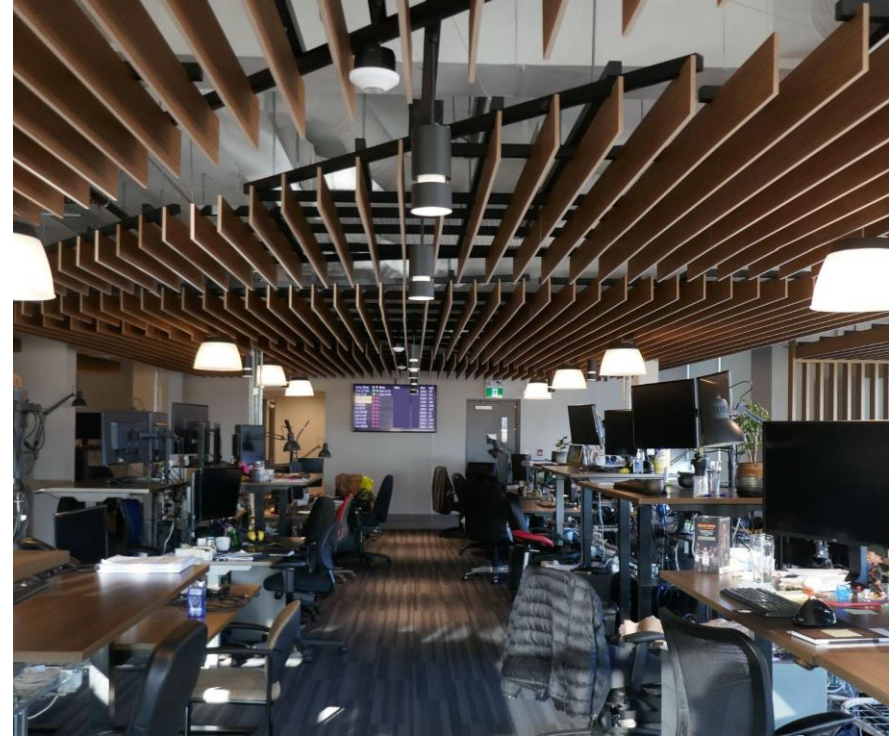
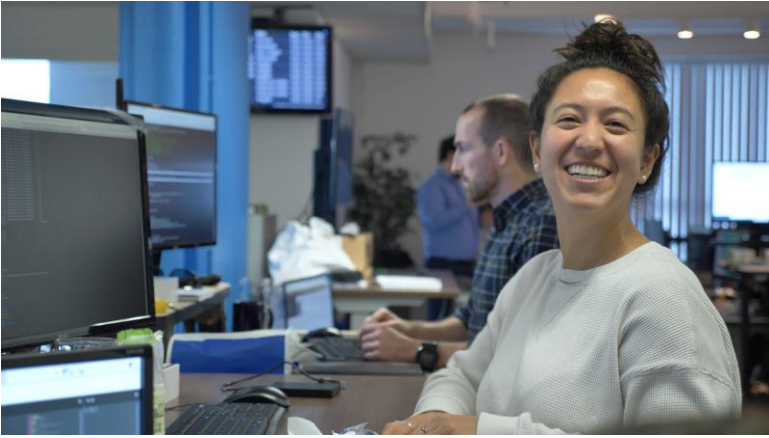
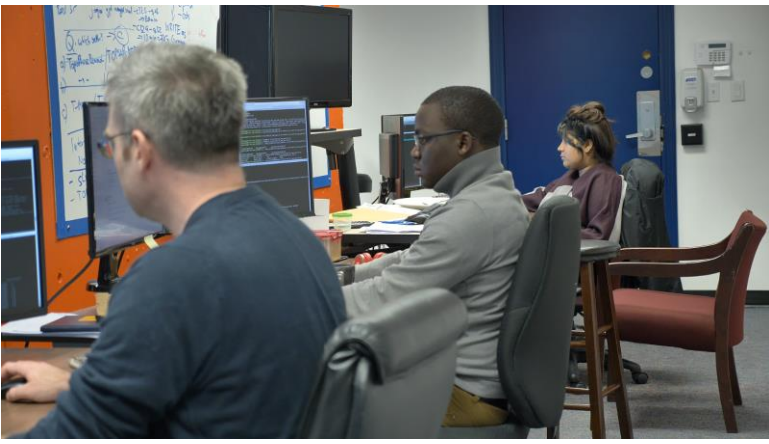


# Impacts of ALOS-2 InSAR on a Global Scale

Narrated by Colin Montgomery  
Business Development Specialist | Marketing

# Who is 3vGeomatics?







“The ALOS-2 InSAR results obtained over past 2 years period have allowed us to **identify hazards** and control the mining and pipeline areas, which allows for timely and reliable information to establish stabilization and management strategies in **case of an emergency.**”

*-South American mine + pipeline operator*



The technical group responsible for monitoring the project recognizes that the information from the **ALOS-2** satellite is of **critical importance** as it can acquire data in areas with vegetation cover. This type of cover is **not provided by the land-based equipment** that we currently have.

*-South American dam operator*





“We are working with 3vGeomatics using InSAR and other datasets to detect activity within geohazards along pipeline right-of-ways. The **ALOS-2** image acquisitions and InSAR data is **supporting engineers** and proving to be a valuable tool to assist with the **management of geohazard threats to pipelines.**”

*-North American pipeline operator*





**KINDER MORGAN**  
INC.

**BHP**



VALE

**RioTinto**

**Teck**

**Freeport-McMORAN**

**SUNCOR**  
ENERGY

**ENBRIDGE**

**INPEX**



### Pipeline Rapid Report

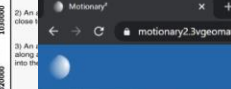
Source: TerraSAR-X Stripmap  
Mode: Descending  
Dates: Oct 10 - Oct 21, 2015  
Image Resolution: 3 m

- Possible Displacement
  - Confirmed Displacement
- Grid Labels    Map Arrows  
 Pipeline Mask

**Notes:**  
A 500 ft buffer along the pipeline corridor was analyzed for displacement, excluding areas of incoherence.  
Confirmed displacement was detected in two areas and possible displacement was detected in one area. All measurements are along the satellite line of sight.  
The data quality was excellent for monitoring displacement along the pipeline corridor.

#### Displacement Zones

1) An area of potential displacement - 0.2 in. This is consistent with the last report. The displacement does not enough into the pipeline buffer.



Change colour scale:

Filter values below threshold:  on  off

Change opacity:

Overlay Layers

Basemap

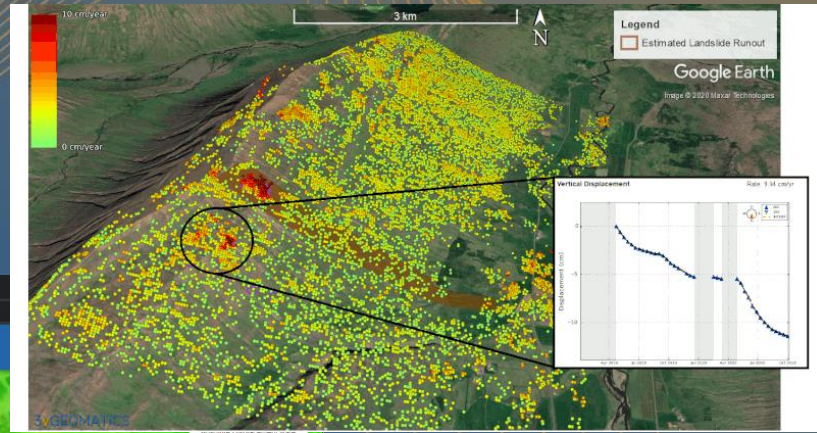
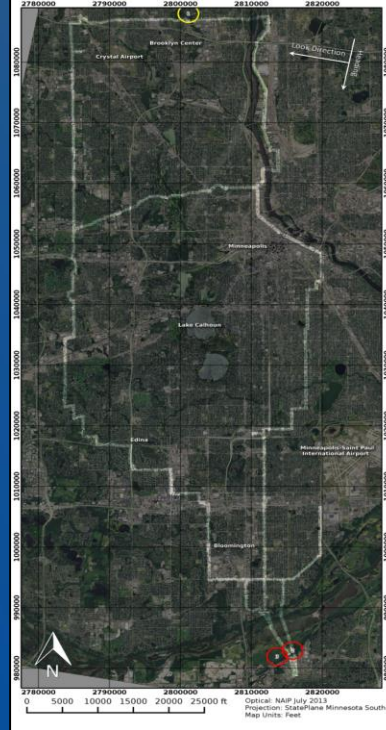
Preferences

