EPOS – European Plate Observing System

# Near-real time estimation of troposphere delay and deformations

**Damian Tondaś, Jan Kapłon, Kamila Pawłuszek**

Wrocław University of Environmental and Life Sciences

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# EPOS - European Plate Observing System

## POIR.04.02.00-14-A0003/16

Priority IV: **INCREASING THE RESEARCH POTENTIAL**
Action 4.2: **DEVELOPMENT OF MODERN RESEARCH INFRASTRUCTURE OF THE SCIENCE SECTOR**

**Period of realization: 2016 - 2021**
**Project value: 61 996 279,64 PLN**
**ERDF co-financing: 46 632 332,69 PLN**

**Beneficiary:**

Instytut Geofizyki
Polskiej Akademii Nauk

**Consortium members:**

CYFRONET

GIG

IGiK

UNIVERSITAS RERUM NATURALIUM WRATISLAVIENSIS

WAT

POLSKA GRUPA GÓRNICZA

PROJECT **EPOS - EUROPEAN PLATE OBSERVING SYSTEM** IS CO-FINANCED BY THE EUROPEAN UNION FROM THE FUNDS OF THE EUROPEAN REGIONAL DEVELOPMENT FUND (ERDF)

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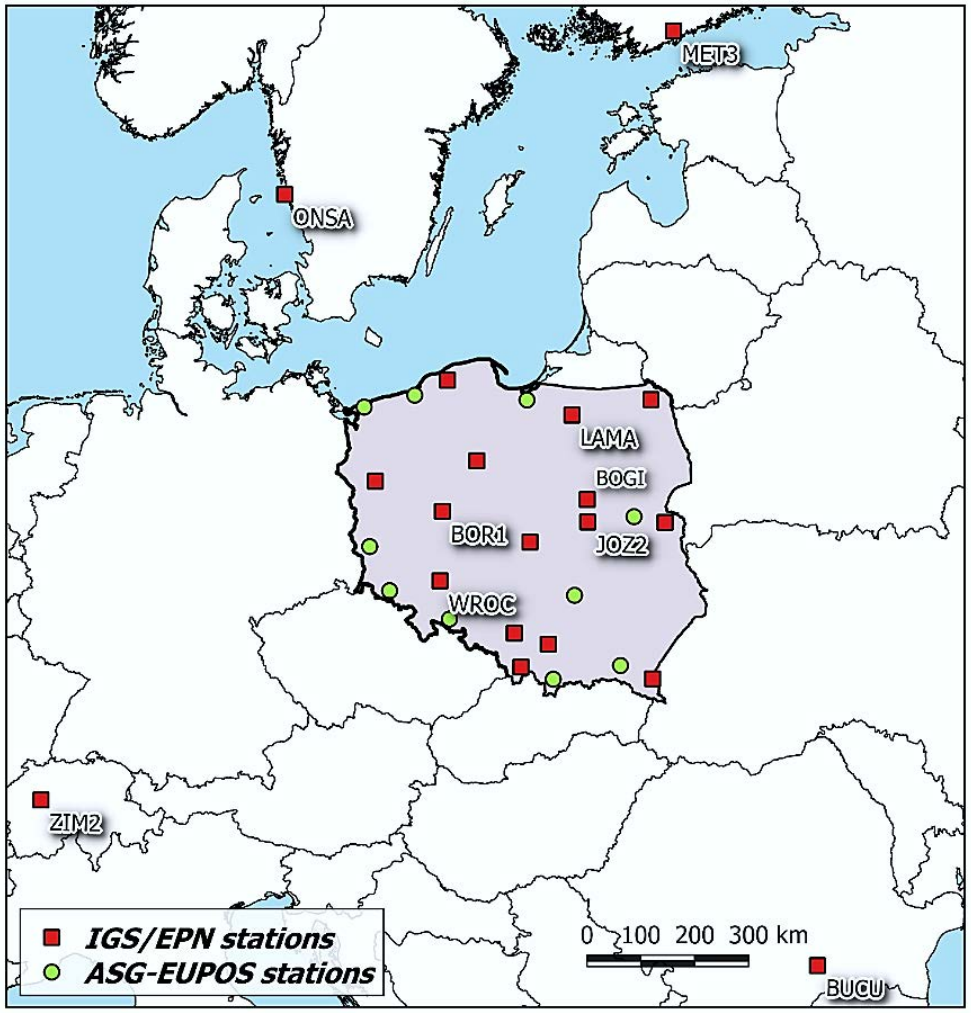
# Troposphere test goals

- Upgrade NRT 1h processing to **Ultra - fast NRT 15-minutes**
- Use the ultra-fast scenario to monitor troposphere parameters
- Achieve satisfactory quality of products




