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Managing Sustainable Data Infrastructures: The Gestalt of EOSDIS

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Abstract Text:

NASA's Earth Observing System Data and Information System (EOSDIS) has been a central component of the NASA Earth observation program since the 1990's. The data collected by NASA's remote sensing instruments represent a significant public investment in research. EOSDIS provides free and open access to this data to a worldwide public research community. From the very beginning, EOSDIS was conceived as a system built on partnerships between NASA Centers, US agencies and academia. EOSDIS manages a wide range of Earth science discipline data that include cryosphere, land cover change, polar processes, field campaigns, ocean surface, digital elevation, atmosphere dynamics and composition, and inter-disciplinary research, among many others. Over the years, EOSDIS has evolved to support increasingly complex and diverse NASA Earth Science data collections.

EOSDIS epitomizes a System of Systems, whose many varied and distributed parts are integrated into a single, highly functional organized science data system. A distributed architecture was adopted to ensure discipline-specific support for the science data, while also leveraging standards and establishing policies and tools to enable interdisciplinary research, and analysis across multiple scientific instruments. The EOSDIS is composed of system elements such as geographically distributed archive centers used to manage the stewardship of data. The infrastructure consists of underlying capabilities/connections that enable the primary system elements to function together. For example, one key infrastructure component is the common metadata repository, which enables discovery of all data within the EOSDIS system. . EOSDIS employs processes and standards to ensure partners can work together effectively, and provide coherent services to users. While the separation into domain-specific science archives helps to manage the wide variety of missions and datasets, the common services and practices serve to knit the overall system together into a coherent whole, with sharing of data, metadata, information and software making EOSDIS more than the simple sum of its parts. This paper will describe those parts and how the whole system works together to deliver Earth science data to millions of users.