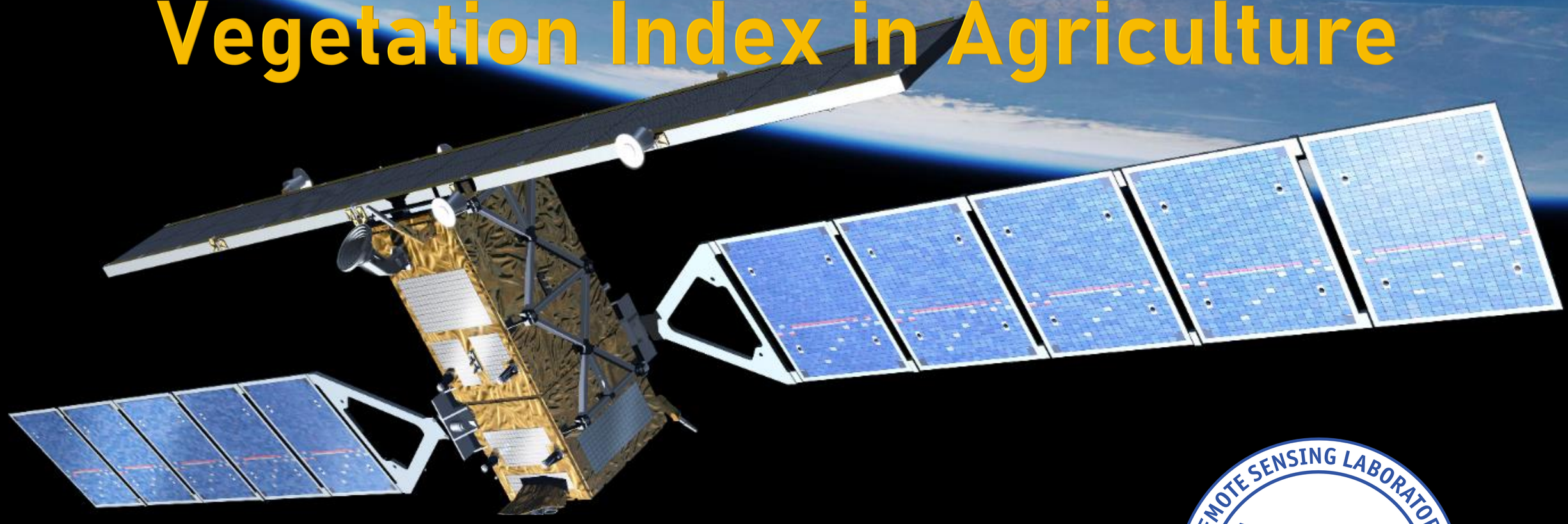
Využitelnost radarového vegetačního indexu RVI4S1 v zemědělství

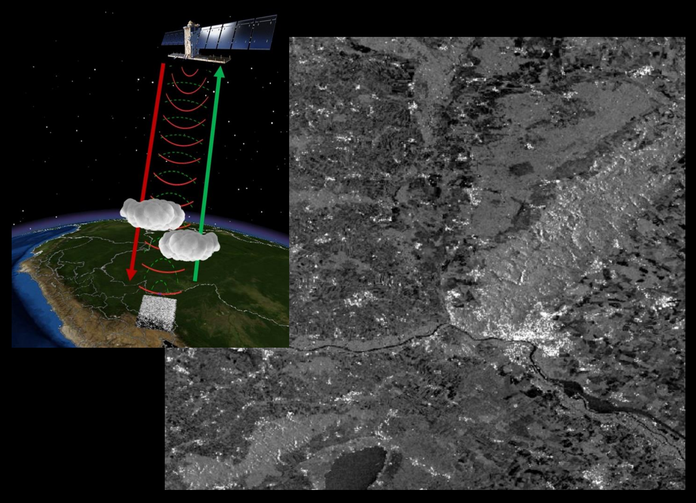
Seidlová, Jana; Kvapil, Jiří; Doubrava, Pavel
2022

