

Detecting the Palaeochannels Based on Optical Data and High-Resolution Radar Data for Periyarriver Basin

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Abstract : Paleochannels are the buried part of an active river system which was separated from the active river channel by the process of cutoff or abandonment during the dynamic evolution of the active river. Over time, they are filled by young unconsolidated or semi-consolidated sediments. Additionally, it is impacted by geo morphological influences, lineament alterations, and other factors. The primary goal of this study is to identify the paleochannels in Periyar river basin for the year 2023. Those channels has a high probability in the presence of natural resources, including gold, platinum,tin,an duranium. Numerous techniques are used to map the paleochannel. Using the optical data, Satellite images were collected from various sources, which comprises multispectral satellite images from which indices such as Normalized Difference Vegetation Index (NDVI),Normalized Difference Water Index (NDWI), Soil Adjusted Vegetative Index (SAVI) and thematic layers such as Lithology, Stream Network, Lineament were prepared. Weights are assigned to each layer based on its importance, and overlay analysis has done, which concluded that the northwest region of the area has shown some paleochannel patterns. The results were cross-verified using the results obtained using microwave data. Using Sentinel data, Synthetic Aperture Radar (SAR) Image was extracted from European Space Agency (ESA) portal, pre-processed it using SNAP 6.0. In addition to that, Polarimetric decomposition technique has incorporated to detect the paleochannels based on its scattering property. Further, Principal component analysis has done for enhanced output imagery. Results obtained from optical and microwave radar data were compared and the location of paleochannels were detected. It resulted six paleochannels in the study area out of which three paleochannels were validated with the existing data published by Department of Geology and Environmental Science, Kerala. The other three paleochannels were newly detected with the help of SAR image.

Keywords : paleochannels, optical data, SAR image, SNAP

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