



Hydro Engine - a software tool for the analysis of hydrographic datasets

Gennadii Donchyts (1,2), Hessel Winsemius (1,3), Fedor Baart (1), and Nick van de Giesen (2)

(1) Deltares, Delft, Netherlands (gennadii.donchyts@deltares.nl), (2) Delft University of Technology, (3) Vrije Universiteit Amsterdam

Hydrographic datasets are crucial for many environmental applications, and are defined by various hydrographic features, such as rivers, lakes, reservoirs, and hydrological catchment boundaries. These features are defined by geometry, topology, and physical properties. Collecting and munging these datasets for specific scientific use may take a substantial amount of researcher's time. On the other hand, multi-petabyte-scale archives of remote sensing data being rapidly generated and provide a convenient way to monitor these hydrographic features at high spatiotemporal resolutions globally. These remote sensing datasets usually require large storage and high-performance computing resources, as well as knowledge of specialized remote sensing algorithms to derive higher-level data products. Google Earth Engine is one of the platforms that dramatically simplifies this task. The platform becomes an essential tool for many environmental scientists and can be easily integrated with the open-source geospatial ecosystem. In this presentation, a new open-source software tool, Hydro Engine, will be demonstrated. The tool simplifies querying hydrographic information in a way convenient for environmental scientists. It utilizes Google Earth Engine, to store, analyze, and query both geospatial and meta information defined for hydrographic features. The underlying raw data products are currently based on some popular hydrographic datasets: HydroSHEDS, HydroBASINS, and HydroLAKES. Additionally, the software provides a way to query dynamic physical variables, derived from satellite datasets, such as surface water area dynamics, snow or vegetation cover. One of the unique features of Hydro Engine is its ability to generate input data for hydrological models. The data can be generated using a command-line tool or a Python library. The tool operates as a web service, providing a RESTful API, making it easy to develop derived software applications. Additionally, a simple web interface is provided to explore these datasets. The main purpose of the Hydro Engine is to simplify daily life of hydrologists, struggling during data collection and interpretation of these hydrographic datasets.