Correlation between Sentinel-1 radar data, Sentinel-2 multispectral data and ground measurement reference data for soil moisture monitoring

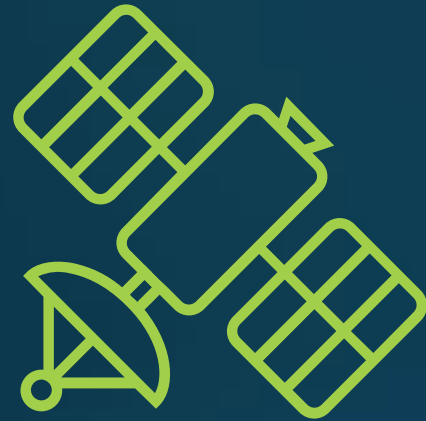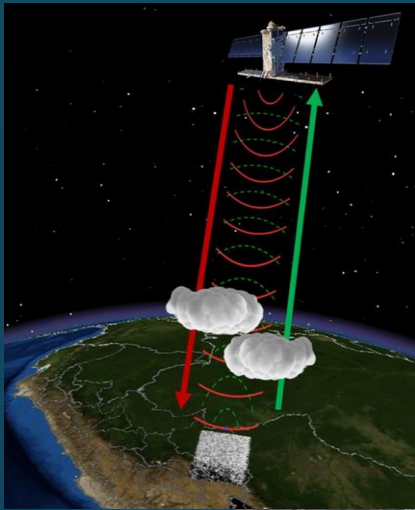Batrlová, Iva; Seidlová, Jana
2020

Correlation between Sentinel-1 radar data, Sentinel-2 multispectral data and ground measurement reference data for soil moisture monitoring