Filter Displacement Time-Series:  on  off

Change units:  imperial  metric

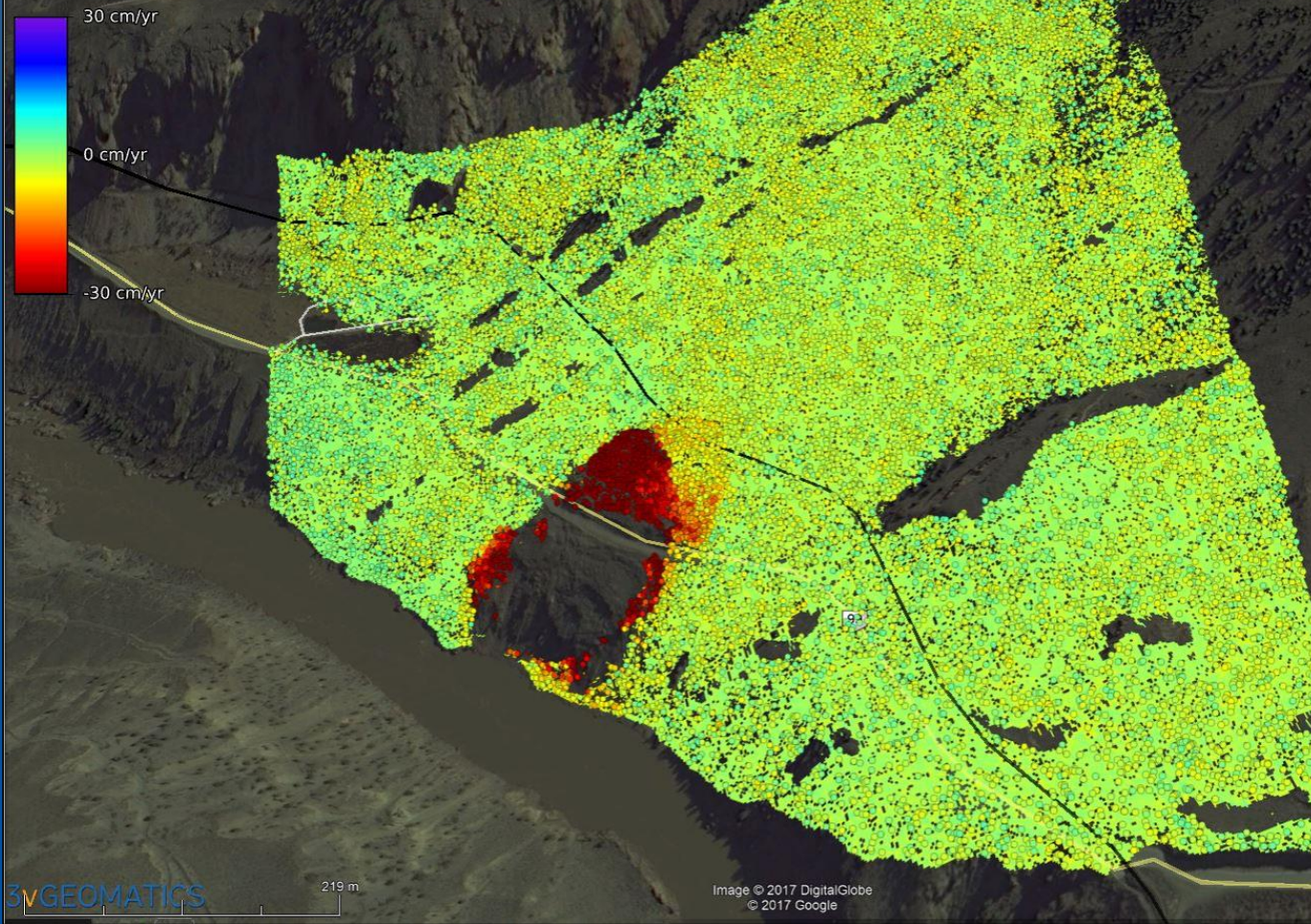
Change Color Theme:

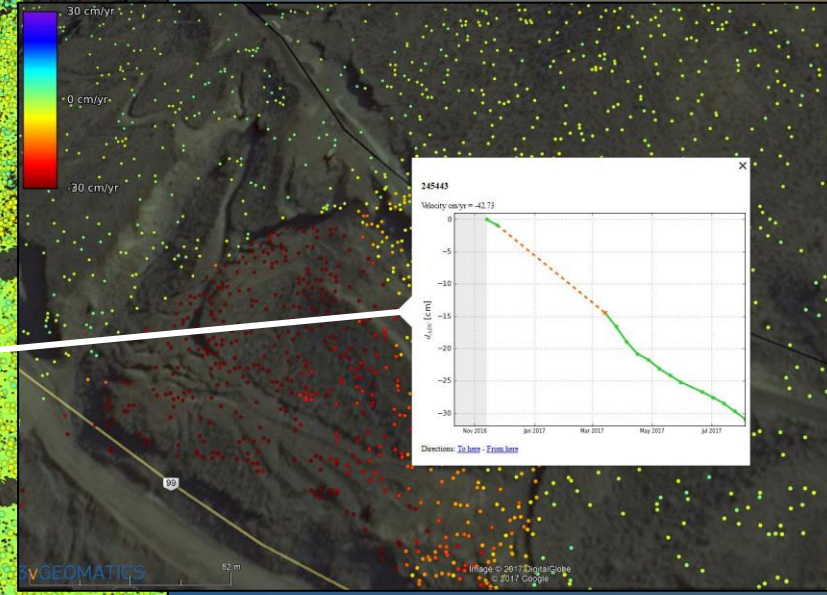
Color Theme



# Why InSAR?

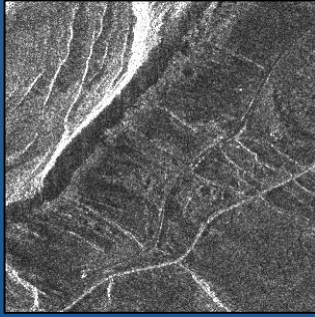






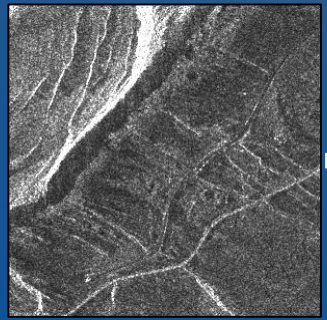


+



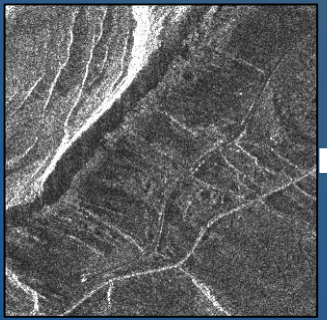
Radar Image 1

Radar Image  
1,2,3...

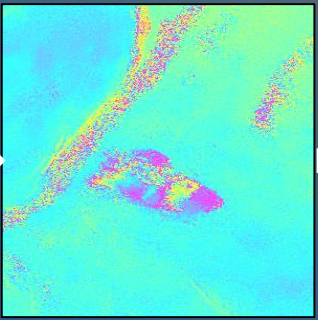


Radar Image 1

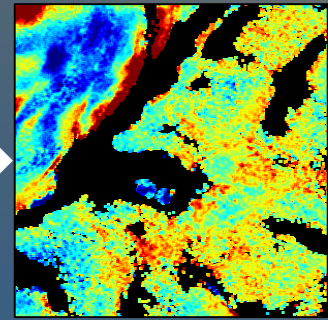
+



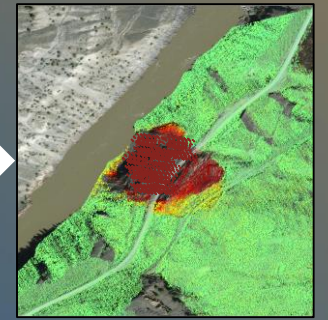
Radar Image  
1,2,3...



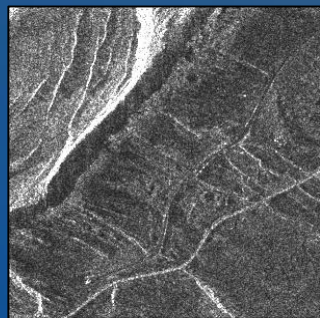
Interferograms



Advanced Processing



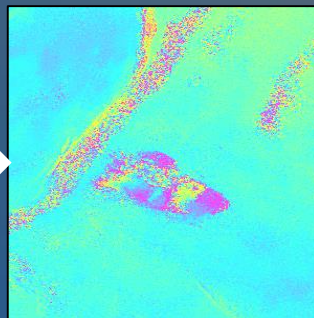
Output



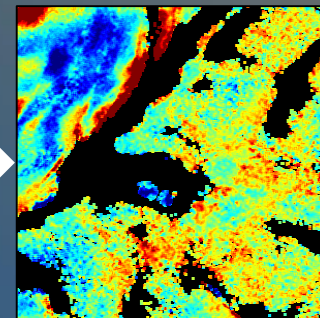
Radar Image 1



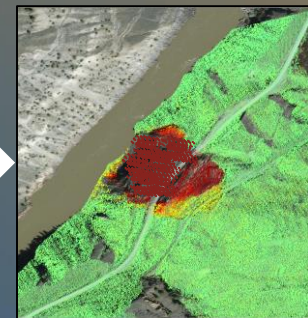
Radar Image  
1,2,3...



