



NASA web-based decision support systems tools: Climate data access, and retrieval (NASAaccess) and hydrological modeling visualization (SWAT-online)

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Sustainability of the environment and resilience, and risk reduction from climatological disasters are clearly connected to the ongoing United Nations Sustainable Development Goals (SDGs) initiative. In this work, we present an effort to obtain climate data (NASAaccess) as well as visualizing, examining, and interpreting results and data input from the Soil and Water Assessment Tool hydrological model (SWAT-online) through using open source web development, web services, and cloud storage technologies. The NASAaccess is a software program and a web application framework intended to facilitate accessing and processing the National Aeronautical and Space Administration (NASA) earth observations data (doi: 10.3390/rs10060885). The NASAaccess software program has the capability to streamline smooth time series data considering spatial scale resolution issues (i.e. the Global Precipitation Measurement mission, GPM, and the Tropical Rainfall Measurement Mission, TRMM) or handling temporal resolution needs (e.g., finding daily minimum and maximum air temperature records from the Global Land Data Assimilation System, GLDAS, 3-hour product). The SWAT-online is a web application framework developed to serve as a modular platform for visualizing and sharing SWAT hydrological model input and output data. The SWAT-online application has been designed to overcome the limitations of existing desktop and web technologies for the SWAT model visualization capabilities. The SWAT-online application is completely open source and has been built to be resilient to changes in the SWAT model software developments. The web-based applications presented can be duplicated, installed, and run from any machine with a Tethys platform installed. The Tethys platform is an easily customizable platform that hosts web applications (<http://www.tethysplatform.org/>). The applications presented in this work have the potential to increase awareness of scientists, scholars in addition to non-technically trained stakeholders and decision makers charged with hydro-climatic management applications. We think that eliminating technical barriers for accessing, processing, and interpreting different types of hydro climate time series and spatial data would assist our world to achieve the United Nations SDGs. The NASAaccess and the SWAT-online applications are part of a SERVIR-Mekong project that is related to integrating geospatial information in government decision-making, planning, and communication for societal good (<http://tethys-servir.adpc.net/apps/>). The SERVIR program is a joint venture between the NASA and the U.S. Agency for International Development in Washington (USAID). In a nutshell, our work contributes to the fulfillment of the SERVIR program goal which is strengthening the ability of governments and other development stakeholders to incorporate earth observations and geospatial technologies to respond to natural disasters, improved food security, safeguard human health, and manage water and natural resources.