Archiving of the Geostationary Operational Environmental Satellite (GOES) R Series Level 0 Data

Report from the Data Archive and Access Requirements Working Group (DAARWG)

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Introduction and Background

DAARWG received an initial briefing regarding GOES-R Level 0[1] data archiving at its May 2013 meeting. GOES-R is the next iteration of geostationary Earth observations satellites. At that time concern was raised whether NOAA should consider long-term archiving of GOES-R Level 0 data rather than discarding it after two years. Subsequently DAARWG requested approval from SAB to explore the issue more fully. DAARWG received a number of briefings on this topic and finalized its review as part of its October 2014 meeting.

The briefings related to GOES-R Level 0 data considered the question from a number of different aspects related to the decision not to archive L0 data. These included discussions regarding whether the processing algorithms were proprietary, discussions of the decision-making process related to archiving, perceived prohibitive costs to add a new archiving requirement after the satellite system procurement process had been completed. Additional considerations focused on the differences between the various data processing levels and what it would mean to archive a lower-level product, the opportunity costs of not archiving the lowest level of data product feasible, and discussions of whether or not there was a demand for access to lower level products.

(Note: DAARWG prepared a briefing for the April 2015 SAB meeting. However, this briefing was postponed to the August 2015 meeting due to the need to modify the SAB meeting agenda.)

Question Under Consideration

Whether NOAA should re-examine its decision not to preserve a long-term archival copy of GOES-R Level 0 data, and whether archival planning for future satellite missions should consider Level 0 data.

[1] See definitions in Terminology section below.

Current Situation

As the DAARWG understands it, NOAA's decision not to archive Level 0 data was largely a factor of the way the satellite system specification process was conducted. There was ultimately a disconnect between stakeholders who might raise relevant archival questions and the other parts of the technical and procurement process as it went forward.

The current plan is for NOAA to maintain a copy of Level 0 data for at least two years in a rolling first-in, first out storage scenario, to support the potential for reprocessing due to calibration/validation issues determined at a future date.

Level 1a data will not be saved, Level 1a only exists as an interim processing artifact.

Level 1b data is the current product targeted for long-term archival maintenance.

Discussion

The central question under consideration regarding whether or not to preserve a long-term archival copy of GOES-R L0 data devolves into a number of more specific questions. These include: 1) What is the appropriate level of satellite data to archive for the long-term? 2) Whether or not the question of long-term archiving is adequately represented in the satellite system specification and procurement process, and 3) Whether or not there will be future demand for a lower level satellite product such as L0.

On the first question, what is the appropriate level to archive, this depends on a number of different factors such as how the data are generated, what ancillary information is needed to process the data, and what level represents the first-order information product for dissemination to end-users. In the case of GOES-R, Level 1a might represent the appropriate, lowest level product to archive for the long-term. However, due to the nature of how the GOES-R system has been implemented the L1a data is not available for archiving because it is an interim product created as part of real-time processing, and would be difficult to save. L0 is being saved, with appropriate ancillary information in the rolling first in, first out (FIFO) repository.

On the second question, on making sure that archival requirements are incorporated into satellite system developments, DAARWG's impression based on briefings received is that data management planning for next generation satellite systems (e.g. GOES-R and JPSS) did not fully address archival requirements. However, such planning is being addressed via the NESDIS Data Management Policy that is being finalized this summer. DAARWG fully endorses the effort to develop a NESDIS Data Management Policy and is pleased with the progress to date.

On the third question, as to whether or not there would be demand for L0 data if it were made available, it is difficult to judge since the community has not traditionally

had access to these data. It cannot be asserted that there will not be demand without approaching relevant communities to see if they might have a use for such data in the long term.

Recommendations

DAARWG endorses - the digital data curation standard practice of archiving the lowest-level satellite data possible for potential future reprocessing, in addition to archiving derived products.

DAARWG encourages - NOAA to ensure that all future (after GOES-R) satellite development efforts consider data archiving requirements for both unprocessed data and derived products at the beginning and throughout the development process.

DAARWG recommends - NOAA utilize the interim period of two to three years before the first round of GOES-R L0 data is slated to be discarded to host a workshop to invite the relevant communities, e.g. scientists and others, to examine in more detail the utility of maintaining a L0 copy of data for the long term. The output of this workshop should influence NOAA's policy regarding the archiving of GOES-R L0 data.

Relevant Terminology from GOES R

Level 0

Reconstructed unprocessed instrument data at full resolution; any and all communications artifacts (e.g. synchronization frames, communications headers) removed.

Level 1a data

Level 0 data with all supplemental information appended for use in subsequent processing.

Level 1b data

Level 0 data, with radiometric and geometric correction applied to produce parameters in physical units.

Selected Relevant Resources

NAO 212-15: Management of Environmental Data and Information
http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.html

NASA Earth Science Data Preservation Content Specification
https://earthdata.nasa.gov/sites/default/files/field/document/423-SPEC-001_NASA%20ESD_Preservation_Spec_OriginalCh01_0.pdf

NOAA Environmental Data Management (EDM) Framework
https://www.nosc.noaa.gov/EDMC/framework.php

NOAA Procedure for Scientific Records Appraisal and Archive Approval
https://www.nosc.noaa.gov/EDMC/documents/NOAA_Procedure_document_final_12-16-1.pdf

Workshop Report on Global Change Science Requirements for Long-Term Archiving
http://www.globalchange.gov/browse/reports/global-change-science-requirements-long-term-archiving