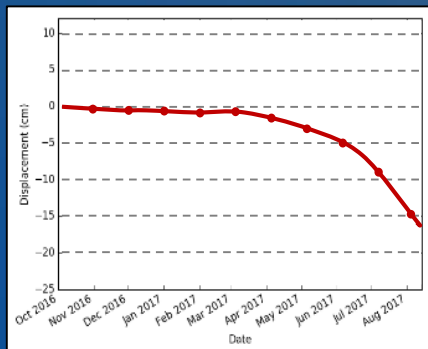
Interferograms



Advanced Processing



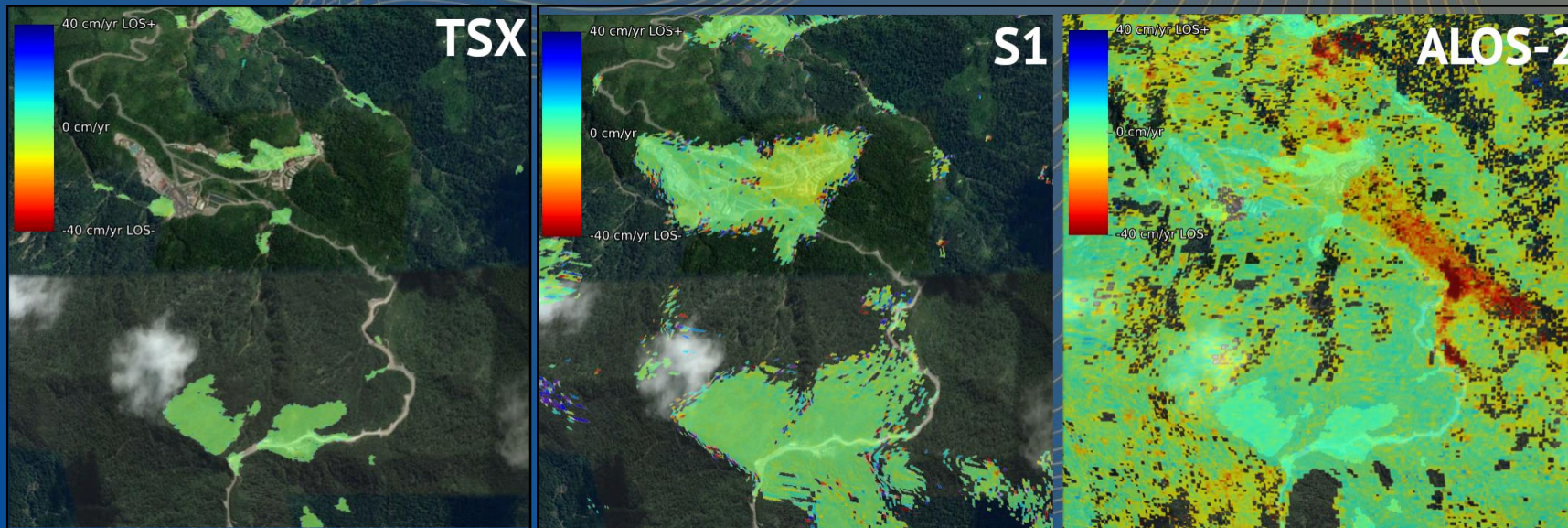
Output



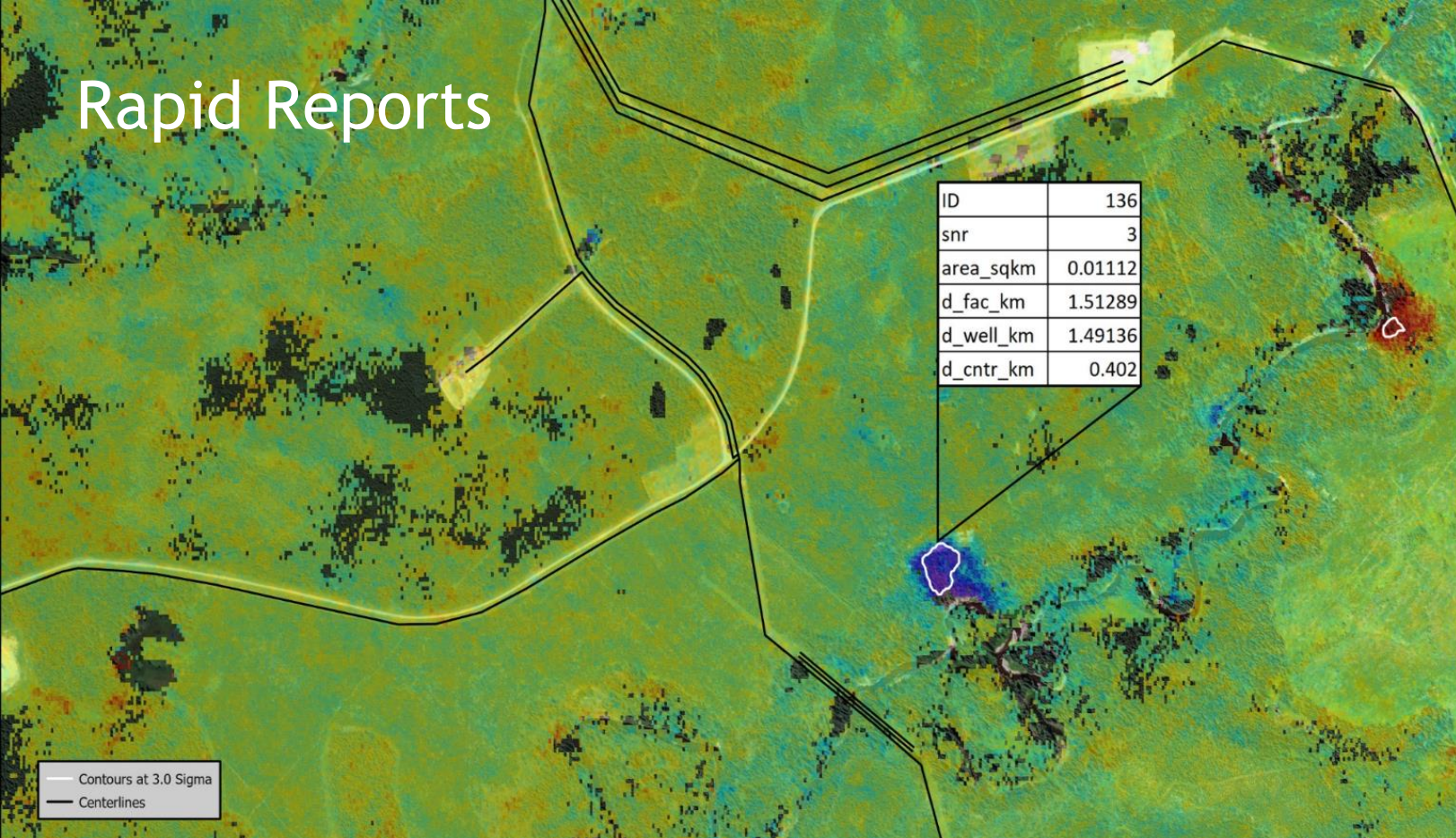


# Benefits of ALOS-2

# Coverage



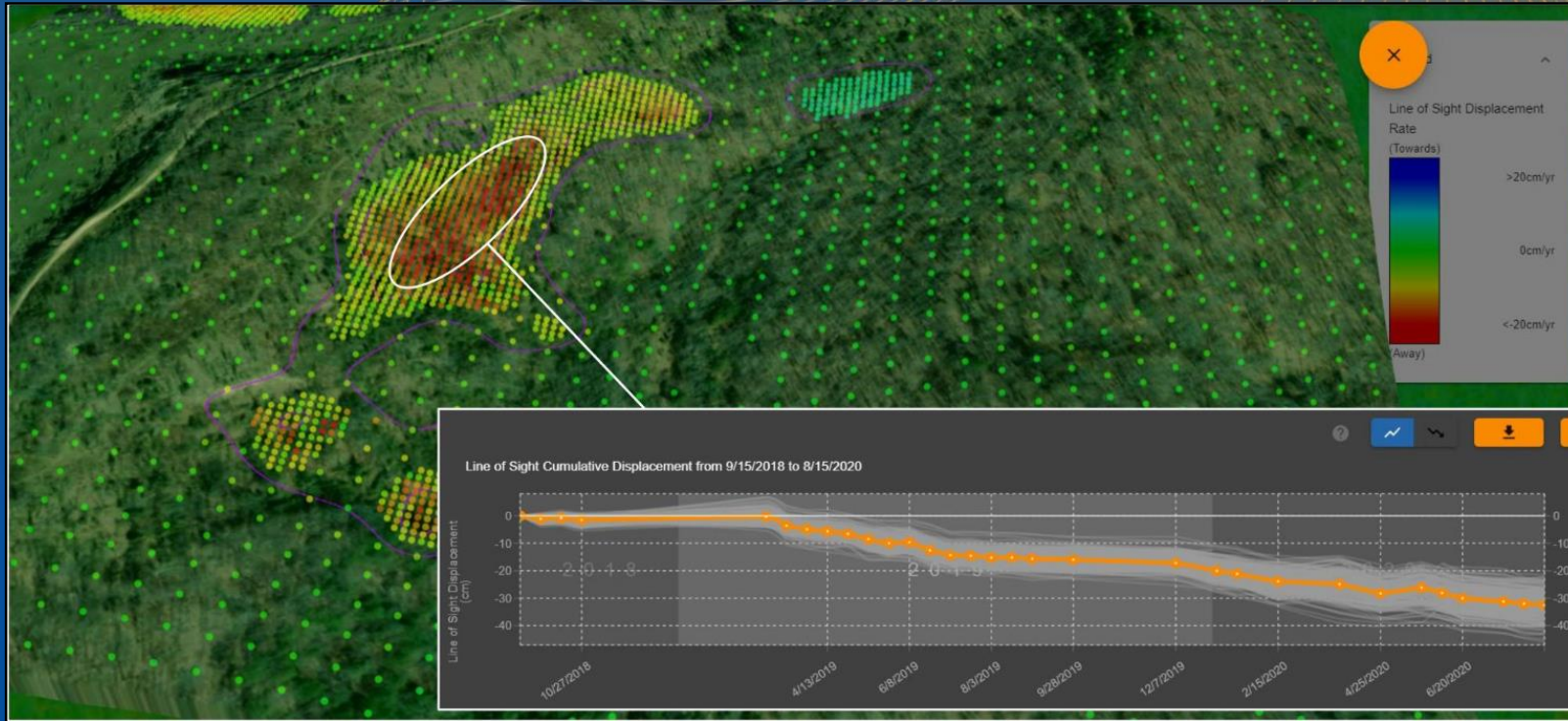
# Rapid Reports



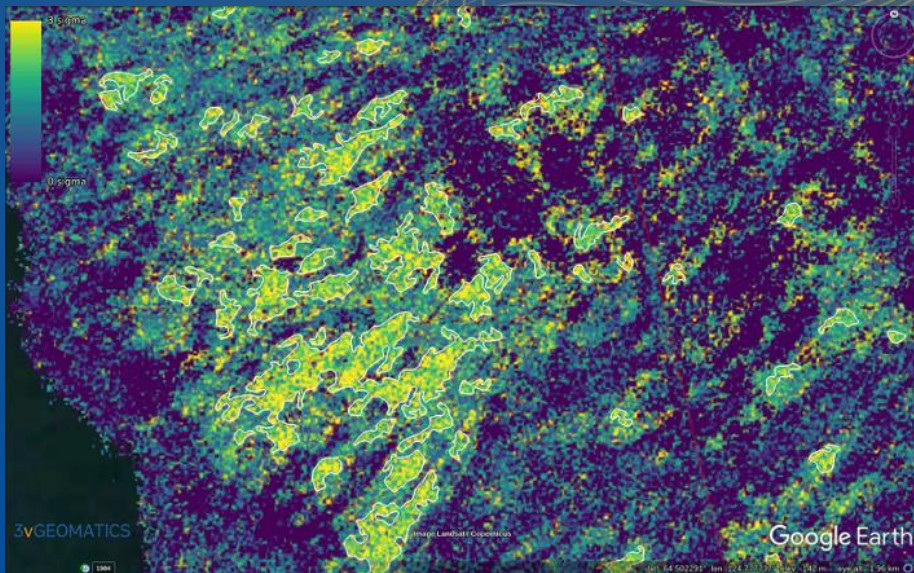
— Contours at 3.0 Sigma  
— Centerlines