GNSS network for ultra-fast NRT tests

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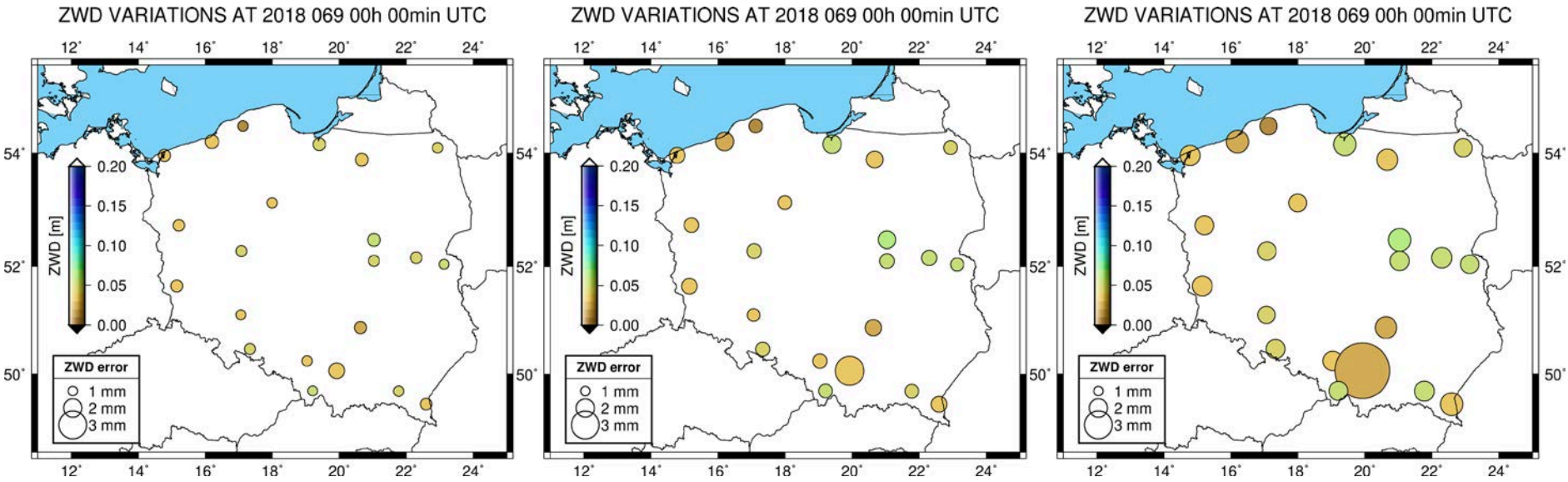
# ZWD Variations




| | Ultra-fast processing | | | Daily processing |
|---|---|---|---|---|
| Constr-aining / MF | Maximum ZTD / Grad. | Medium ZTD / Grad. | Minimum ZTD / Grad. | Reference ZTD / Grad. |
| Niell | 1.0 / 0.1 mm | 2.5 / 0.25 mm | 10.0 / 1.0 m | --------- |
| GMF | 1.0 / 0.1 mm | 2.5 / 0.25 mm | 10.0 / 1.0 mm | --------- |
| VMF1 | 1.0 / 0.1 mm | 2.5 / 0.25 mm | 10.0 / 1.0 mm | 1 m / 1m |

Bernese GNSS Software
Version 5.2

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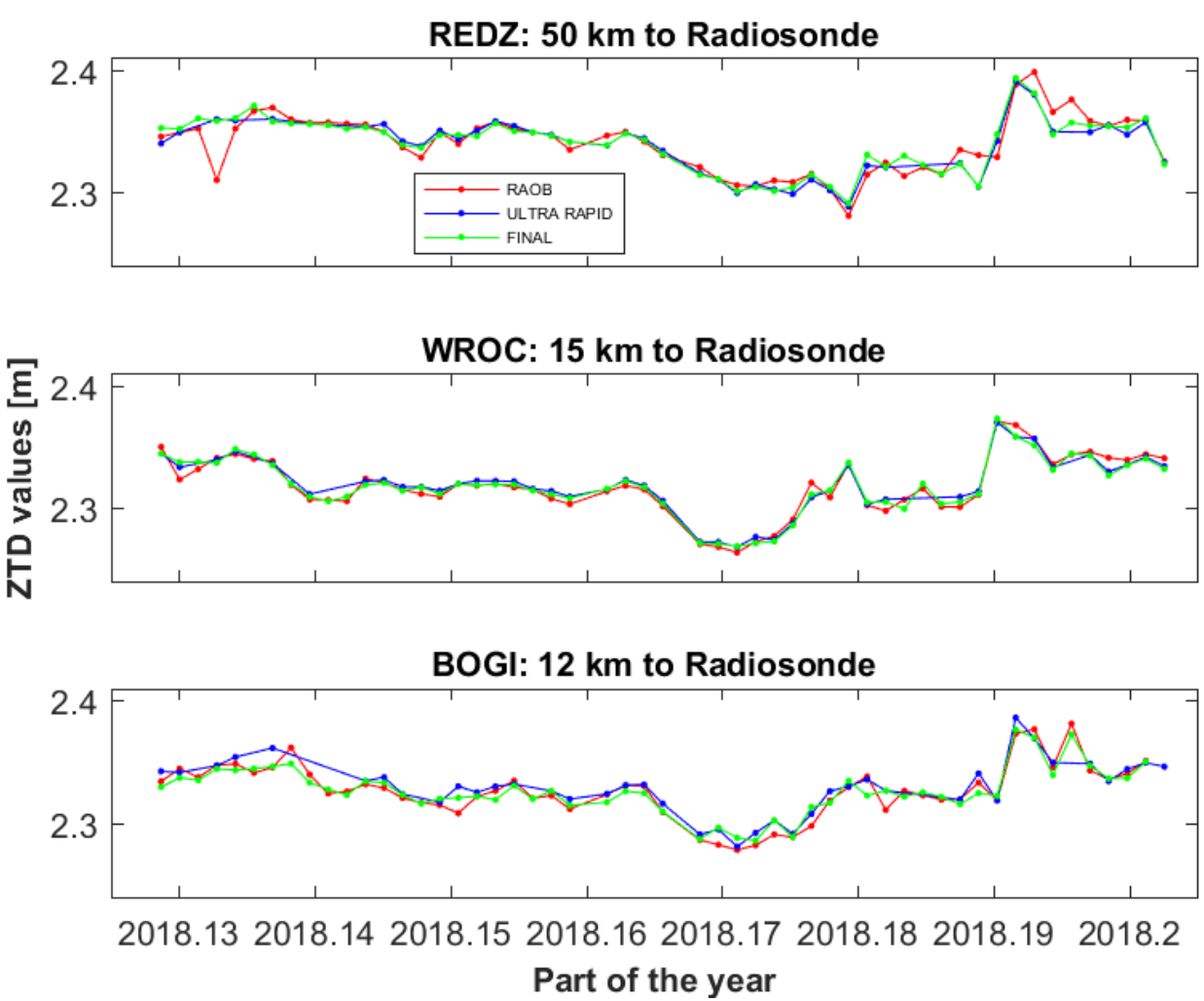
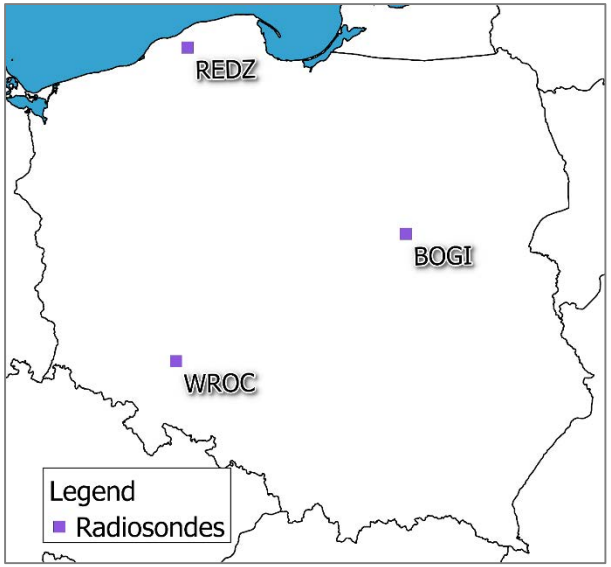
# Radiosonde vs. NRT: ZTD comparison




