

Building Geospatial Data-intensive Learning and Research Environments: Experiences and Lessons-learned

Meixia Deng and Liping Di

Center for Spatial Information Science and Systems
George Mason University
4400 University Drive, MSN 6E1
Fairfax, VA 22030

Abstract

Modern Earth science (ES) is increasingly data-intensive. Data-intensive ES plays the most critical role in transforming raw Earth observations (data) into applicable products (information), and intelligible results and discoveries (knowledge), and providing reasoned solutions to problems we face with climate change, environment protection, natural hazards, and other global issues. However, scientific and educational endeavors in data-intensive ES are still largely challenged and hampered, mainly due to intrinsic difficulties, geospatial data accessibility and usability issues and limitations of current computing infrastructures. In order to remove the barriers to data-intensive ES, great efforts have been put on building geospatial data-intensive learning and research environments in recent years. This paper will share the experiences and lessons-learned in building two significant geospatial data-intensive environments: the “NASA EOS Higher-education (NEHEA) and GeoBrain” and the “Global Agriculture Drought Monitoring and Forecasting System (GADMFS)” (funded by NOAA). Both environments are open, interoperable, collaborative, and Service-Oriented Architecture (SOA) based cyber-systems, providing online, on-demand, specialized and personalized geospatial data, information and knowledge services to worldwide users. They can be easily used for facilitating and promoting scientific and educational activities in data-intensive ES. The experiences and lessons-learned in the development and application of these two systems can provide guidance and insights as well as technology foundation to building more effective data, information and knowledge environments for data-intensive learning and research in the future.

Keywords: geospatial Web service, data-intensive, Service-Oriented Architecture (SOA), data service, information service, knowledge service