# Comprehensive Reports

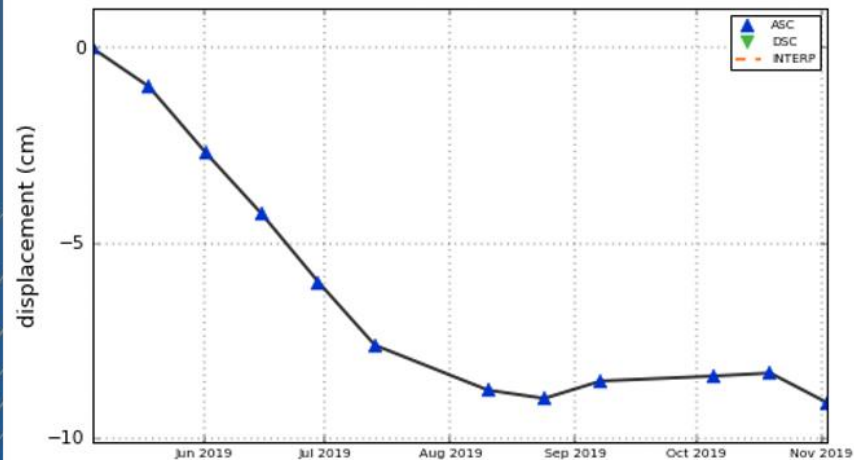


# Monitoring Arctic terrain

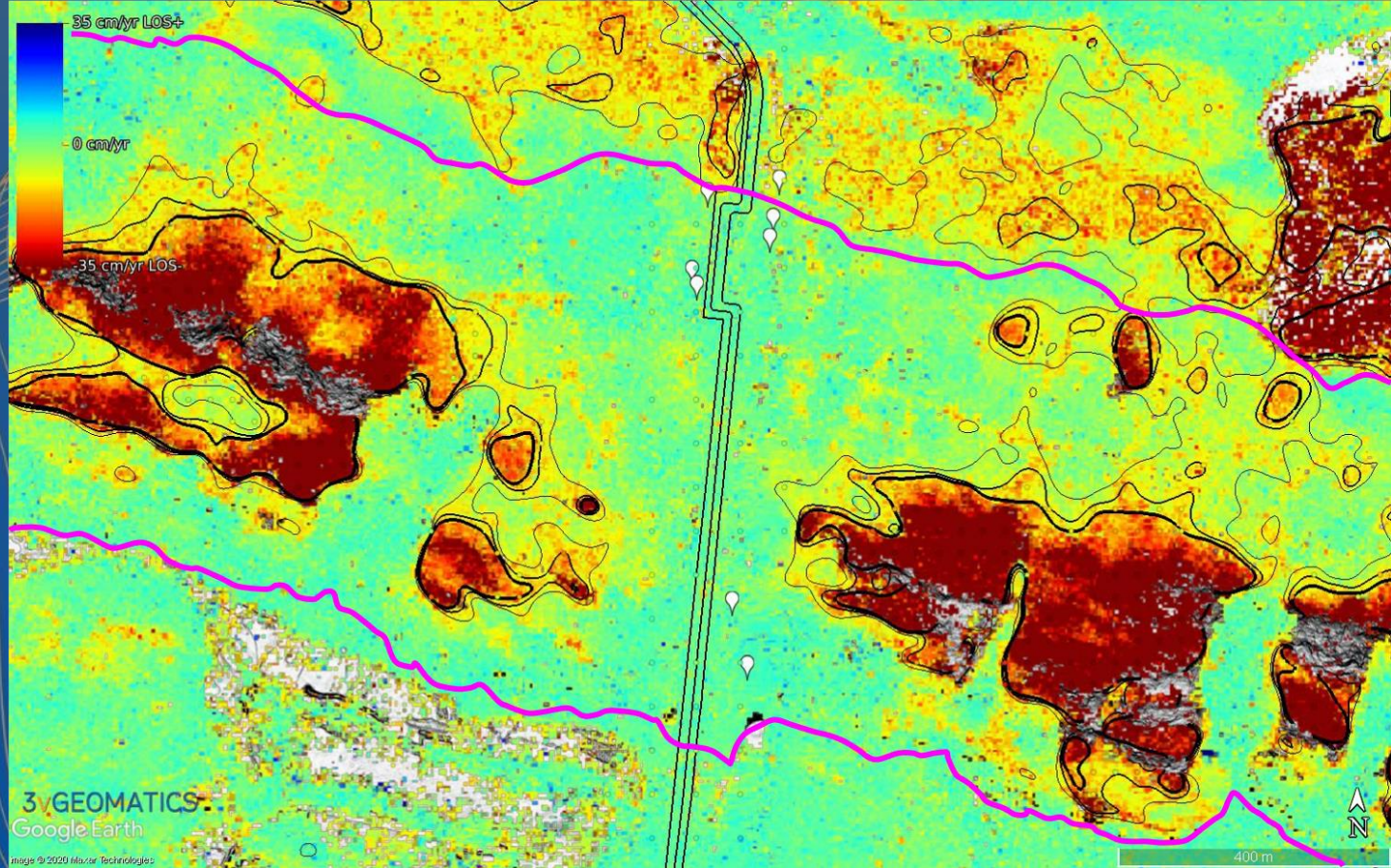


## Line-of-Sight Displacement

Rate: -18.22 cm/yr



# Deploying Instruments



# Applications I - Dam

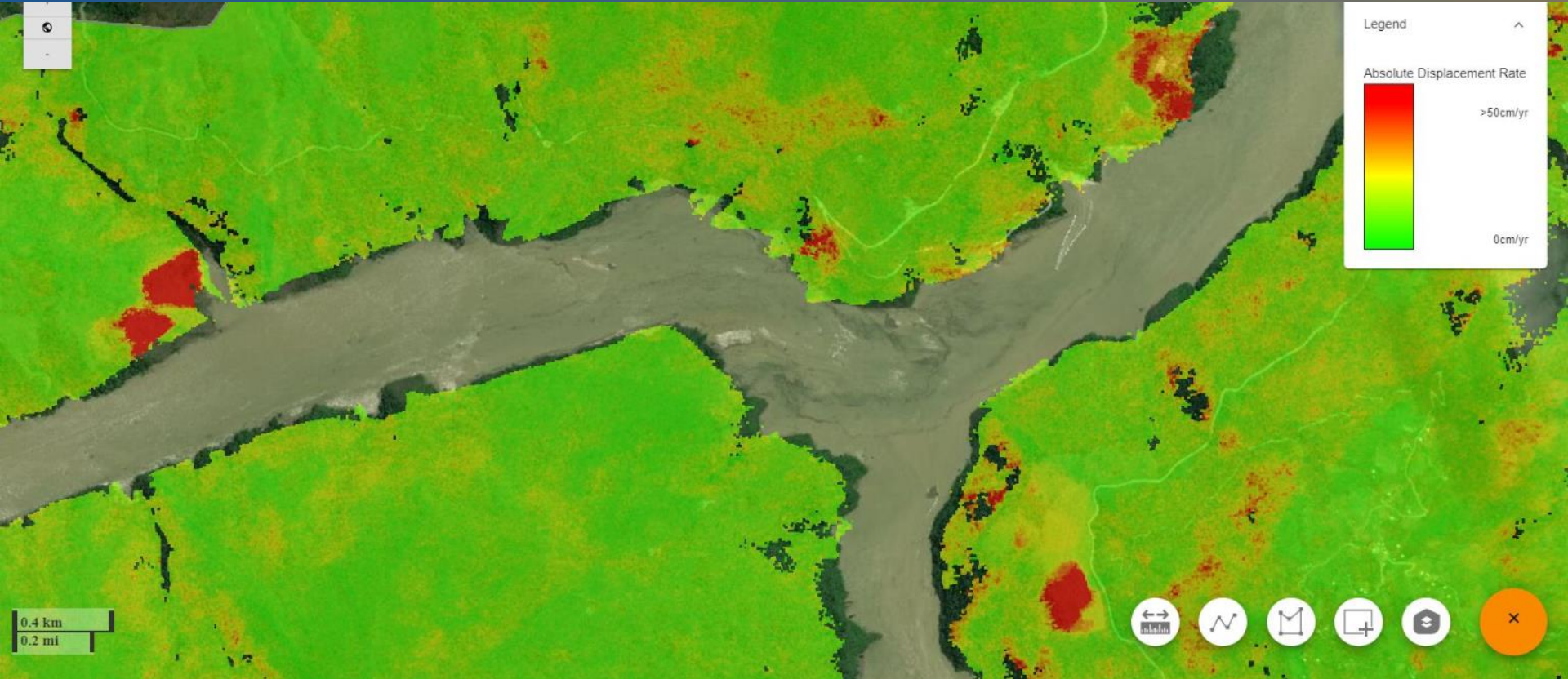






Road





Legend ^

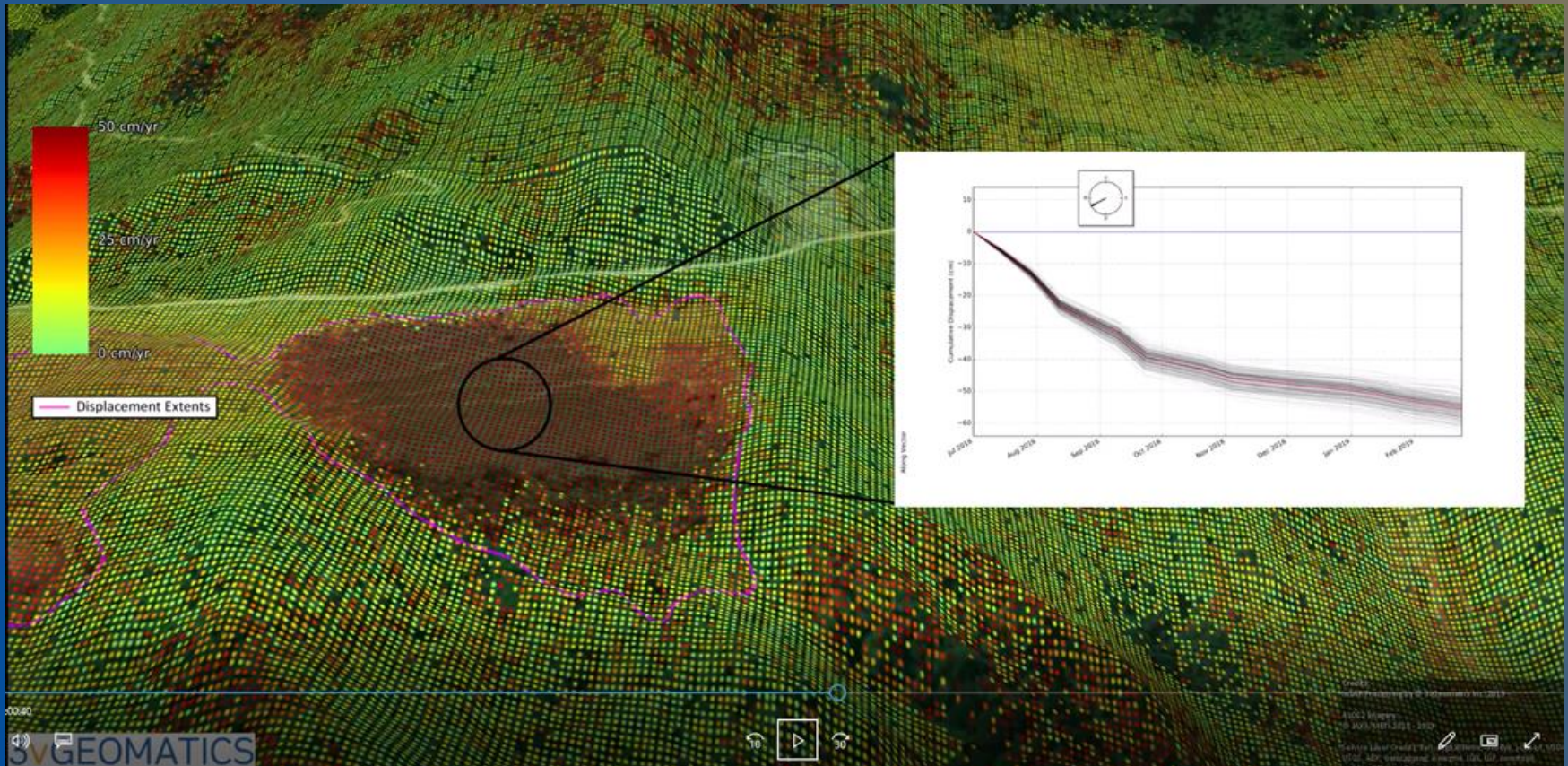
Absolute Displacement Rate

>50cm/yr

0cm/yr

0.4 km  
0.2 mi

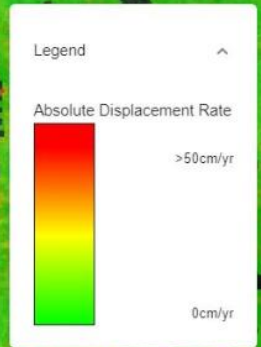
A set of navigation icons typically found in GIS software. From left to right: a pan icon (four arrows pointing outwards), a zoom icon (a magnifying glass), a home icon (a house), and a close icon (an orange circle with a white 'x').