**Mean Std. of ZTD**

- Radiosonde vs. Ultra-fast: **7.4 mm** (For VMF1 and Max. constaining)
- Radiosonde vs Final: **7.5 mm**

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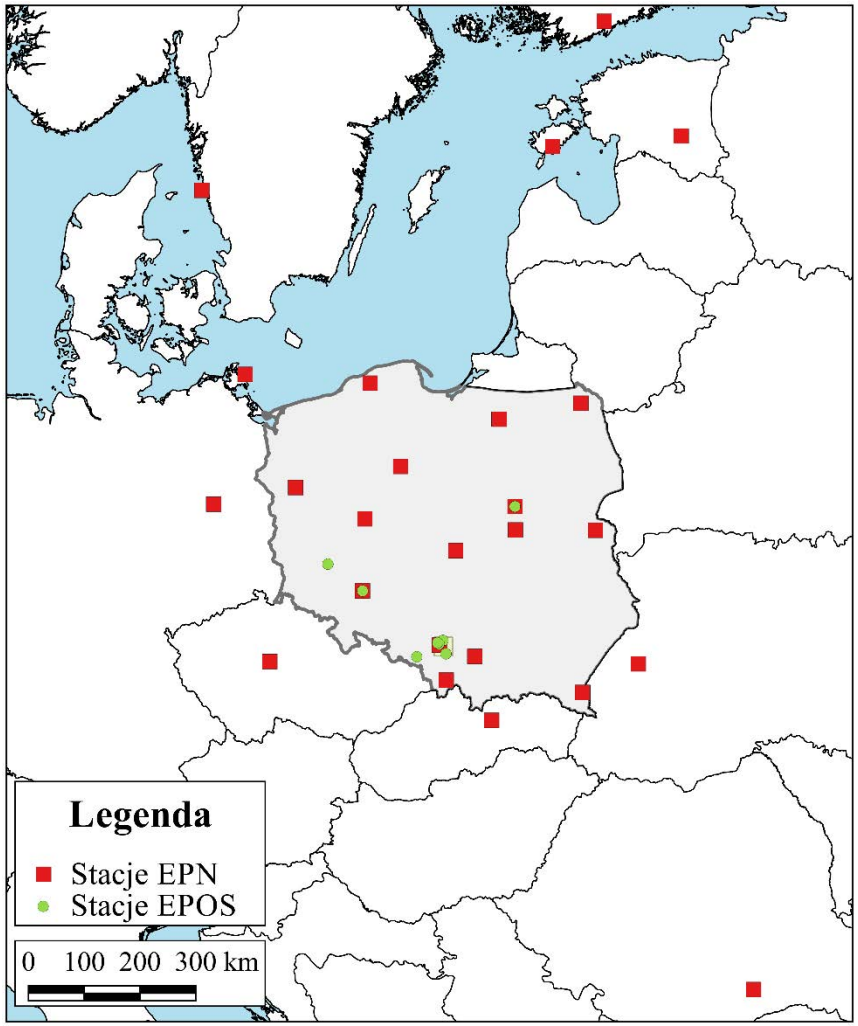
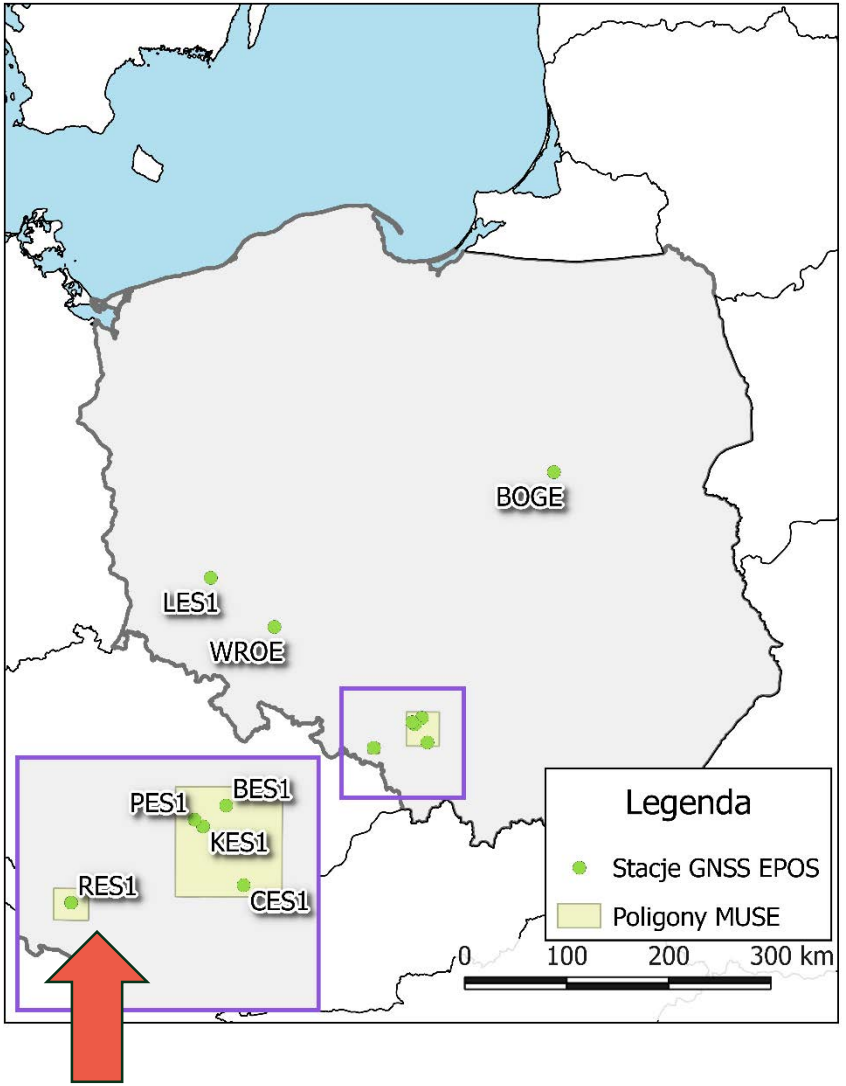
# GNSS EPOS Stations in NRT solution

