

EARTH OBSERVATION SYMPOSIUM (B1)
International Cooperation in Earth Observation Missions (1)

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ASSESSING THE ADEQUACY OF THE GLOBAL SATELLITE CLIMATE MONITORING SYSTEM

Abstract

The Intergovernmental Panel on Climate Change (IPCC) fifth assessment report, released in October 2013, stated that “warming of the climate system is unequivocal” and “human evidence on the climate system is clear.” This assessment is based on research drawing on a wide variety of observations of the Earth, many of which make use of remote sensing satellites. Adequately monitoring changes in the climate system is crucial to making well informed climate mitigation and adaptation policies. This data is needed not only for designing policies, but also for policy evaluation, ensuring that actions that have been implemented are having the intended effects.

In 2013, there were hundreds of Earth observation satellite instruments in orbit with the potential to contribute toward a global climate monitoring system. However, despite the global importance of understanding and monitoring climate change, and the existence of these systems, many argue that key measurements are not being taken, accuracy and resolution of existing measurements are often not adequate for climatic uses, and stable, long-term collection of data is not assured. To evaluate these claims, it is necessary to define what a sufficient climate monitoring system would entail. This paper looks at existing efforts to define such a system, including those of the Global Climate Observing System (GCOS) and the World Meteorological Organization (WMO), the ability of existing measurements to meet these requirements, and future steps needed to both refine definitions and improve global climate monitoring.

This paper uses a comprehensive database of current and planned satellite systems as well as analysis of ongoing climate efforts within international organizations and individual space agencies to answer the following set of research questions: 1) What types of measurements would constitute a sufficient satellite climate observation system? How many of these measurements are being taken by current satellites, or are expected to be taken by future planned satellites? 2) What specific technical attributes must each of these measurements have to be useful for observation of climate change? To what extent do current and future planned satellites meet these requirements? 3) What non-technical attributes are important to ensuring an adequate climate monitoring system? To what extent are these requirements being met? 4) What actions would be required to develop a sufficient satellite climate observation system, given the current, and planned future, system? What processes could be followed to better define or reach agreement on a sufficient satellite climate observation system?