000.00



Created:  
2019/02/01 10:00:00 AM  
3D Model:  
3D Model: 3D Model  
3D Model: 3D Model  
3D Model: 3D Model  
3D Model: 3D Model



1 km  
0.6 mi



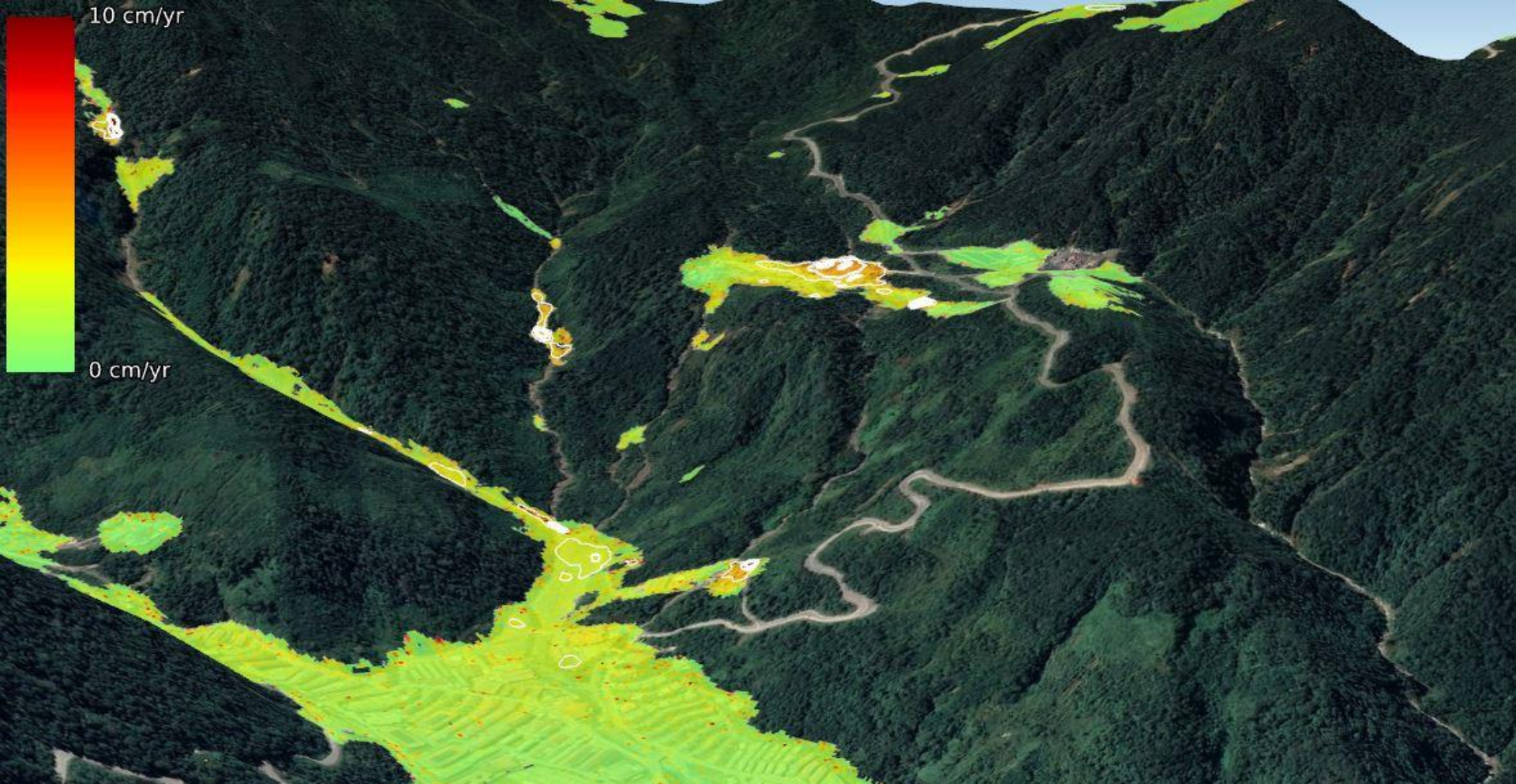