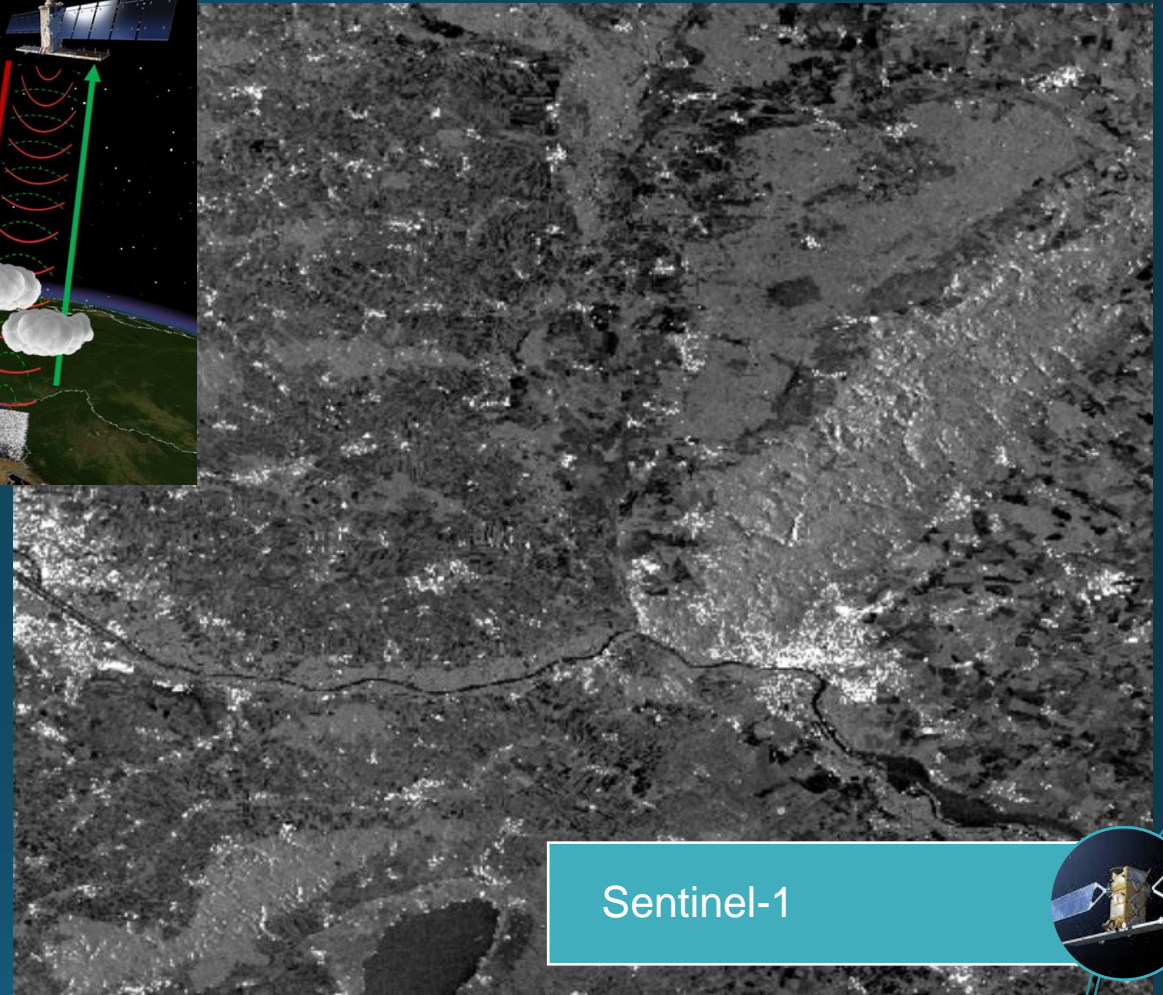Kostelecké inspirování 2020

Introduction

Why satellite data?

What's the advantage of radar data?
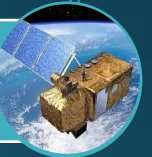
Combining data sources

What does the project deal with and what is the goal?
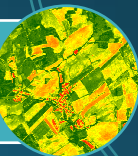
Sentinel-1

Sentinel-2

Spectral indices

Sentinel-1

- C-SAR radar instrument

- Constellation of Sentinel-1A and Sentinel-1B satellites

- Spatial resolution: 5x20m

- Temporal resolution: 6 days

- Utilization: ocean and Arctic region mapping, agriculture, forestry, Earth surface classification, …

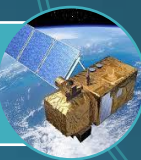- Usable at any weather conditions and any time of day

Where to download:

- https://scihub.copernicus.eu

- https://asf.alaska.edu

Sentinel-2

- MSI Multispectral Instrument
- Constellation of Sentinel-2A and Sentinel-2B satellites
- 13 spectral bands
- Spatial resolution: 10; 20; 60 m
- Temporal resolution 5 days

- Utilization: agriculture, forestry, security applications, land management, …
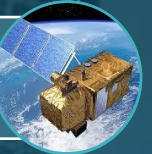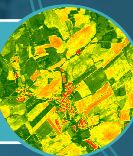- Limited by cloud cover and time of day

Where to download:
- http://collgs.czechspaceportal.cz
- https://scihub.copernicus.eu
- https://dpz.cenia.cz/archiv

Sentinel-1

Sentinel-2

Spectral indices

Spectral indices

Vegetation indices:

NDVI, RVI, PVI, IPVI, WDVI, TNDVI, GNDVI, GEMI, ARVI, NDI45, MTCI, MCARI, REIP, S2REP, IRECI, PSSRa

Soil indices:

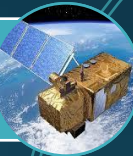SAVI, TSAVI, MSAVI, MSAVI2, BI, BI2, RI, CI

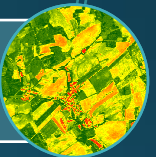Water indices:

