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Grid services to store, mine and visualize environmental data

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Describe the activity, tool or service using or enhancing the EGEE infrastructure or results. A high-level description is needed here (Neither a detailed specialist report nor a list of references is required).

Developing grid services for environmental data is one of our activities in the EGEEIII Earth Science cluster. Environmental data service will provide storage and direct access for grid computing tasks to metadata and multidimensional scientific data arrays, including station observations, numerical model output, remote sensing images and digital maps. The grid service will include components for distributed data processing and data mining to search for trends and events in the environment.

Report on the impact of the activity, tool or service. This should include a description of how grid technology enabled or enhanced the result, or how you have enabled or enhanced the infrastructure for other users.

We have already demonstrations of our technology use in grid for seismic and space weather modeling, as well as cross-disciplinary study of the relations between regional climate and vegetation change.

Describe the added value of the grid for your activity, or the value your tool or service adds for other grid users. This should include the scale of the activity and of the potential user community, and the relevance for other scientific or business applications.

File level grid data management does not satisfy many requirements of the Earth Science community because of the limitations in access time, number of different data formats, and rapidly growing size of the data collections. We use distributed clusters of relational and spatial databases to store large collections of environmental data in the common data model, derived from a multidimensional numeric array. We have developed a grid data service on top of the distributed database to allow metadata search, simple read and write activities, as well as advanced data mining and visualization tasks. Our approach provides near-real time access to the very large arrays of environmental data and unifies API to data across multiple subject areas. We implement the grid service as a OGSA-DAI resource with a set activities specific for the array data model. Distributed environmental data become a service part of the grid infrastructure with the common functions for metadata, API and access control.

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