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Remote sensing – based analysis of the islands dynamics in the Lower Danube River

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River islands are important components of the river morpho-dynamics, which can provide essential information on fluvial processes, as well as on sediment and flow regimes. In the same time, river islands play an essential role from the political, environmental and socio-cultural points of view. Thus, understanding the temporal dynamics of the river islands is a required task for channel navigation safety, port functionality, agricultural production and biodiversity. The aim of this study is to analyse the spatial and temporal changes on the river islands during the last 40 years, based on satellite remotely sensed images. The study focuses on the Lower Danube River, downstream the Iron Gates dams altering the flow and sediment load, which also suffers from dredging for navigation. The islands of the Lower Danube River generate major impacts on riparian states relationship, interfere with the ports activity and EU investments (as it is the case of Rast port in Romania), or are the subject of ecological restoration. Multispectral satellite data, including Landsat and Sentinel-2 images, were used for river islands mapping at different temporal moments, with a medium spatial resolution (up to 15 m on Landsat pansharpened data and 10 m on Sentinel-2). Spectral indices, as NDVI and NDWI, allowed the automatic extraction of island boundaries and land cover information. On these, two processes were carried out: 1) the characterization of the river islands morphology, and 2) the quantification of the spatial and temporal changes over time. The resulted data are connected with in-situ measurements on flow regime and sediment supply, as well as with flood events and human activities in order to identify the potential drivers of change. The results demonstrate a strong correlation between river islands dynamics and flood events in the Lower Danube River, as the major flood event from 2006 significantly modified the islands size and shape. This research can allow the identification of the evolutionary model of the Danube River.

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