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Aquapath-Soil: Supporting farmers with hydrologic models and EO data

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The AquaPath-Soil service (support to agricultural production) aims to provide support services for irrigation, based on the use of satellite images, hydrological models and meteorological data. Users can observe the project results through the website page (http://www.agro-evapo.eu) maps of Leaf Area Index (LAI), and animated maps of Actual Evapotranspiration (ETA) or receive SMS throughout the period with meteorological information and actual evapotranspiration. The service has been tested for a period of 3 years, and presently has about 80 pivot being covered by the service. The farmers evaluated positively the service and the service will continue in 2013.
ETA maps are generated by MOHID LAND model and represent the evapotranspiration accumulated weekly throughout the growing period of maize between May and September, using LAI as input. Both this models (SWAT and MOHID LAND) calculate plant growth, actual evapotranspiration and soil moisture by explicitly calculating water balance of the system soil-plant-atmosphere.
The information provided in the SMS is obtained through SWAT model running in forecast mode using meteorological data from the previous week and forecasts for the next week. The weather data is from the closest station of each field (precipitation, temperature, relative humidity, wind speed and solar radiation). The weather forecasts are obtained from the MM5 model (http://meteo.ist.utl.pt). Models and satellite images have been validated during this last three years using field measurements and farmers support.
Main challenge of Aquapath-Soil service is the reduction of operational costs, mainly related with satellite acquisition and processing. The recently approved SenSyF FP7 project will implement a framework to obtain this aim. The SenSyF project proposes a complete system for fully automated data acquisition and processing. The SenSyF project provides a specialized Sandbox Service with tools and development/validation platforms where developers are able to implement and test their applications, and then tap into a distributed pool of cloud resources when ready for the exploitation phase. This project will allow for the development and testing of new processing chains and methods for Sentinel and GMES contributing mission data on a continuous basis, and the delivery of higher-level products and services complementing the information provided by the (pre-)operational services. This system will be based on a dynamic parallel processing infrastructure, where the capabilities of grid computing applied to Sentinel data processing can be exploited and demonstrated. The sandbox model furnishes a test environment very similar to the space agencies operational environments, where the applications are ran against large EO series of datasets, and where the “time- to-market” understood as the applications maturity and readiness for production can be streamlined. The distributed processing services are bridging the exploitation gap by offering access to EO data and processing power, and bringing the processors and applications closer to the data. By using the same model behind the European Space Agency (ESA) Grid Processing on-Demand environment, the SenSyF project will enable the collaborative sharing of data and processing power from commercial or/and private clouds. The SenSyF project will provide an infrastructure where SME and scientists can develop and deploy Earth Science application with a lower overall cost of data and infrastructure setup and maintenance.
On top of the Synergy Framework being proposed, a selected set of demonstrative services were selected, which will 1) demonstrate the system’s potential, 2) provide valuable development feedback for the framework improvement, and 3) prove the overall concept by addressing specific services needs within the European and global setting. Aquapath-Soil is one of the services to be included in SenSyF Framework.