NDWI, NDWI2, MNDWI, NDPI, NDTI
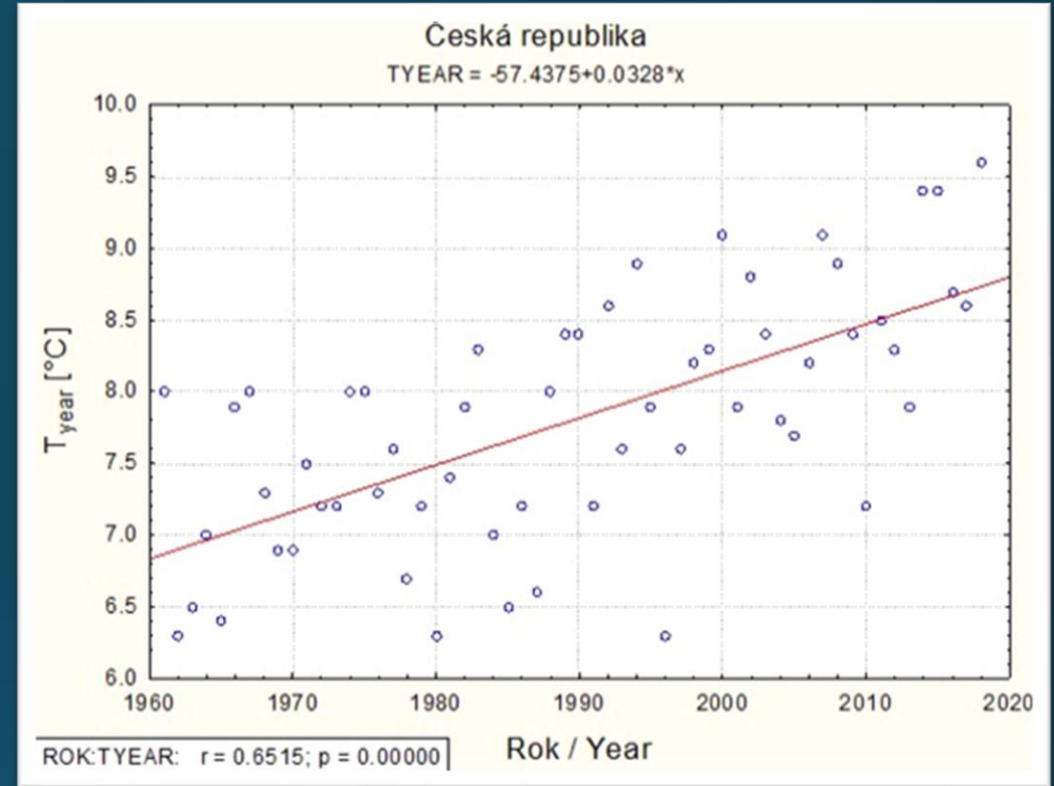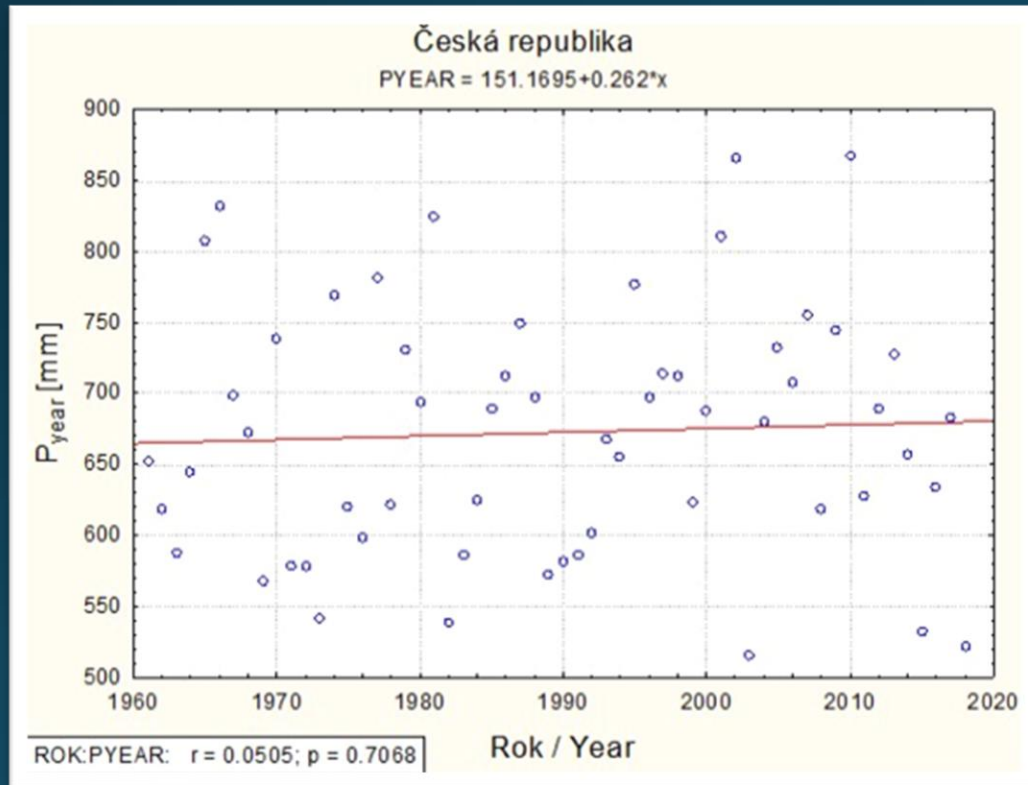
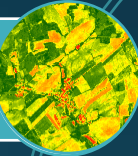Radar indices:

RVI, LIA

Sentinel-2

Spectral indices

Reference data

Reference data

Spectral indices

Reference data

Software

Software

ArcGIS Pro

ArcMap

ENVI

JUPYTER

SNAP

QGIS

Reference data

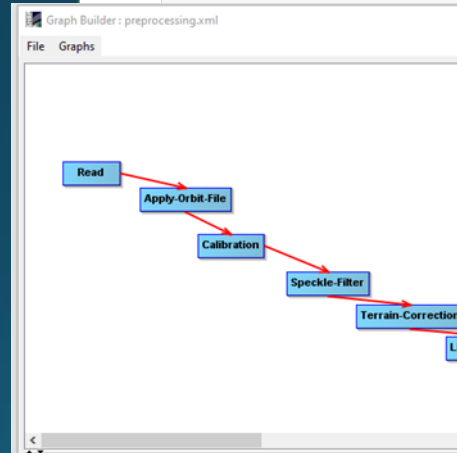**Software**

Methodology

Methodology

- Data download and processing

- Calculation of 61 spectral indices

- Comparison of Sentinel-2 spectral indices
  with and Sentinel-1 indices and backscatter