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# The RES1 station

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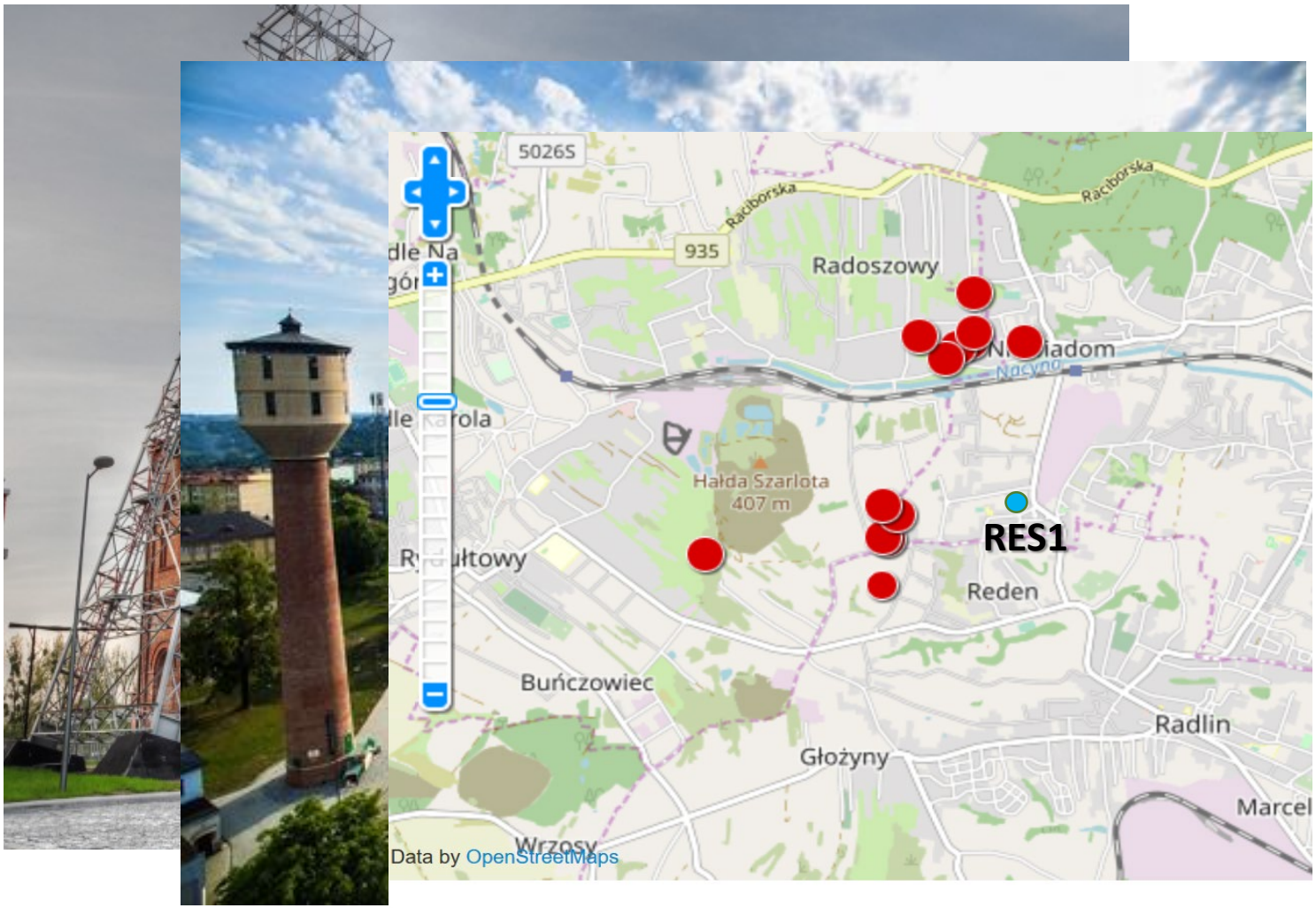
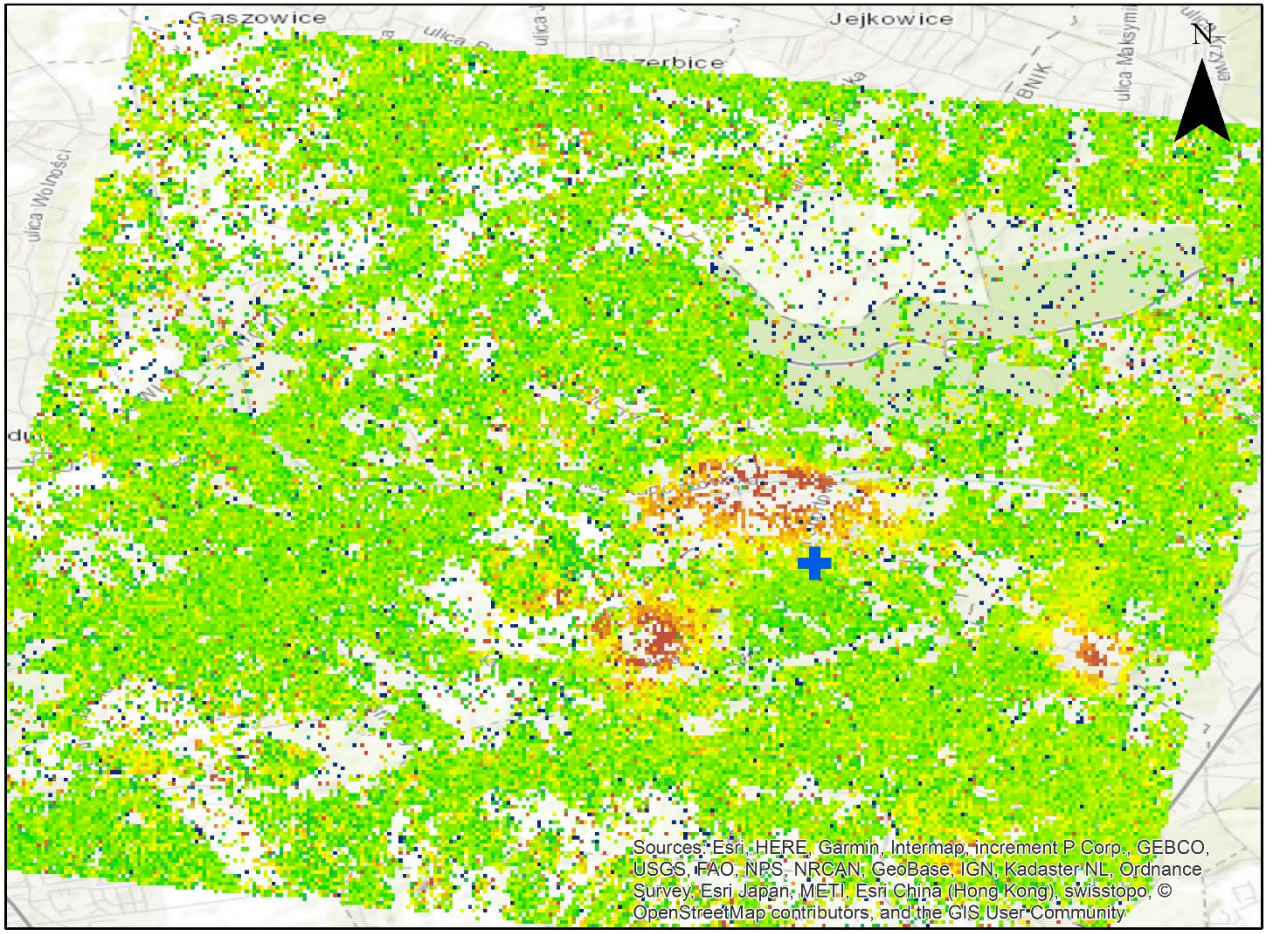


