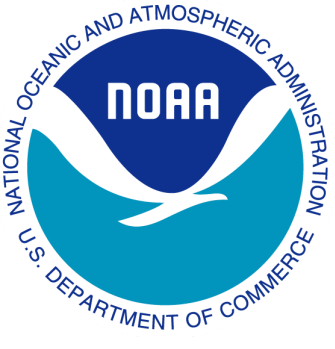

NOAA Response to the MITRE Technical Report MTR180173V1

Assessment of National Oceanic and Atmospheric Administration Scientific Integrity Policies and Procedures as Applied to the 2015 Dr. Thomas Karl, et al. Science Paper: "Possible Artifacts of Data Biases in the Recent Global Surface Warming Hiatus."

NOAA Research Council

November 1, 2019

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The 2015 research paper by Thomas Karl, et al. entitled, "Possible Artifacts of Data Biases in the Recent Global Surface Warming Hiatus,"[1] was criticized in a blog post written by a former NOAA employee stating several concerns and issues. Responding to the critique, the Department of Commerce commissioned an independent company, MITRE, to objectively assess the processes used to develop and publish the paper.

MITRE released its technical report, *Assessment of National Oceanic and Atmospheric Administration Scientific Integrity Policies and Procedures* (hereafter referred to as MITRE Report) to the public on or about December 20, 2018.[2] NOAA tasked the NOAA Research Council to address the report's findings and recommendations. The Research Council then tasked its committee, the Research and Development Enterprise Committee (RDEC), with reviewing the report's findings and appropriately addressing those that require a response, along with any other important issues that the Research Council should address.

To complete this review, RDEC solicited input from across NOAA Line Offices using two of the committees that support NOAA Strategy Councils. RDEC members provided input to the discussion on behalf of each Line Office concerning recommendations related to FRCs. The Environmental Data Management Committee (EDMC), which serves the NOAA Observing Systems Council (NOSC), provided feedback on the recommendations related to environmental data management.

The recommendations of the MITRE Report focus on two core topics: Fundamental Research Communications (FRCs) and environmental data management. Neither of these topics is new to NOAA, and, in fact, NOAA has many existing policies and procedures addressing these topics.

The NOAA Research Council developed the *NOAA Framework for Internal Review and Approval of Fundamental Research Communications*[3] (hereafter referred to as FRC Framework) in 2013 (and revised in 2016) per the principles and requirements found in the NOAA Administrative Order on Scientific Integrity (NAO 202-735D)[4], the Department of Commerce

[1] T. R. Karl et al., "Possible artifacts of data biases in the recent global surface warming hiatus," *Science*, pp. 1469-1472, 26 June 2015.
[2] MITRE Corporation, *Assessment of National Oceanic and Atmospheric Administration Scientific Integrity Policies and Procedures*, McLean, Virginia, July 2018.
[3] NOAA, *NOAA Framework for Internal Review and Approval of Fundamental Research Communication*, updated in November 2016. https://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_202/FRC%20Guidance%20Nov%208%202016.pdf
[4] NOAA, *NOAA Administrative Order 202-735D: Scientific Integrity*, December 2011. https://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_202/202-735-D.html

Administrative Order on Public Communications (DAO 219-1)[5], and the Information Quality Act[6], [7].

The FRC Framework promotes high-quality, open scientific communication and is the foundation of the robust peer review system that NOAA utilizes. It also directs NOAA Line Offices to further develop and document their own internal review processes that are consistent with the FRC Framework.

One NOAA line office, National Marine Fisheries Service (NFMS), developed and implemented the Research Publication Tracking System (RPTS) in response to this request. RPTS is a centralized, database-driven, web-based application designed to track the internal review process of research publications from submission for internal review through publication in peer-reviewed literature and other venues[8]. RPTS has been so successful that two other line offices have adopted the same system to track their publications.

NOAA also hosts an Institutional Repository (IR) that allows the public to search for and download copies of publications resulting from federally-funded research, including documents not typically published elsewhere such as NOAA technical reports, data reports, and technical memoranda[9]. The NOAA IR was developed in response to the Office of Science and Technology Policy (OSTP) Memorandum *Increasing Access to the Results of Federally Funded Scientific Research*[10] and *NOAA Plan for Increasing Public Access to Research Results* (NOAA PARR)[11]. The OSTP Memo and NOAA PARR both promote greater public accessibility to publications and digital data, including environmental data.

