



WEB-GIS Decision Support System for CO₂ storage

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Environmental decision support systems (DSS) paradigm evolves and changes as more knowledge and technology become available to the environmental community. Geographic Information Systems (GIS) can be used to extract, assess and disseminate some types of information, which are otherwise difficult to access by traditional methods. In the same time, with the help of the Internet and accompanying tools, creating and publishing online interactive maps has become easier and rich with options.

The Decision Support System (MDSS) developed for the MUSTANG (A Multiple Space and Time scale Approach for the quantification of deep saline formations for CO₂ storage) project is a user friendly web based application that uses the GIS capabilities.

MDSS can be exploited by the experts for CO₂ injection and storage in deep saline aquifers. The main objective of the MDSS is to help the experts to take decisions based large structured types of data and information. In order to achieve this objective the MDSS has a geospatial object-oriented database structure for a wide variety of data and information.

The entire application is based on several principles leading to a series of capabilities and specific characteristics: (i) Open-Source - the entire platform (MDSS) is based on open-source technologies - (1) database engine, (2) application server, (3) geospatial server, (4) user interfaces, (5) add-ons, etc. (ii) Multiple database connections - MDSS is capable to connect to different databases that are located on different server machines. (iii) Desktop user experience - MDSS architecture and design follows the structure of a desktop software. (iv) Communication - the server side and the desktop are bound together by series functions that allows the user to upload, use, modify and download data within the application.

The architecture of the system involves one database and a modular application composed by: (1) a visualization module, (2) an analysis module, (3) a guidelines module, and (4) a risk assessment module. The Database component is build by using the PostgreSQL and PostGIS open source technology. The visualization module allows the user to view data of CO₂ injection sites in different ways: (1) geospatial visualization, (2) table view, (3) 3D visualization. The analysis module will allow the user to perform certain analysis like Injectivity, Containment and Capacity analysis. The Risk Assessment module focus on the site risk matrix approach. The Guidelines module contains the methodologies of CO₂ injection and storage into deep saline aquifers guidelines.