# Mining deformation of PInSAR

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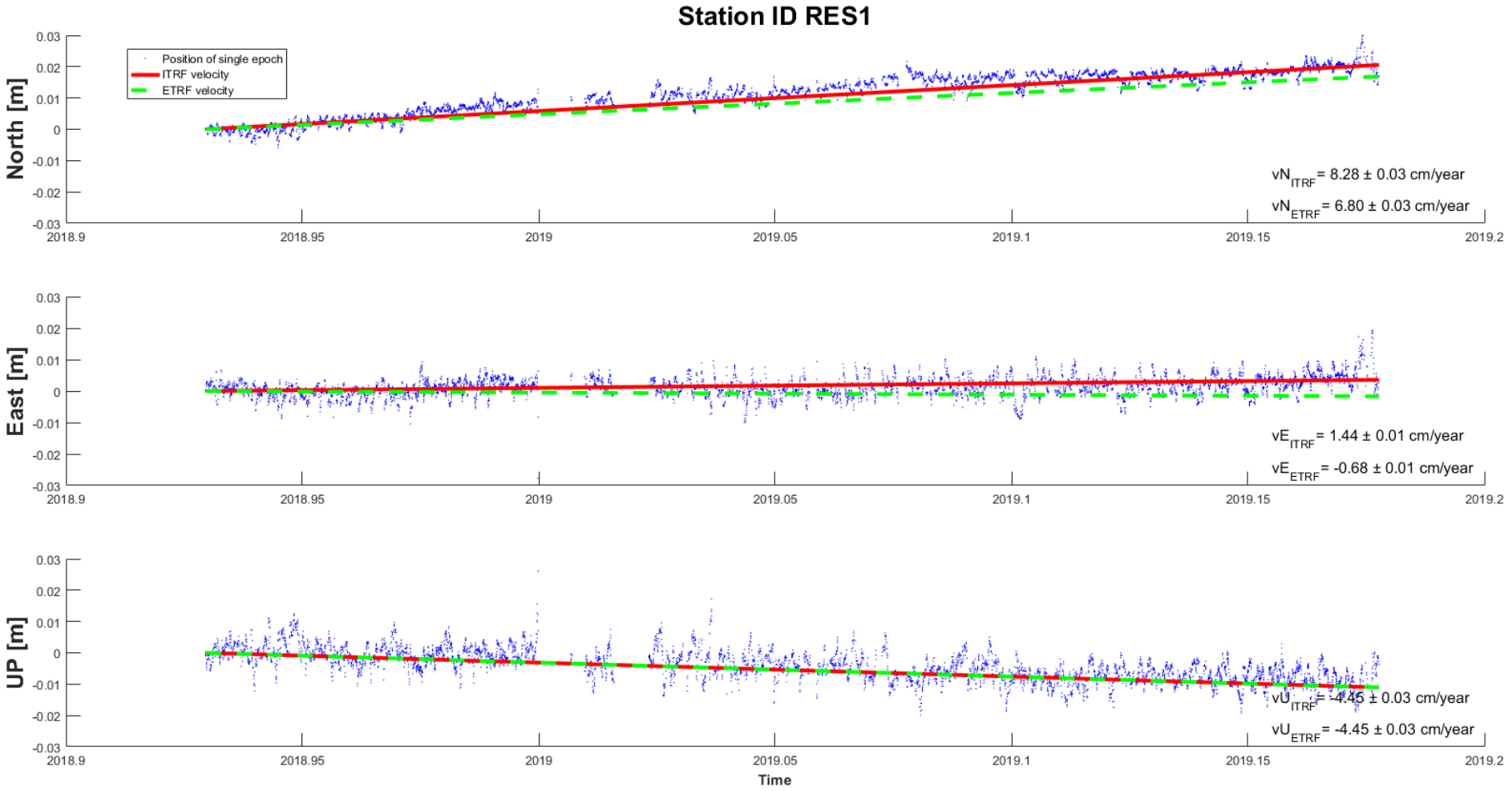
# The RES1 station

