A wetland mapping method by temporal integrals derived from H/A/alpha decomposition of Sentinel-1 images

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Wetlands are dynamic and diverse ecosystems, and play important role for example in decreasing the likeliness of floods or in filtering, and cleaning of surface and waste water. The identification and monitoring of them is essential to preserve them as ecosystem service providers.

For reaching good classification result with an ensemble learning method like Random Forest, the selection of input data is fundamental. When the land cover is as complex as wetlands, and the collected reference data is uncertain or not up-to-date, selecting the best remote sensing input layers becomes even more significant. So the intent of my study is to find proper temporal integrals of polarimetric descriptors that could support a supervised classification in finding wetlands.

The studied time period is from October, 2014 to October, 2018, that means more than a hundred acquisition dates. Polarimetric descriptors were generated based on H/A/Alpha decomposition of covariance matrix of Sentinel-1A dual-pol (VV+VH) data. From the downloaded SLC images we extracted scattering coefficients (Sigma0), and derived the following ten descriptors: alpha and its two components, anisotropy, entropy, the two eigenvalues of covariance matrix, Shannon entropy and its two components.

In this study, the examined area is one from the Kiskunság region, Hungary, having different types of wetlands, grasslands, scrubs, and agricultural habitats. The reference data is provided by Ministry of Agriculture, Department for Nature Conservation, and its categories correspond to the General National Habitat Classification System.

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