithm Description (OAD) online, OID assigned, and under CM	Level 4 + System information online Complete data provenance online	❖ Level 3 - Product information available in literature (http://journals.ametsoc.org/doi/abs/10.1175/2007JCLI1824.1 ; doi:10.5194/essd-2015-44) - ATBD available online (http://www1.ncdc.noaa.gov/pub/data/sds/cdr/CDRs/Sea_Surface_Temperature_Optimum_Interpolation/AlgorithmDescription.pdf) - Source code package with Readme available online (http://www.ncdc.noaa.gov/cdr/operationalcdrs.html) - OID assigned for dataset, source code package, and documentation package per Submission Agreement	In the process of transitioning to CDR FOC (Full Operational Capability)
Data Integrity <i>(The state of data integrity being verifiable)</i>	Unknown or no data ingest integrity check	Data ingest integrity verifiable (e.g., checksum technology)	Level 2 + Data archive integrity verifiable	Level 3 + Data access integrity verifiable Conforming to community data integrity technology standard	Level 4 + Data authenticity verifiable (e.g., data signature technology) Performance of data integrity check monitored and reported	❖ Level 3.5 - file-level checksum is generated and verified by archive at ingest and at archive - using standard-based technology for generating checksum - The file checksum is verified for staging sometimes but not all the time	Recommending to verify checksum before staging the data for access and to provide checksum for each file at public ftp site

Data Stewardship Maturity Scoreboard

Maturity Scale	Preservability	Accessibility	Usability	Production Sustainability	Data Quality Assurance	Data Quality Control/Monitoring	Data Quality Assessment	Transparency /Traceability	Data Integrity
Level 1 – Ad Hoc Not Managed	Any storage location Data only	Not publicly available Person-to-person	Extensive product-specific knowledge required No documentation online	Ad Hoc or Not applicable No obligation or deliverable requirement	Data quality assurance (DQA) procedure unknown or none	None or Sampling unknown or spotty Analysis unknown or random in time	Algorithm/method/model theoretical basis assessed (method and results online)	Limited product information available Person-to-person	Unknown or no data ingest integrity check
Level 2 - Minimal Managed Limited	Non-designated repository Redundancy Limited archiving metadata	Publicly available Direct file download (e.g., via anonymous FTP server) Collection/dataset level searchable	Non-standard data format Limited documentation (e.g., user's guide) online	Short-term Individual PI's commitment (grant obligations)	Ad Hoc and random DQA procedure not defined and documented	Sampling and analysis are regular in time and space Limited product-specific metrics defined & implemented	Level 1 + Research product assessed (method and results online)	Product information available in literature	Data ingest integrity verifiable (e.g., checksum technology)
Level 3 - Intermediate Managed Defined, Partially Implemented	Designated archive Redundancy Community-standard archiving metadata Conforming to limited archiving process standards	Level 2 + Non-standard data service Limited data server performance Granule/file level searchable Limited search metrics	Community Standard-based interoperable format & metadata Documentation (e.g., source code, product algorithm document, processing or/and data flow diagram) online	Medium-term Institutional commitment (contractual deliverables with specs and schedule defined)	DQA procedure defined and documented and partially implemented	Level 2 + Sampling and analysis are frequent and systematic but not automatic Community metrics defined and partially implemented Procedure documented and available online	Level 2 + Operational product assessed (method and results online)	Algorithm Theoretical Basis Document (ATBD) & source code online Dataset configuration managed (CM) Unique Object Identifier (OID) assigned (dataset, documentation, source code) Data citation tracked (e.g., utilizing Digital Object Identifier (DOI) system)	Level 2 + Data archive integrity verifiable
Level 4 - Advanced Managed Well-Defined, Fully Implemented	Level 3 + Conforming to community archiving standards	Level 3 + Community-standard data services Enhanced data server performance Conforming to community search metrics Dissemination report metrics defined and implemented internally	Level 3 + Basic capability (e.g., subsetting, aggregating) & data characterization (overall/global, e.g., climatology, error estimates) available online	Long-term Institutional commitment Product improvement process in place	DQA procedure well documented, fully implemented and available online with master reference data Limited data quality assurance metadata	Level 3 + Anomaly detection procedure well-documented and fully implemented using community metrics, automatic, tracked and reported Limited quality monitoring metadata	Level 3 + Quality metadata assessed (method and results online) Limited quality assessment metadata	Level 3 + Operational Algorithm Description (OAD) online, OID assigned, and under CM	Level 3 + Data access integrity verifiable Conforming to community data integrity technology standard
Level 5 - Optimal Level 4 + Measured, Controlled, Audit	Level 4 + Archiving process performance controlled, measured, and audited Future archiving standard changes planned	Level 4 + Dissemination reports available online Future technology and standard changes planned	Level 4 + Enhanced online capability (e.g., visualization, multiple data formats) Community metrics of data characterization (regional/cell) online External ranking	Level 4 + National or international commitment Changes for technology planned	Level 4 + DQA procedure monitored and reported Conforming to community quality metadata & standards External review	Level 4 + Cross-validation of temporal & spatial characteristics Physical consistency check Conforming to community quality metadata & standards Dynamic providers/users feedback in place	Level 4 + Assessment performed on a recurring basis Conforming to community quality metadata & standards External ranking	Level 4 + System information online Complete data provenance available online	Level 4 + Data authenticity verifiable (e.g., data signature technology) Performance of data integrity check monitored and reported

