15. Remote sensing multispectral semi-automated analysis of Sentinel-2 satellite data with open-source solutions.

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The open availability of multispectral imagery provided by the Sentinel-2 mission has significantly improved access to Earth Observation data (shorter temporal intervals, cloud-free acquisitions and minimized atmospheric disturbances). At the same time, even more the challenges associated with the acquisition, management, storage, and analysis of large geospatial datasets are spread. Recent advances in computer science and geospatial programming have made it possible to automate and optimize these workflows through scriptingbased solutions. This contribution, developed within the EO4Des (Earth Observation for Desertification) PRIN research project, investigates the integration of different open-source technologies aimed at improving the efficiency of multispectral data processing from Sentinel-2 imagery. The proposed strategy consists of three main phases: the search and acquisition of multispectral satellite imagery – based on the Google Earth Engine (GEE) platform; the analysis and processing of the acquired geospatial datasets – developed on Python-based workflow working in Anaconda platform; the integration in a WebGIS platform – based on Leaflet JavaScript libraries. The proposed workflow simplifies and accelerates traditional approaches based on manual desktop-based geospatial processing. Furthermore, it optimizes data transfer and storage requirements by reducing the amount of imagery that needs to be downloaded and managed locally. Despite these advantages, the adoption of the proposed solution limits its functionalities on two times selection and requires soft programming skills. Future developments will focus on the automation of a full processing chain capable of performing faster and more efficient multispectral analyses from satellite imagery. A demo version of the platform is freely available at the link: https://github.com/marcellolg1987/semi-automated-Sentine-2-WebGIS-analyzer.