

A systematic review on remote sensing of wetland environments

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Abstract

This review provides an overview of the progress made in remote sensing application for soil moisture, vegetation and inundation mapping in wetland environments. The main objective of the paper was to assess the link between soil moisture variations and vegetation characteristics in wetland remote sensing studies. To achieve this objective, relevant literature was gathered from established search engines, e.g. Science Direct and Web of Science, along with specific search strategies and key phrases. Three hundred and ninety-three journal articles on wetland remote sensing published between 1980 and 2023 were collected and subjected to a comprehensive analysis. The findings indicate that remote sensing of wetland moisture, vegetation and inundation has been increasing, from three published work in the 1980s to 22 in the 1990s, to 88 between 2001 and 2010, and to 278 between 2011 and 2023. Results showed that there has been an improvement in the application of remote sensing in mapping of wetland moisture, inundation and vegetation in Africa between 2015 and 2023. Despite wide application of remote sensing to map these aspects, very few studies (2.1%) have focused on establishing the relationship between them. The analysis indicated that the launch of new Sentinel-1 radar and Sentinel-2 optical sensors in addition to the Landsat series, along with a variety of analytical methods, provided a great opportunity for derivation of soil moisture and vegetation data which can be used to establish the soil moisture–vegetation nexus.

Keywords: arid environments, remote sensing, satellite data, soil moisture, vegetation, wetlands