Usability of the RVI4S1 Radar Vegetation Index in Agriculture

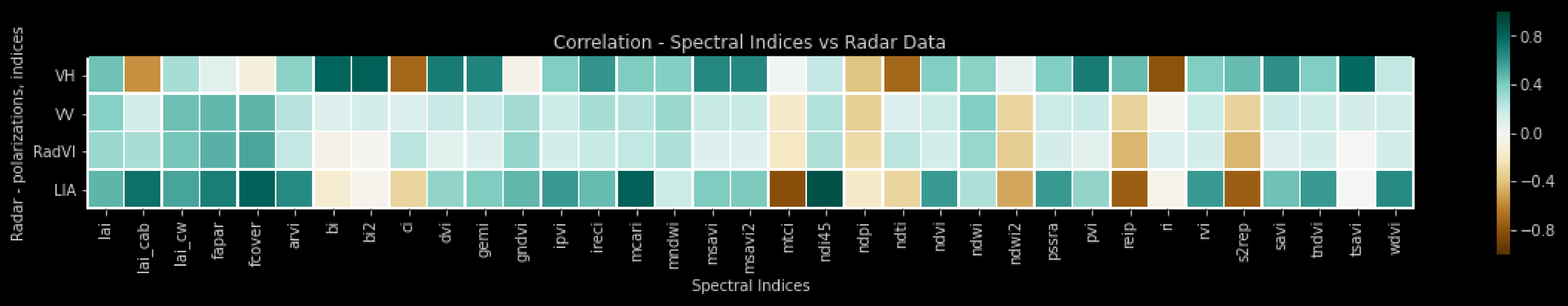


A well-known advantage of radar satellite data is its ability to penetrate through clouds. This research seeks to make the best possible use of radar satellite data in combination with multispectral satellite data in the evaluation of the Earth's surface.

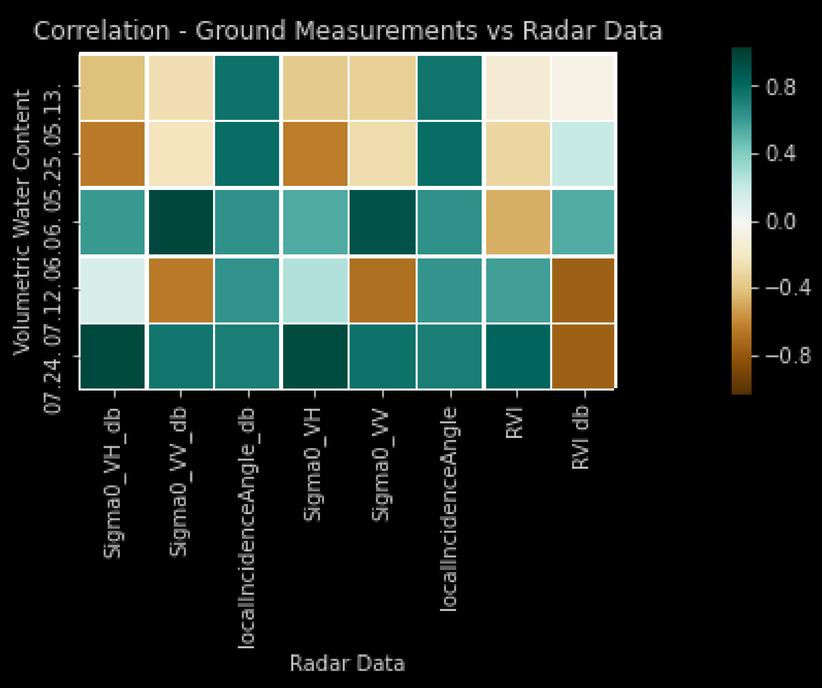
The aim of the research was to determine whether the radar vegetation index RVI4S1 can be considered as a possible substitute of the vegetation index NDVI or EVI for the purposes of mapping agricultural land.



Vegetation indices NDVI and EVI are probably the most frequently used indices for identification and determination of vegetation cover state, not only in agriculture. However, during the growing season, increased cloud cover is a common phenomenon, which makes it impossible to accurately map the vegetation cover over time. By using radar satellite data, it is possible to obtain a periodic time series of data which is not affected by clouds or weather conditions. By calculating the radar vegetation index RVI4S1, additional data can be obtained and used in the cases when data from multispectral satellite sensors are not available. The study compared vegetation indices calculated from both multispectral (Sentinel-2) and radar (Sentinel-1) satellites.



#Vegetation indices: DVI, RVI, PVI, IPVI, WDVI, TNDVI, GNDVI, GEMI, ARVI, NDI45, MTCI, MCARI, REIP, S2REP, IRECI, PSSRa
#Soil indices: SAVI, TSAVI, MSAVI, MSAVI2, BI, BI2, RI, CI
#Water indices : NDWI, NDWI2, MNDWI, NDPI, NDTI



Testing took place in the Czech Environmental Information Agency test area in the north of Czechia, where 7 data loggers (HOBO U23 Pro v2 Temperature / Relative Humidity Data Logger) are located, which measure relative humidity and surface temperature daily. In the first phase, values of vegetation indices over time were compared with each other using statistical and mathematical methods. In the second phase satellite data were compared with ground measurements data.

It turned out, that there is a similar trend apparent in the development graphs of the indices, but the statistical results of the correlations are not yet satisfactory. The different phases of the crop phenophases are able to be observed through the development graphs, but correlations of separate fields seam to be weak. However, the results of the research are not definitive. The issue will be further investigated and attention will be paid to testing other methods for the application of radar satellite data in agriculture, as such data could be a very valuable input.

cenia

Jana Seidlová (jana.seidlova@cenia.cz)
Jiří Kvapil (jiri.kvapil@cenia.cz)
Pavel Doubrava (pavel.doubrava@cenia.cz)