MITRE Report Recommendation 1: New NOAA Policy for Fundamental Research Communications

> **NOAA Response:** NOAA does not agree that a new FRC policy document is warranted. NOAA will continue to evolve its FRC policy to address changes in related law and

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[5] Department of Commerce, *Department of Commerce Administrative Order 219-1: Public Communications*, April 2008. http://www.osec.doc.gov/opog/dmp/daos/dao219_1.html
[6] Information Quality Act (section 515 of Public Law 106-554; H.R. 5658), 21 December 2000. https://www.govinfo.gov/content/pkg/PLAW-106publ554/pdf/PLAW-106publ554.pdf
[7] Office of Management and Budget, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, 22 February 2002. https://www.federalregister.gov/documents/2002/02/22/R2-59/guidelines-for-ensuring-and-maximizing-the-quality-objectivity-utility-and-integrity-of-information.
[8] NOAA, "Research Publication Tracking System (RPTS)." https://inport.nmfs.noaa.gov/inport/item/27877.
[9] NOAA Institutional Repository. https://repository.library.noaa.gov/.
[10] Office of Science and Technology, *Memorandum: Increasing Access to the Results of Federally Funded Scientific Research*, 22 February 2013. https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf.
[11] NOAA, *NOAA Plan for Increasing Public Access to Research Results*, 22 February 2013. https://repository.library.noaa.gov/view/noaa/10169.

policy. Two recent examples of this are the FRC Framework and NOAA's Information Quality Act (IQA) policy.

The FRC Framework was revised in 2016, and this revision clarified the review requirements and process for FRCs. Additionally, the relationship to other guidance, such as the NOAA Administrative Order on Scientific Integrity (NAO 202-735D)[5] and the Department of Commerce Administrative Order on Public Communications (DAO 219-1)[6], was clarified.

The FRC Framework is not the appropriate venue for defining ISI and highly influential scientific assessments (HISA). ISI and HISA are addressed by the NOAA IQA guidelines, which are referenced in the FRC guidance.

In April 2019, the Office of Management and Budget released a memorandum (OMB M-19-15) "to reinforce, clarify, and interpret agency responsibilities with regard to responsibilities under the Information Quality Act (IQA)."[12] The Office of the Chief Information Officer is responsible for updates to the NOAA IQA policy and these updates will be reflected in the FRC Framework.

MITRE Report Recommendation 2: New NOAA Peer Review Handbook for Fundamental Research Communications

NOAA Response: NOAA does not agree that a new peer review handbook, separate from the FRC Framework and Line Office-specific procedures, would result in any meaningful changes in the peer review process. Instead, NOAA recommends that the Line Office-specific procedures be reviewed to ensure they are consistent with the slightly revised FRC Framework, once that is complete. NOAA remains committed to consistent implementation of the FRC Framework across Line Offices and will continue to promote it as a priority.

An example is the Research Publication Tracking System (RPTS), which facilitates review and approval of FRC, improves compliance with policy, and improves enterprise awareness of potentially controversial publications. National Marine Fisheries Service (NMFS) developed RPTS, and it was later adopted by the National Environmental Satellite Data and Information Service (NESDIS) and the Office of Oceanic and Atmospheric Research (OAR). The National Ocean Service (NOS) is now also in the process of developing its requirements for adopting RPTS.

The NOAA Research and Development Enterprise Committee encourages examination of RPTS for application in the remaining parts of NOAA as a means of implementing the FRC Framework in a consistent manner across NOAA.

[12] Office of Management and Budget, *Memorandum: Improving Implementation of the Information Quality Act (M-19-15)*, 24 April 2019. https://www.whitehouse.gov/wp-content/uploads/2019/04/M-19-15.pdf.

MITRE Report Recommendation 3: Updated Policies and New Procedures for Environmental Data Management

MITRE Report Recommendation 3.1: Update Current Policy for NOAA Environmental Data Management

NOAA Response: NOAA agrees that policies for environmental data management should be routinely examined and updated. NOAA will determine and implement appropriate further definition and guidance on the distinction between research and operational data. However, NOAA recognizes that research and operational data are not mutually exclusive. There is a spectrum of possible usages for each dataset.

Instead of focusing on the definitions, NOAA believes the focus should be on the quality control going into the datasets, which is clearly laid out in NOAA's IQA Policy. The quality control processes applied to a dataset should be sufficiently documented so that all users can determine the fitness of the data for the purpose for which they may consider using it.

