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Rolling Deck to Repository (R2R): Standards and Semantics for Open Access to Research Data

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In recent years, a growing number of funding agencies and professional societies have issued policies calling for open access to research data. The Rolling Deck to Repository (R2R) program is working to ensure open access to the environmental sensor data routinely acquired by the U.S. academic research fleet. Currently 25 vessels deliver 7 terabytes of data to R2R each year, acquired from a suite of geophysical, oceanographic, meteorological, and navigational sensors on over 400 cruises worldwide. R2R is working to ensure these data are preserved in trusted repositories, discoverable via standard protocols, and adequately documented for reuse.

R2R maintains a master catalog of cruises for the U.S. academic research fleet, currently holding essential documentation for over 3,800 expeditions including vessel and cruise identifiers, start/end dates and ports, project titles and funding awards, science parties, dataset inventories with instrument types and file formats, data quality assessments, and links to related content at other repositories. A Digital Object Identifier (DOI) is published for 1) each cruise, 2) each original field sensor dataset, 3) each post-field data product such as quality-controlled shiptrack navigation produced by the R2R program, and 4) each document such as a cruise report submitted by the science party. Scientists are linked to personal identifiers, such as the Open Researcher and Contributor ID (ORCID), where known. Using standard global identifiers such as DOIs and ORCIDs facilitates linking with journal publications and generation of citation metrics.

Since its inception, the R2R program has worked in close collaboration with other data repositories in the development of shared semantics for oceanographic research. The R2R cruise catalog uses community-standard terms and definitions hosted by the NERC Vocabulary Server, and publishes ISO metadata records for each cruise that use community-standard profiles developed with the NOAA Data Centers and the EU SeaDataNet project. R2R is a partner in the Ocean Data Interoperability Platform (ODIP), working to strengthen links among regional and national data systems, as well as a lead partner in the EarthCube “GeoLink” project, developing a standard set of ontology design patterns for publishing research data using Semantic Web protocols.