- Comparison with ground measurement data

Software

Methodology

Results

Results

Correlation - Spectral Indices vs Radar Data

Correlation - Ground Measurements vs Radar Data

- Finding correlation between Sentinel-1 data and ground measurement data

- Finding correlation between Sentinel-2 and Sentinel-1 data

Methodology

Results

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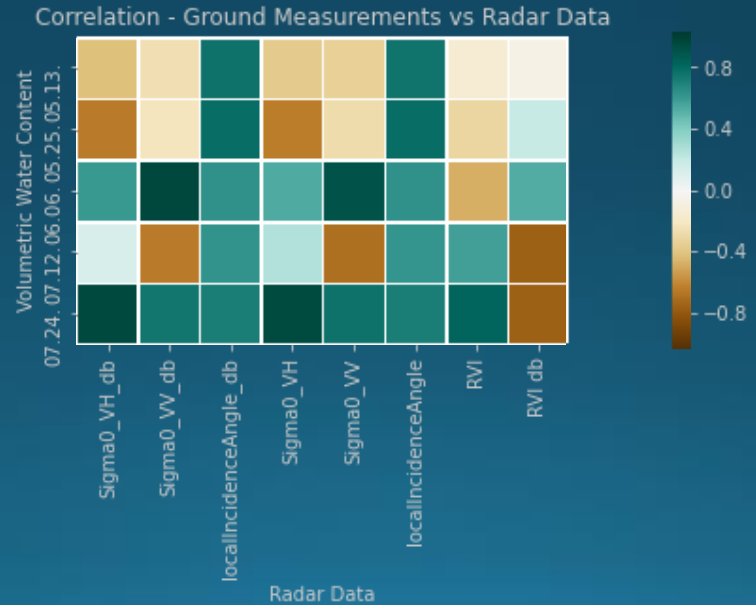
#Vegetation indices: DVI, RVI, PVI, IPVI, WDVI, TNDVI, GNDVI, GEMI, ARVI, NDI45, MTCI, MCARI, REIP, S2REP, IRECI, PSSRa
#Soil indices: SAVI, TSAVI, MSAVI, MSAVI2, BI, BI2, RI, CI
#Water indices : NDWI, NDWI2, MNDWI, NDPI, NDTI

Conclusion

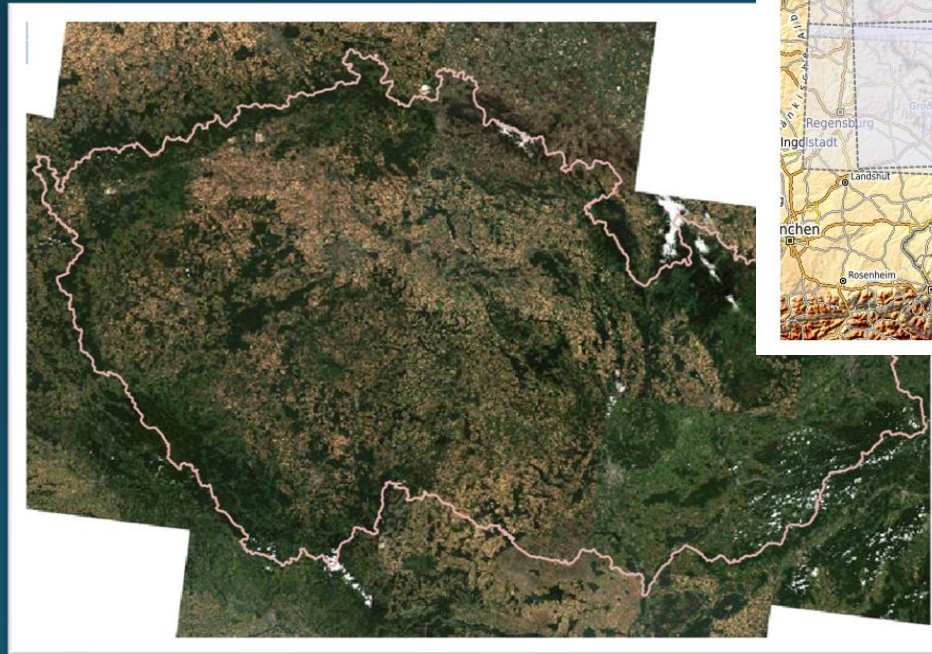- Overall results

- Future research

Remote Sensing Laboratory

CENIA, Czech Environmental Information Agency

New products:

- Satellite data archive

- Sentinel-2 mosaic in true colours

Methodology

Our Laboratory

Conclusion

Thank you for your attention!

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jana.seidlova@cenia.cz