Referencing these datasets in NOAA FRCs is something already communicated in both NOAA PARR and *NOAA Data Citation Procedural Directive* (Data Citation Directive)[13]. The Data Citation Directive was approved on June 1, 2015 and establishes the requirements for obtaining persistent identifiers for data archived at the NOAA National Centers for Environmental Information (NCEI), the procedure for creating landing pages providing dataset information and access instructions, and recommendations regarding citation of NOAA data by internal and external users.

MITRE Report Recommendation 3.2: Update Current Policy for NOAA Research and Development Transitions

NOAA Response: NOAA agrees with the recommendation to update *NOAA Administrative Order 216-105B: Policy on Transition of Research to Application* (NAO 216-105B)[14] to simplify concepts and processes for transitioning research and development output to operations, application, and commercialization. NAO 216-105B was last reviewed in February 2019, following the release of the MITRE Report.

However, NAO 216-105B is not the source of definition of Climate Data Records (CDRs) in terms of maturity levels; there is a citation error on page 36 of the

[13] NOAA, *NOAA Data Citation Procedural Directive*, 01 June 2015, https://nosc.noaa.gov/EDMC/documents/EDMC-PD-DataCitation-1.1_accessible.pdf

[14] NOAA, *NOAA Administrative Order 216-105B: Policy on Transition of Research to Application*, last reviewed 26 February 2019, https://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_216/216-105B.html

MITRE Report. The correct source of this information is the *Transitioning CDRs from Research to Operations (R2O)*[15] guidelines from the National Centers for Environmental Information at NOAA (NCEI; previously the National Climatic Data Center).

NCEI is actively working towards updating and clarifying the definition of a CDR to create consistency both internally at NOAA and externally across the national (NASA, USGS) and international communities. This drive toward consistency is being led jointly by the Committee for Earth Observing Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS) in association with the World Meteorological Organization (WMO). Currently, the CDR concept and associated standards are largely confined to the satellite community, however NCEI is assessing its applicability to non-satellite data (e.g., RADAR, in situ).

To provide greater clarity and transparency for public understanding of adjustments to CDRs, NOAA practices standard configuration control processes. NOAA documents all algorithm changes in CDR Algorithm Theoretical Basis Documents (ATBDs), including citations of the scientific peer-reviewed publications, justifying the changes, and a plain language explanation for public understanding. The ATBDs and other descriptional information are available on public-facing websites.

MITRE Report Recommendation 3.3: New Procedural Document for NOAA Environmental Data Management

NOAA Response: NOAA does not agree that a single procedural document for environmental data management is warranted. Managing NOAA's environmental data has many different facets that may not be appropriate to condense into one procedural document. Instead, NOAA will continue to routinely examine and update all procedures related to environmental data management.

Efforts to consolidate Initial Operational Capability (IOC) and Full Operational Capability (FOC) into a single operational stage were already underway at the time of the release of the MITRE report. NCEI at NOAA will continue to work to update guidance to reflect this change.

NOAA has an Environmental Data Management Committee (EDMC) which is responsible for coordinating the development of NOAA's environmental data management strategy and policy, and provides guidance to promote consistent implementation across NOAA. Furthermore, the EDMC hosts an annual Environmental Data Management Workshop and uses the feedback from the workshop to help determine which NAOs and directives need to be updated.

[15] NOAA, *Transitioning CDRs from Research to Operations (R2O)*, revised on 13 March 2014, https://www1.ncdc.noaa.gov/pub/data/sds/cdr/Guidelines/Transitioning_CDRs_from_R2O.pdf

Since the conclusion of the MITRE investigation, there is new legislation relating to environmental data management (Foundations for Evidence-Based Policymaking Act[16], updates to Information Quality Act, Geospatial Data Act[17]). Several federal and agency strategies are also underway (Federal Data Strategy[18], NOAA Data Strategy[19], NOAA Enterprise Cloud Strategy[20]). The EDMC is working to incorporate this new legislation and strategies into new and existing policies, procedures, and directives.

[16] Foundations of Evidence-Based Policymaking Act (Public Law 115-435, H.R. 4147), 14 January 2019. https://www.congress.gov/bill/115th-congress/house-bill/4174.
[17] Geospatial Data Act of 2017 (H.R. 4395), 2017. https://www.congress.gov/bill/115th-congress/house-bill/4395.
[18] *Federal Data Strategy*. https://strategy.data.gov/.
[19] NOAA, *NOAA Data Strategy,* in progress.
[20] NOAA, *NOAA Enterprise Cloud Strategy*, in progress