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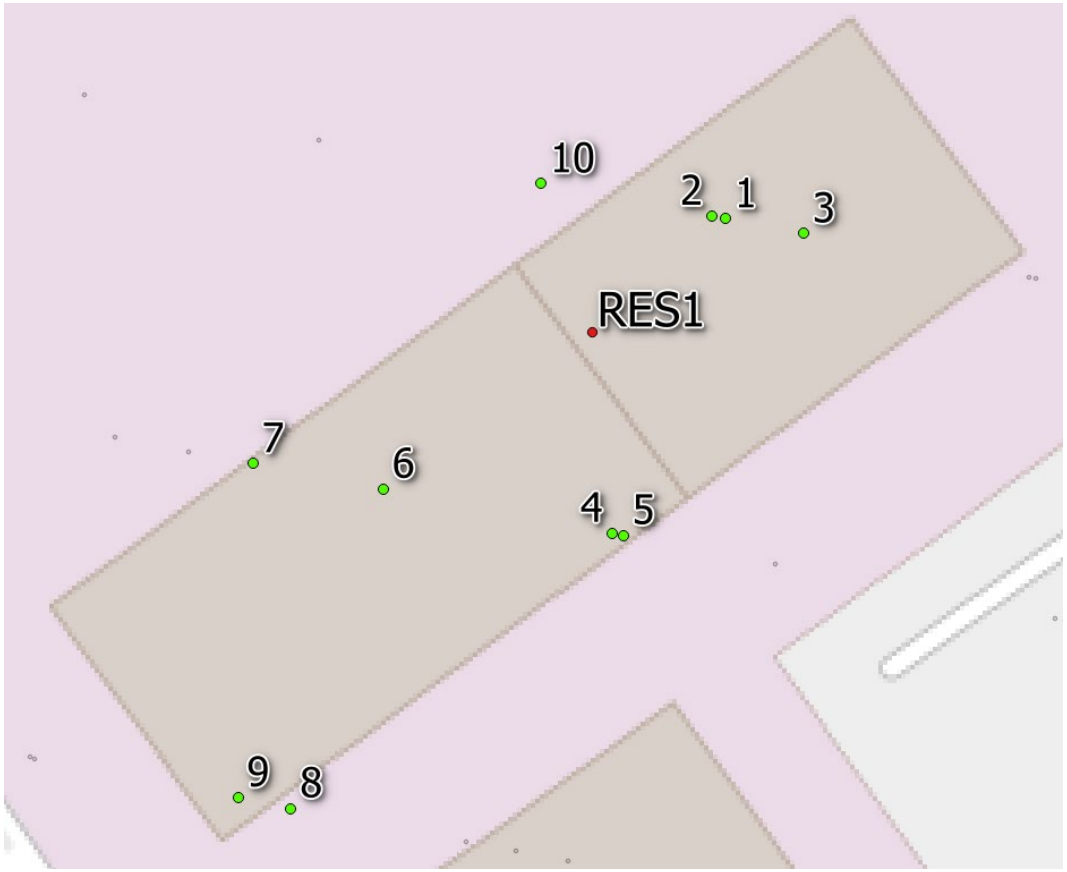
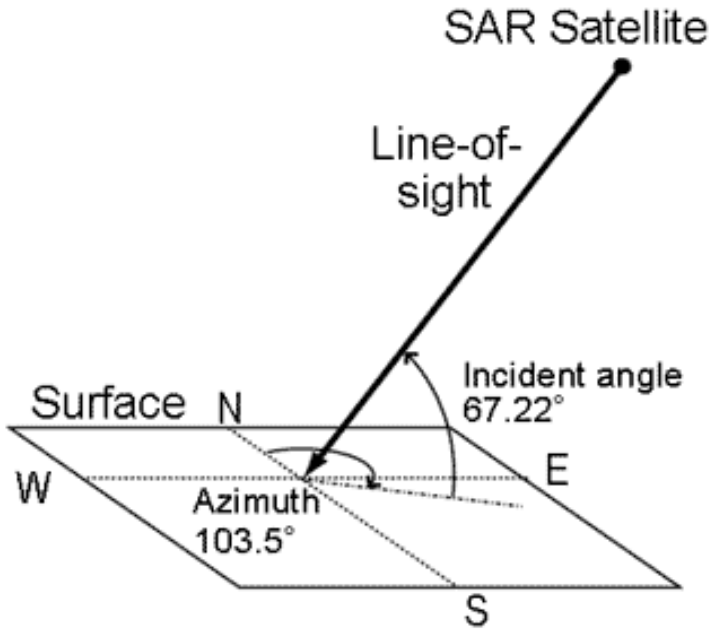
# Mining deformation of PInSAR




$$Z_{\text{los}} = [\sin(\theta_{\text{inc}})\sin(\alpha) - \sin(