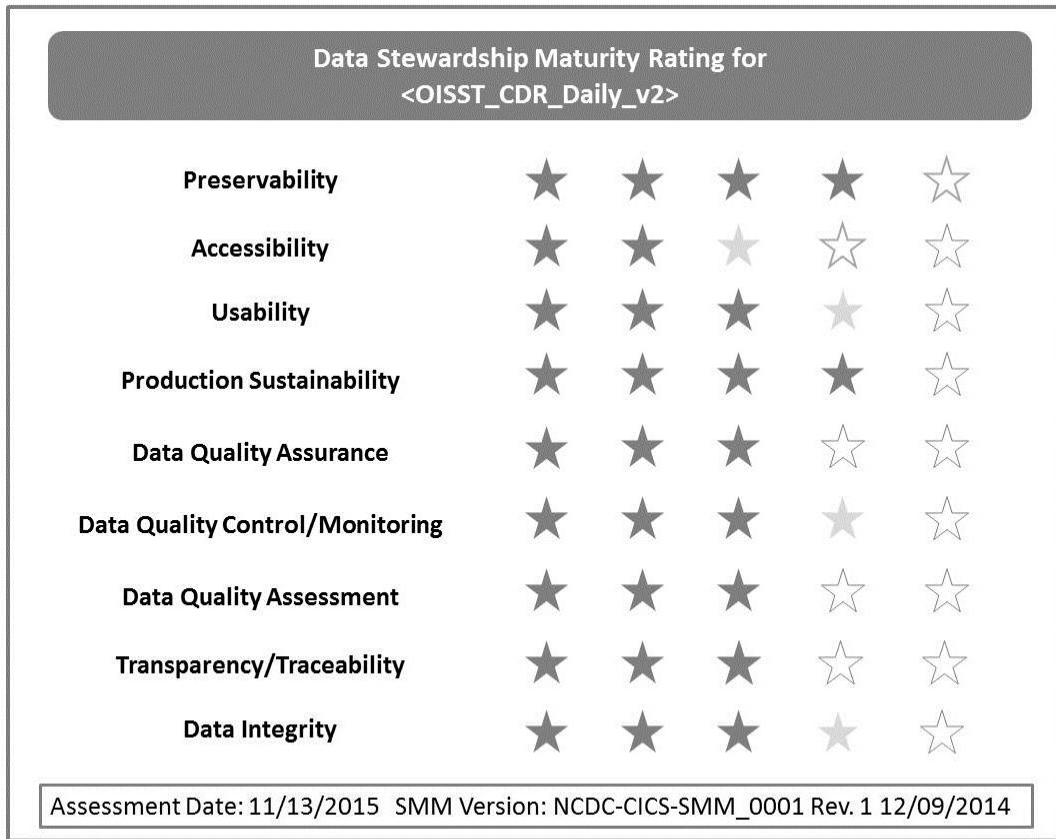
Dataset Information: <http://doi.org/doi:10.7289/V5SQ8XB5>

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Figure 1: Data stewardship maturity scoreboard for OISST_CDR_Daily_v2.
If two cells are filled, it is an indication that only a partial maturity rating at the higher level is satisfied.



Dark solid filled stars – completely satisfied
 Light solid filled stars – partially satisfied
 Non-filled stars – not satisfied

Figure 2: Data stewardship maturity rating diagram for OISST_CDR_Daily_v2.