EarthCube IA: Collaborative Proposal: Cross-Domain Observational Metadata Environmental Sensing Network (X-DOMES)

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Across-domains, agencies and political boundaries, our environment is being continuously observed and studied. We are looking for short-term, near-term and long-term changes while researching new and innovative methods to observe properties and to process the collected observations. Emerging technologies enable us to provide and discover the data openly and freely. But, if we do not understand the newly discovered data, with its inherent limitations and biases, it cannot be responsibly utilized for new or collaborative research efforts. Working with environmental sensor manufacturers and researchers, the X-DOMES project will develop tools and social and technical infrastructure to facilitate the creation of data about data (metadata). Metadata describes not only who, when and where the observations were made, but also it must document how an observation came to be (sensor provenance and process lineage). By taking this knowledge out of manuals and human-readable documents, the X-DOMES model creates metadata that can be treated like data – discoverable and searchable, making it ready to be incorporated into automated archival and processing methods enabling data quality assurance.

Leveraging existing relationships with large NSF-funded data management programs, EarthCube building blocks and working groups, and environmental sensor manufacturers and consortia, we will establish a community of sensor manufacturers and other stakeholders to provide a unifying approach to describing sensors and observations across geo-science domains. Built on an existing sensor metadata model that references registered, standards-based vocabularies, the X-DOMES pilot project will provide a suite of tools, built upon community-adopted standards of the Open Geospatial Consortium (OGC) and World Wide Web Consortium (W3C) to demonstrate and facilitate the generation of metadata documents that are discoverable and accessible on-line and/or directly from onboard sensor descriptions. We will also demonstrate mechanisms to associate the data with the metadata through standards-based web services. With vendor-ready tools implemented throughout a broad-based community, the X-DOMES Network will lay the foundation for the development of and adoption of interoperable access to much needed content-rich sensor metadata.