# Applications II - Mining

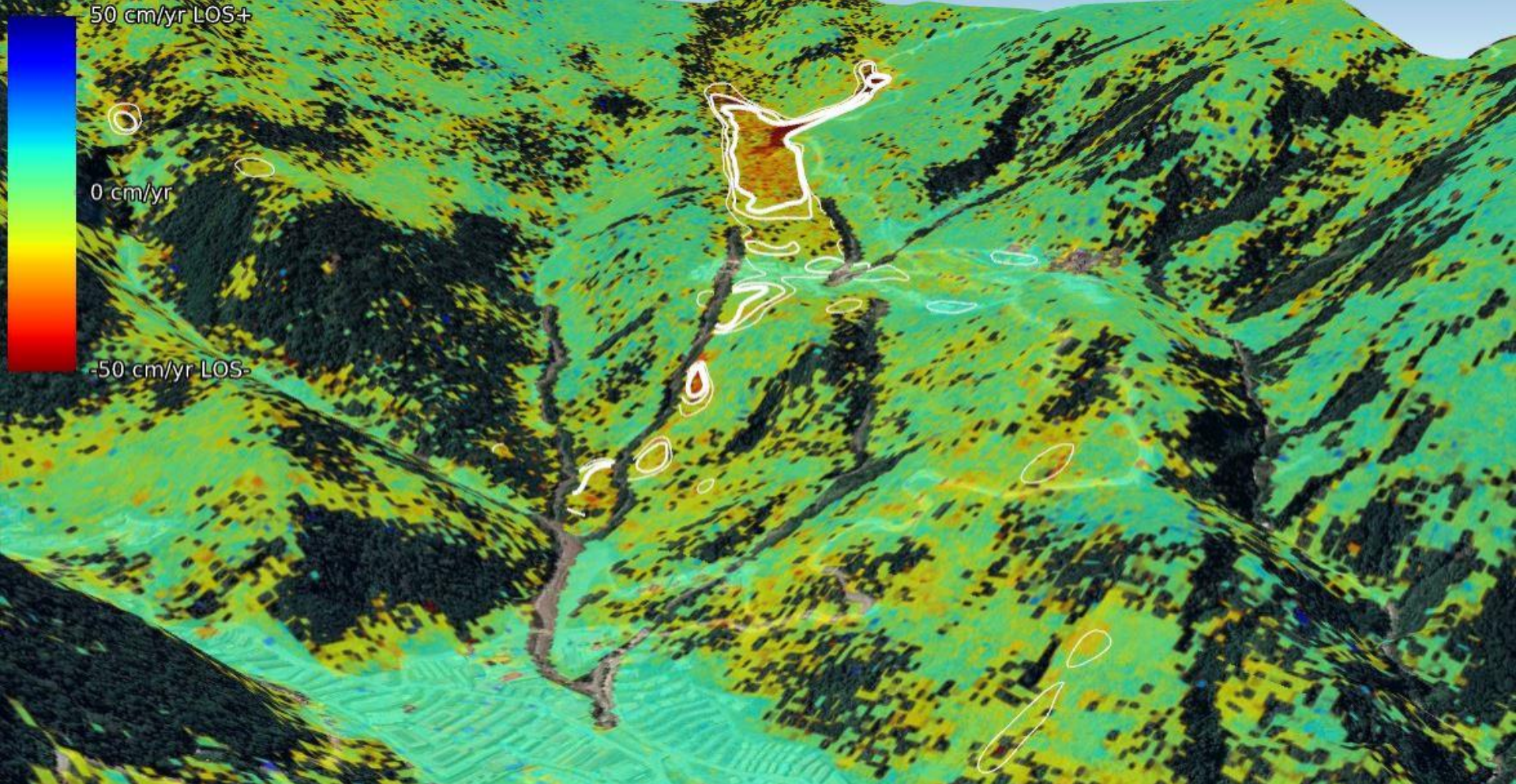




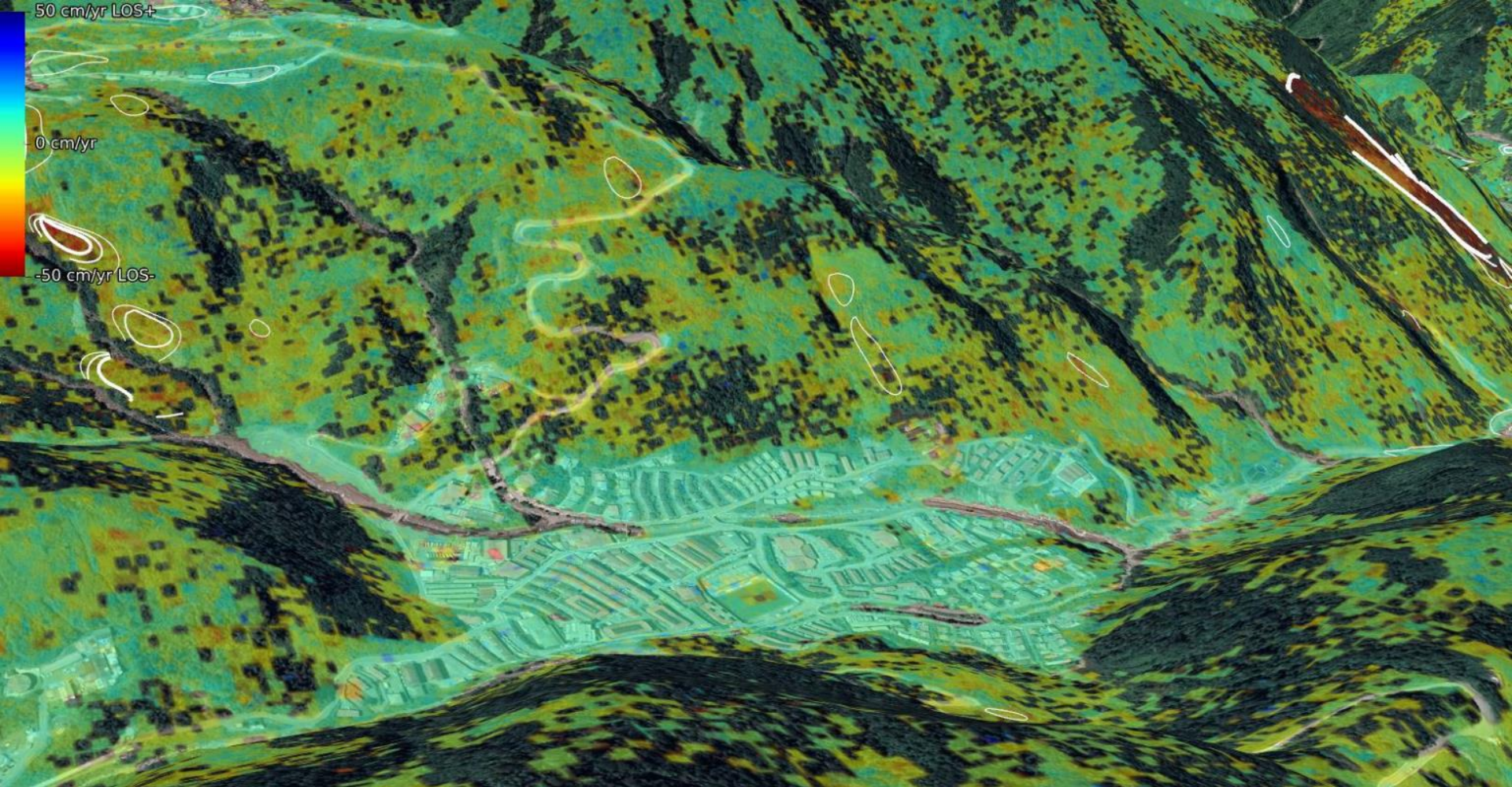






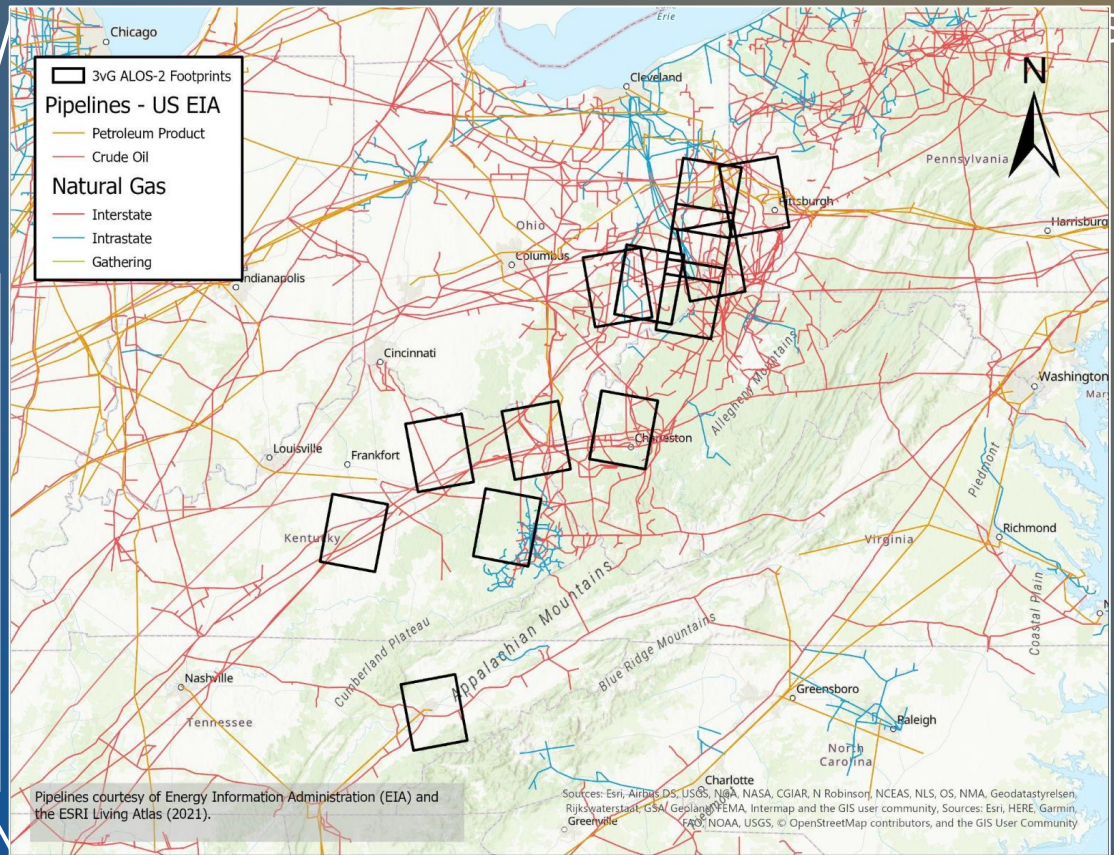
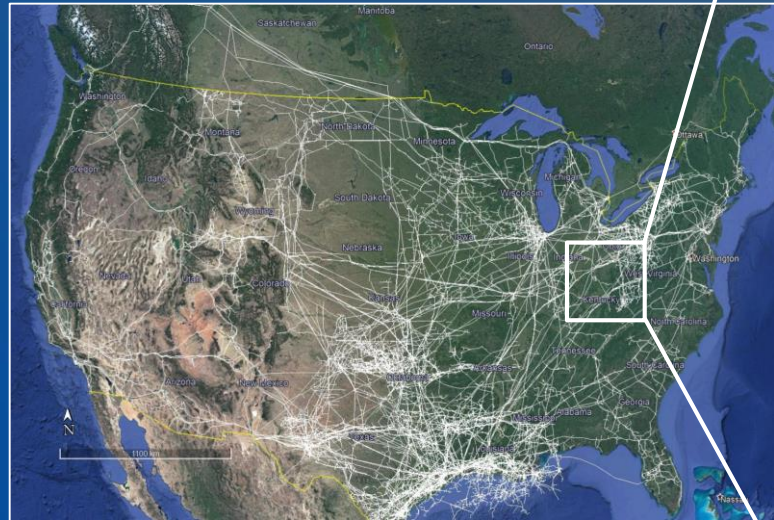






