



## Web services to offer spatial information from 3D geological models in a spreadsheet

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Spatial information in the mind or many people conceived as maps. In the framework of INSPIRE TNO Geological Survey of the Netherlands and other surveys organised in EuroGeoSurveys disseminate their information as maps in WMS format. In the case of TNO these maps are derived from 3-dimensional subsurface models: geological, geohydrological models, models on other themes like geothermal potential, exploitable mineral resources, chances for heat and cold storage etc. Beside the maps, several other representations of the model are of interest for users: virtual boreholes in the model, vertical cross sections, horizontal slices in some visualisation. In the case to be presented the development of a heat and cold storage planning tool by a was the driver for TNO to development of a web service to offer just a table in a spreadsheet on a certain location. The table was to contain depth intervals with hydraulic and other properties read from one of the subsurface 3D models. Technology used was a SOAP service with capabilities defined in WSDL. With this approach it hopefully fits INSPIRE in future.

Except for viewing the table and using the property values as spreadsheet variables in the spreadsheet macro language, the web service can also be invoked from an application development environment like VBA.

With this development users within and outside the Geological Survey of the Netherlands were very glad, because suddenly it was possible to quickly consult the subsurface model of their choice at the geographical position of their choice in the standard Microsoft Office environment. TNO widely communicated and communicates the potential of this development as it is a demonstration of what rather easy to implement web services may mean for also other user applications.

In the meantime other capabilities have been added to the service, like offering the outline of the models in GML and a choice of visualisation. With Microsoft Nederland it is investigated how also these visual representations can be included in the Office environment. The last step would be to have a small map in Excel so as to indicate the location of choice on the map or select a location from the map. Then we would have rounded the circle and come back to tools that were originally exclusively used for spatial information, GIS. Did we go a bridge too far or is this what is to be expected: integration of all tools in one user environment to be serviced through the Internet?