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Utilization of Operational Environmental Satellite Data: Ensuring Readiness for 2010 and Beyond-*Summary*

SPACE STUDIES BOARD
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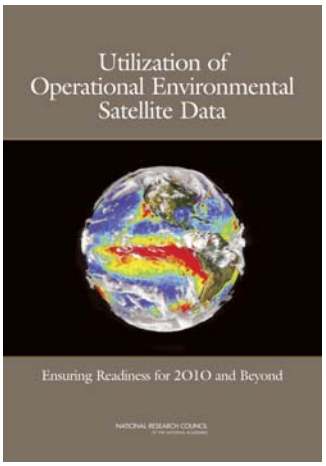
Background



The system of satellites in place to provide environmental data—data to monitor events such as forest fires and floods; to make weather predictions; to assess crop yields and health, transportation patterns, fisheries use, and land-use patterns; to measure sea temperature, winds, and soil moisture, among other things—is serving a wide and growing array of users. To ensure that these data serve effectively this broad user community, a new vision for the future of operational environmental satellite data utilization is needed. This is particularly critical given the large expansion in data availability that will take place in the coming decades as a result of the next generation of operational environmental satellites now being planned in a collaboration of NOAA, NASA, and DOD. User needs are also evolving and this along with the large increase of data on the horizon will force new demands for data transparency, access, traceability, and characterization. To help develop approaches for handling this potential data overload, NASA, with technical support from NOAA, asked the NRC to conduct an end-to-end review of issues about the utilization of operational environmental satellite data for 2010 and beyond.

Findings and Recommendations

Introduction

The study was performed by the NRC ad-hoc Committee on Environmental Satellite Data Utilization (CESDU). The study topic is, by nature, broad. The committee identified and focused on four themes; and these themes shape the Committee's findings and recommendations: an increasing and diverse spectrum of users depend on environmental satellite data; products that best serve the public create a continual evolution of data requirements; improvements in flight and ground technology are being made that help meet these requirements; and NOAA is committed to improve data quality, reliability,

latency, and content. Furthermore, an even wider array of users likely will use environmental satellite data in the near future. To meet these demands, the responsible agencies will have to develop essential visions, plans, and systems.

Ensuring the Value of Environmental Satellite Data for Specific User Needs

Improved and continuous access to data is the highest priority of a growing array of users. Their needs include real-time imagery, recent imagery, and data coverage spanning many years. **As soon as practical, responsible agencies led by NASA and NOAA should develop an explicit strategy and implementation plan, which should include ways to facilitate access and support users.**

User requirements for multiyear data sets are putting special demands on future data archiving and utilization systems. **NASA and NOAA should select science teams to select those data products that are scientifically important and technologically feasible for long-term climate data records development.**

Major advances have taken place in land remote sensing in the last decade, and although NOAA's mandate does not include land data, the agency's goals and research extend into land (e.g., ecosystems.) The agency would benefit from improving on its limited experience with land data sets. **NOAA should work with NASA to select variables for land vegetation data from operational satellite systems.**

The Distribution of Environmental Satellite Data

More comprehensive coverage of environmental data is possible by combining the data collected by the different national satellite systems now operating. **The U.S. Environmental Satellite Data Program should take steps to facilitate access to other nations' satellites, as well as its own, and data synthesis from those other systems.**

Key to successful implementation of the Comprehensive Large Array-data Stewardship System (CLASS) being designed by NOAA are detailed planning, follow-through and incorporation of lessons learned from similar initiatives and systems in the past. **NOAA should conduct an immediate review of the CLASS program, designate it as the primary environmental satellite data archive, and identify and plan for the resources needed to carry out those two steps.**

NOAA does not appear to be making effective use of the substantial and growing resources available for creating, archiving, and distributing data products. **NOAA should consider both centralized and decentralized approaches to managing generation and distribution of data products to ensure effective use of existing expertise. It should also consider partnering with the private sector to enhance value to end users.**

Online storage of data is competitive with other formats and should allow the internet to be a stable, economic, and widely available data-transfer mechanism. **NOAA should**

adopt a default policy of maintaining all public data online; transition to exclusive online distribution of these data; and identify and plan for resources to handle the expected growth in archival and dissemination demand beyond 2010.

DATA Access and Utilization

Currently, retrieving and manipulating data from diverse satellite platforms and for different variables are an impediment to their use. **Data access and distribution should be designed to be compatible with users' processing, storage, distribution, and communications resources. There are several steps NOAA can take to enable this action including allowing more focused searches; ensuing commonality, ease, and transparency of data access; and accompanying its data with explanatory metadata.**

Inadequate applied research funding, lack of education and outreach support, and lack of trained data brokers and facilitators are the major reasons why some major user groups are not able to utilize fully all of the data available. **Adequate resources—especially applied research and education—are needed to exploit the satellite system. Data providers and researchers should also take a leading role in facilitating collaboration with their end-use partners.**

An essential ingredient to successful use of environmental satellite data is an early and continuous dialogue among data users, hardware and software developers, and U.S. and international data providers. Active R&D is also required, and a critical theme of successful data utilization is the treatment of research and operations as a continuum. **To ensure that future data products are of high quality and utility, an ongoing evaluation of U.S. efforts to collect and provide environmental satellite data is required. It is also critical that that close cooperation take place between the relevant research and operational agencies.**

For Further Information

Copies of the complete report, *Utilization of Operational Environmental Satellite Data: Ensuring Readiness for 2010 and Beyond,* can be obtained on the National Academy Press Web site <http://books.nap.edu/.html>**.**

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