

Numerical characterization of time series data derived from H/A/alpha decomposition of Sentinel-1 images

Vivien Pacskó

*Eötvös Loránd University, Hungary
e-mail: pacsko.vivien@gmail.com*

Polarimetric radar data is applicable to identify different types of crops, according to my mentors ongoing research in the Institute of Geodesy, Cartography and Remote Sensing, Hungary. Z. Friedl et al. has already shown the first results in a conference presentation (PolinSAR 2017, ESA-ESRIN, Frascati, 2017). They examined the phenological changes of the main crops by using calibrated backscatter data, polarimetric descriptors derived from H/A/alpha decomposition of Sentinel-1 dual-pol (VV+VH) time series data, acquired in the March-September period of 2016.

The intent of my study is to analyse which numerical parameters of the fitting curves - representing these time series - show significant difference between the types of crops and so suitable for classification of crop types. The planned method (i) enables the (partial) automatic interpretation of time series and (ii) its results would specify the boundaries between the different types of crops.

The selected study area is the surroundings of Lake Tisza, Hungary, having different types of crops (e.g. maize, sunflower, rapeseed, etc.) as land cover. Afterwards, the specific natural vegetation of the lake (like reedy and soddy areas) and the effects of floods and inland waters on plant-growing could be observed. Polarimetric descriptors were generated based on H/A/Alpha decomposition of covariance matrix of Sentinel-1 images. Time series were made from the followings: alpha and its components, anisotropy, eigenvalues of covariance matrix, Shannon entropy and its components.

Studying the numerical characteristics of fitting curves could be one important part of the identification of crop types in a further development. Moreover, it would become input of a classification algorithm based on radar polarimetry.

Keywords:

agriculture, polarimetric descriptors, Sentinel-1 time series data, phenology, H/A/alpha decomposition, numerical parameters