Geophysical Research Abstracts
Vol. 15, EGU2013-7679, 2013
EGU General Assembly 2013

Brokering Services to Evaluate, Visualize, and Analyze Terrestrial Biosphere Model Output and Observations

Mattia Santoro (1), Yaxing Wei (2), Enrico Boldrini (1), Jay Pearlman (3), Robert B. Cook (2), and Stefano Nativi (1)

(1) Institute of Atmospheric Pollution Research (CNR-IIA), Monterotondo (RM), Italy (mattia.santoro@cnr.it, enrico.boldrini@cnr.it, stefano.nativi@cnr.it), (2) Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA (weiy@ornl.gov, cookrb@ornl.gov), (3) IEEE, Seattle, USA (jay.pearlman@ieee.org)

This presentation demonstrates the use of the GEOSS Common Infrastructure (GCI) brokering components to provide harmonized access and potential discovery to the set of model outputs and observation-based benchmark data into evaluation, visualization, and analysis scientific workflows in a transparent way to facilitate carbon cycle model benchmarking and analysis. This demonstration was made on the Multi-scale Synthesis and Terrestrial Model Intercomparison Project (MsTMIP) , the goal of which is to provide feedback to the terrestrial biospheric modeling community to improve the diagnosis and attribution of carbon sources and sinks across regional and global scales through the intercomparison of model output and observation data. To achieve the goal of MsTMIP, harmonized integration of highly diverse and heterogeneous model outputs, and observation data with scientific workflows is critical for the successful implementation of an integrated model-benchmarking framework.

This work currently focuses on the use of the GCI Access Broker: a middleware component that provides access to datasets according to a "common grid environment" – i.e. Coordinate Reference System (CRS), spatial resolution, spatial extent (e.g., a subset of a data set), and data encoding format. In this way, users are able to access the "standardized" model outputs and benchmark data based on their specific needs to explore, analyze, and seamlessly compare them in scientific workflows (e.g. Vistrails). In this work, the GCI Access Broker provides both model output and benchmark data as netCDF following to the Climate and Forecast (CF) conventions through an OGC WCS interface. At the backend of the GCI Access Broker, it accesses the original benchmark data in HDF-EOS format and original model output data in netCDF format via FTP protocol. Besides the new frontend interfaces and data models that the Access Broker had to support at the backend (e.g. HDF files and FTP transfer protocol), it was necessary to enhance the functionalities of the GCI Access Broker. In fact, there was the need to aggregate two or more model outputs along the time axis. This way, all model outputs are published as a unique coverage and the client can transparently retrieve a coverage with the needed time extent instead of requesting a set of files and aggregate them locally. In the future, we will explore the application of GCI Discovery Broker to allow the transparent and dynamic discovery of models, model outputs, and observation data resources in an integrated model-benchmarking framework.

This is a collaborative work between the National Science Foundation (NSF) EarthCube Brokering Concept Award project (http://earthcube.ning.com/group/brokering), the NSF DataONE Exploration, Visualization, and Analysis (EVA) working group (http://www.dataone.org/working_groups/scientific-exploration-visualization-and-analysis-working-group), the two NASA-funded projects (1) Multi-scale Synthesis and Terrestrial Model Intercomparison Project (MsTMIP, http://nacp.ornl.gov/MsTMIP.shtml), and (2) Modeling and Synthesis Thematic Data Center. (http://nacp.ornl.gov/)