Changes In Water Surface Area in the North of Morocco Using Remote Sensing Data and Google Earth Engine
(Oral)

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ABSTRACT

The dynamics of surface water play an important role in the hydrological cycle and ecological balance and are sensitive to climate change and anthropogenic activities, especially in the semi-arid area. The north of Morocco, characterized by significant hydrological variability and increasing anthropogenic pressure, is particularly vulnerable to the decrease in surface water reserves and therefore requires rigorous and regular monitoring.

At present, satellite remote sensing is the most effective way to monitor and analyze the dynamics of surface waters regularly and at different spatial and temporal scales.

To better understand the changes in water surface areas in our study area we applied a supervised classification by random forest algorithm using the Google Earth Engine platform and the optical and radar data from multisensors such as Landsat 5 TM, Landsat 7 ETM+, Landsat 8 OLI, Sentinel 2 MSI and Sentinel 1 SAR images as source data. The water and vegetation index were also used to quantify the spatiotemporal variability of the surface water area changes over the years, we combine modified normalized difference water index (MNDWI), normalized difference vegetation index (NDVI) and enhanced vegetation index (EVI) to perform more effectively and steadily than the individual index in separating water. Also, we used the histogram-based image segmentation in radar imagery to detect water surface in the region. The dynamic Otsu thresholding algorithm was applied to identify an optimal threshold for each Sentinel 1 image to separate water from non-water pixels for producing a time series of surface water maps, we validated the detected water zones by comparing them to the JRC Global Surface Water database, which confirms the spatial consistency of the result.

The expected results aim to better understand the dynamics of surface water in the north of Morocco and indicate the usefulness of optical and radar remote sensing in water resource management and to mobilize this method in different hydrological contexts.

Keywords: Surface Water, Remote Sensing, Supervised Classification, North of Morocco.

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