\theta_{\text{inc}})\cos(\alpha)\cos(\theta_{\text{inc}})] \begin{bmatrix} Z_n \\ Z_e \\ Z_u \end{bmatrix}$$

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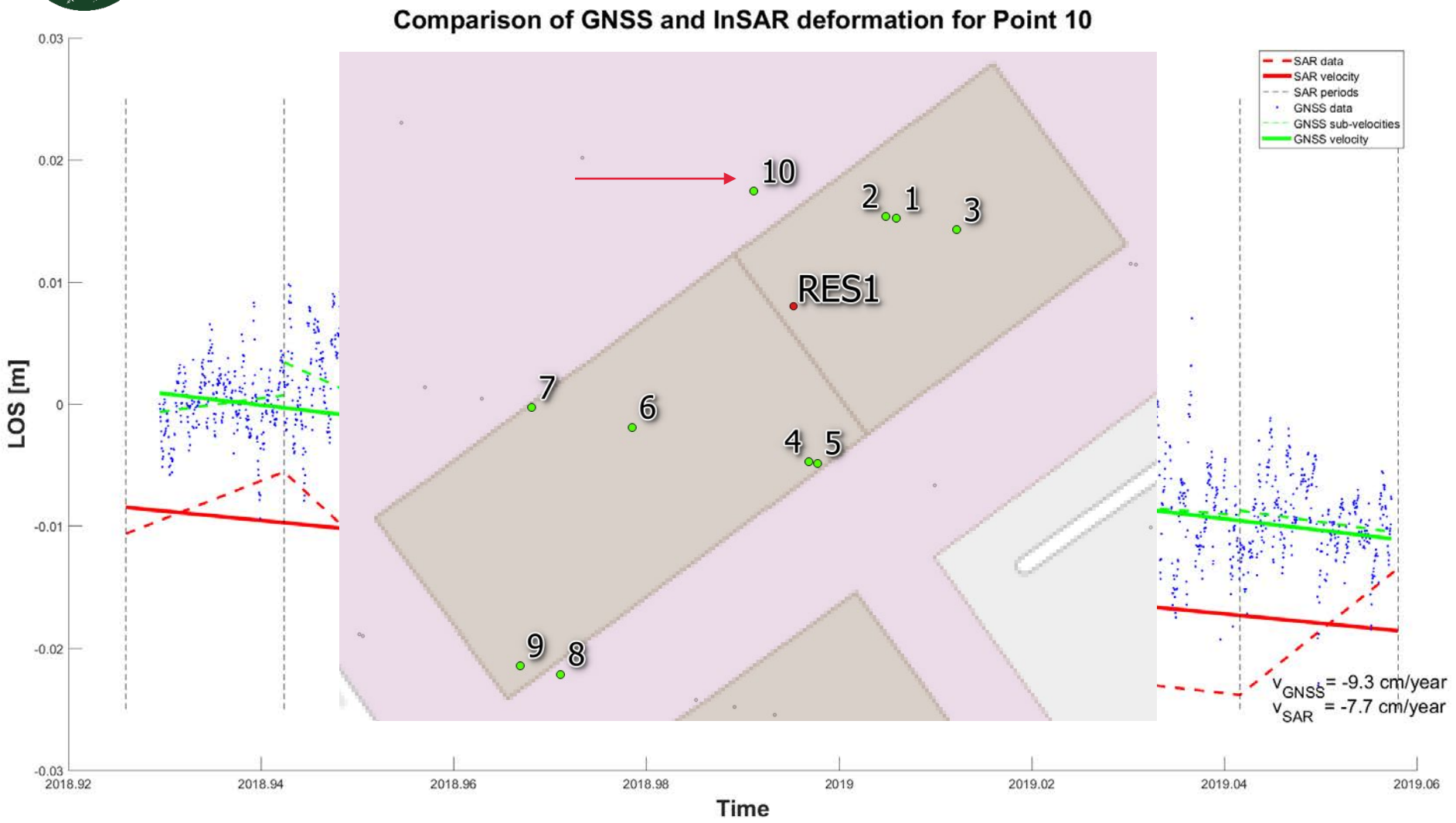
# Mining deformation of InSAR

