Using the NASA Giovanni DICCE Portal to Investigate Land-Ocean Linkages with Satellite and Model Data

ABSTRACT
Data-enhanced Investigations for Climate Change Education (DICCE), a NASA climate change education project, employs the NASA Giovanni data system to enable teachers to create climate-related classroom projects using selected satellite and assimilated model data. The easy-to-use DICCE Giovanni portal (DICCE-G) provides data parameters relevant to oceanic, terrestrial, and atmospheric processes. Participants will explore land-ocean linkages using the available data in the DICCE-G portal, in particular focusing on temperature, ocean biology, and precipitation variability related to El Niño and La Niña events. The demonstration includes the enhanced information for educators developed for the DICCE-G portal. The prototype DICCE Learning Environment (DICCE-LE) for classroom project development will also be demonstrated.

Introduction
One of the major hallmarks of science instruction in the modern classroom is the increase of “hands-on” investigation and experimentation. While “hands-on” classroom activities can be implemented relatively easily in the traditional sciences such as chemistry, biology, and physics, such is not always the case for the earth sciences, particularly for climate and weather investigations with a regional and global perspective.

To address this difficulty, the usage of satellite data from Earth-observing instruments would be useful. Until recently, however, routine usage of such data has been hampered by the number of procedures required to acquire and prepare it for classroom instruction. The implementation of the NASA Giovanni data visualization and analysis system (http://giovanni.gsfc.nasa.gov), which provides rapid access and basic analytical functions for a wide variety of geophysical parameters, markedly reduces the effort required to introduce and utilize remotely-sensed data to investigate weather and climate phenomena and events.

Even though the NASA Giovanni system is easy to use, the system still features a very large population of geophysical parameters from many different Earth observation missions. These parameters frequently have unfamiliar scientific names, and for many of these parameters, documentation of their meaning and significance to meteorology and climate science was cursory. For these reasons, the Data-enhanced Investigations for Climate Change Education (DICCE) project was proposed as a collaborative effort between the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC), SRI International Inc., and Education Development Center Inc. (EDC) to the NASA Climate Change Education program. DICCE was selected and is currently in the second year of a three-year project. Figure 1 displays the major elements of the DICCE project.

DICCE-Giovanni

The DICCE-Giovanni data portal provides a selection of climate-relevant data parameters cross-cutting the data available in the Giovanni system. This selection enables rapid exploration of geographical regions to demonstrate basic climate concepts and allow investigation of data trends. When fully realized, there will be four DICCE-Giovanni data portals: Basic, Intermediate, Full, and Daily (for data available at daily temporal resolution). Data parameters in the Basic and Daily data portals are intended primarily for instruction at the secondary school level; the Intermediate and Full data portals, which will have a larger population of data parameters, are potentially suitable for undergraduate education and research. Resources include data parameter information, trend discussion, and video tutorials.

DICCE-Learning Environment

DICCE-Learning Environment (DICCE-LE) provides an online location for the creation and compilation of climate change education instructional projects. While it will initially be used by teachers, DICCE-LE can also be used for student projects. DICCE-LE provides structure for projects that integrate DICCE-Giovanni graphics, questions and responses, notes and comments, and it enables sharing of completed projects among teachers.

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