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Localization of the invasive water hyacinth (Eichhornia crassipes) in the Guadiana River using Sentinel-2A imagery

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Since 2003, the non-native water hyacinth Eichhornia crassipes (C. Mart.) Solms (1883) has been detected in the Guadiana River Basin (Spain) causing severe economic and ecological impacts. This problematic invasive species of floating plant, native to Brazil, has been identified as a serious threat to ecological stability and biodiversity, leading to its complete prohibition in EU in Jan 2016. Here, we present the use of the new Sentinel-2A Multispectral Instrument (MSI) sensor (with a spatial resolution up to 10 meters) to detect the distribution of this floating weed on the surface waters of the Guadiana River. Several spectral indices (using both L1C and L2 images) were examined for their ability to detect the floating vegetation on the river surface. The best-performing index was the Normalized Digital Vegetation Index (NDVI), for both Top-Of-Atmosphere (TOA) and Bottom-Of-Atmosphere (BOA) images (atmospherically corrected). This NDVI was applied to the whole time series of available Sentinel-2A images (since August 2015) in order to analyse the temporal and spatial variability of the presence of water hyacinth in the Guadiana River. These preliminary results show that Sentinel-2 will be a valuable tool for monitoring the presence of water hyacinth in river basins. These results can help the competent authorities to improve the management of the Guadiana basin.