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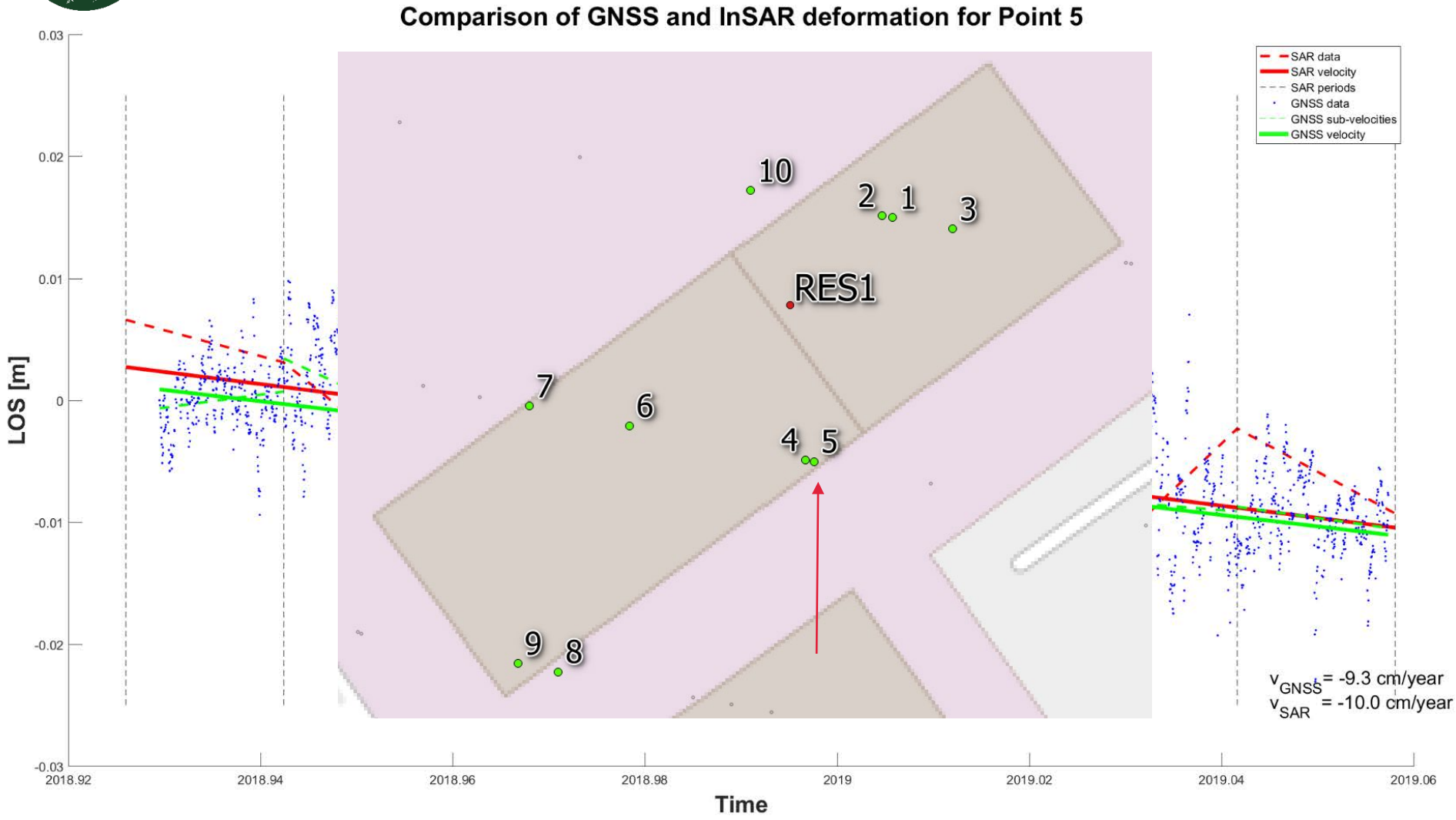
# Mining deformation of PInSAR

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# THANK YOU FOR ATTENTION

damian.tondas@upwr.edu.pl

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