# Applications III - Pipelines

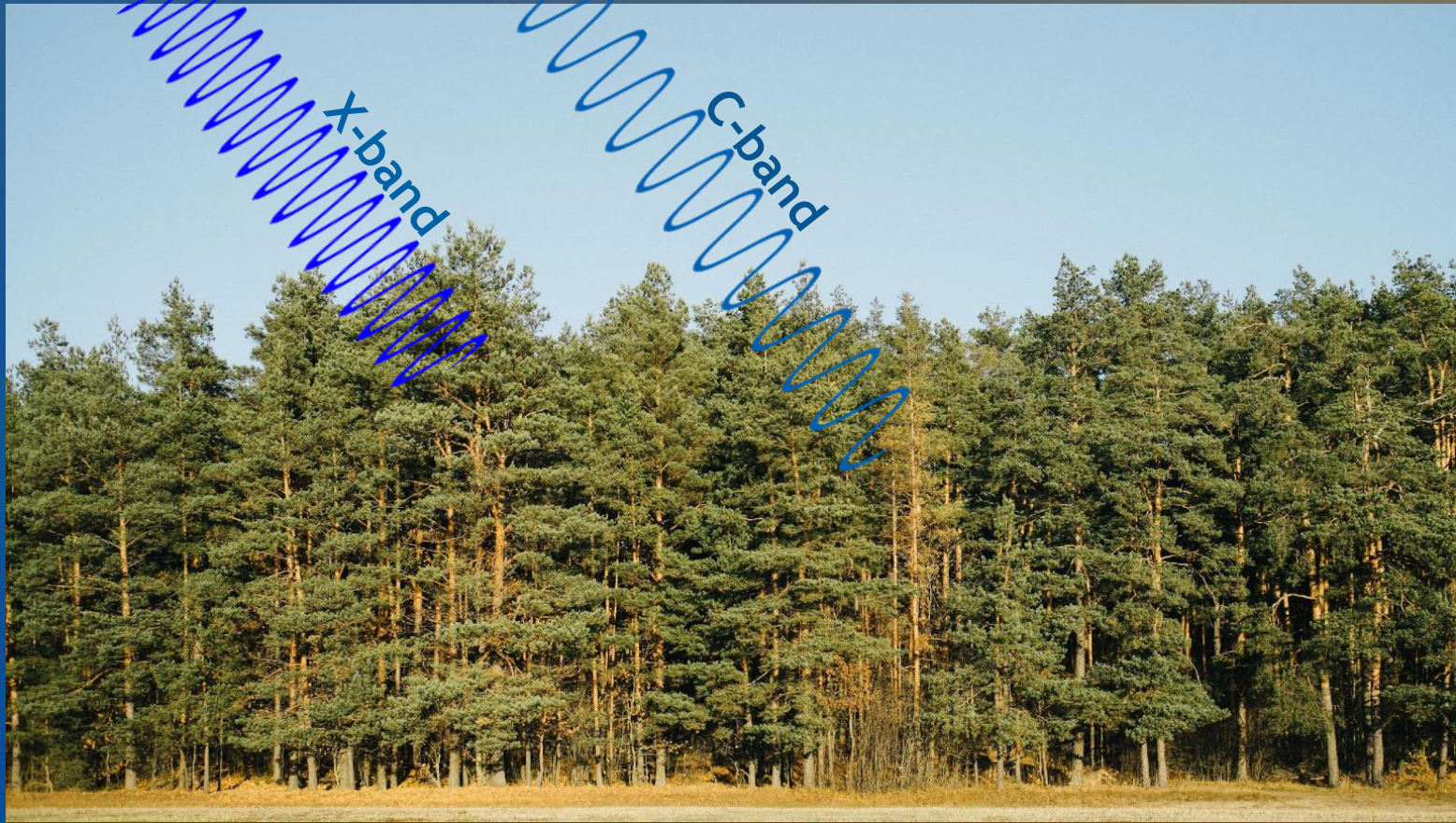






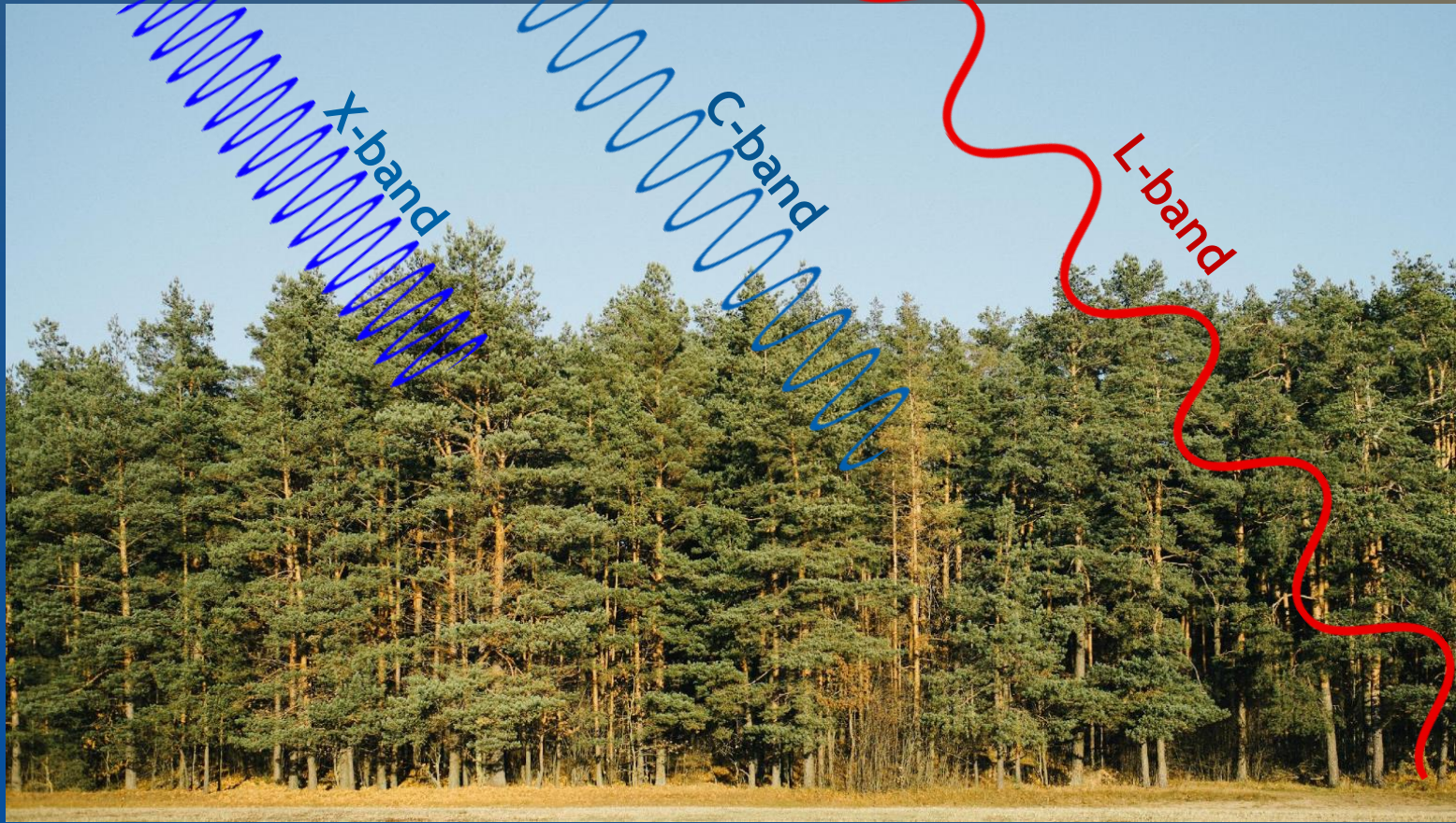


X-band



X-band

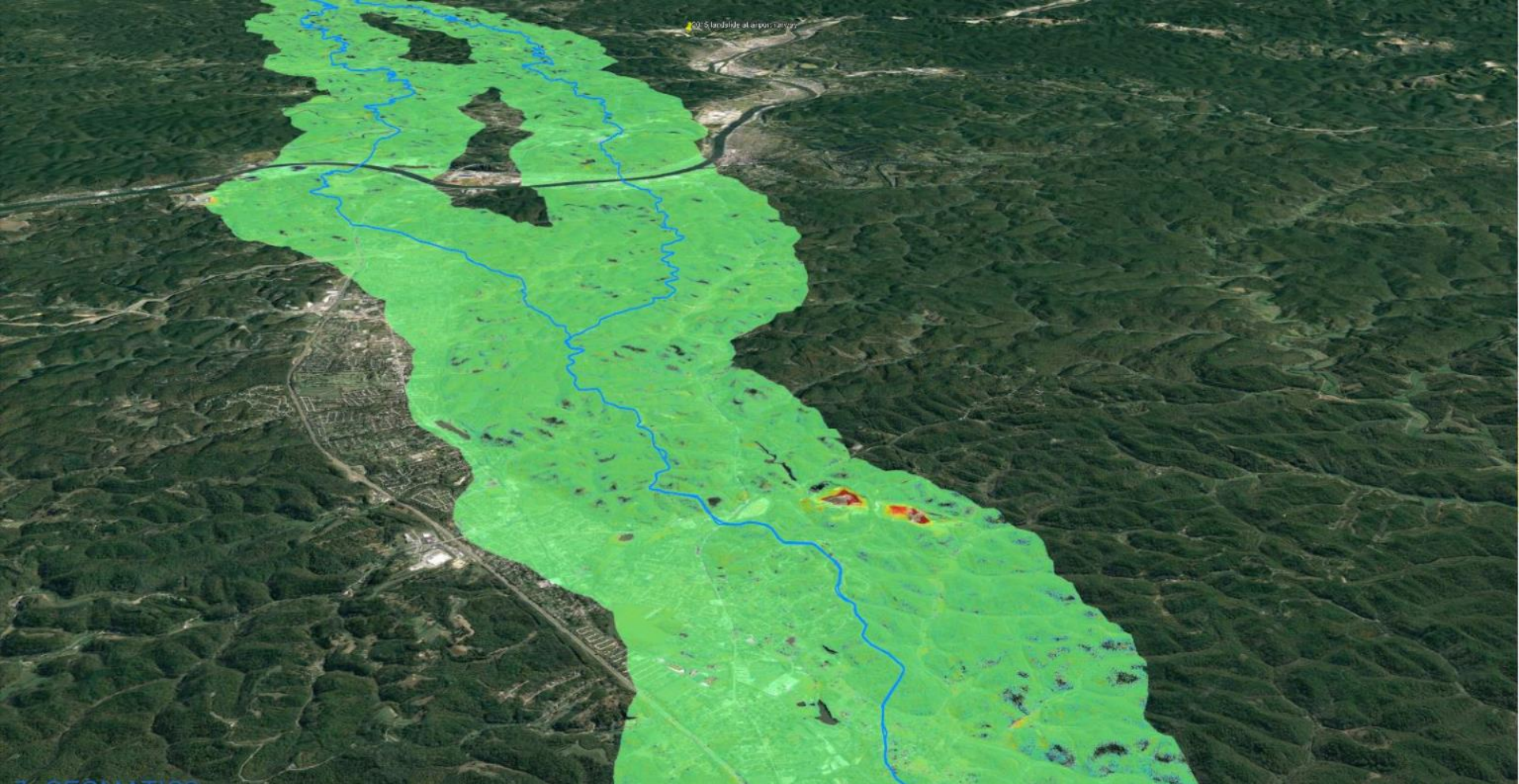
C-band



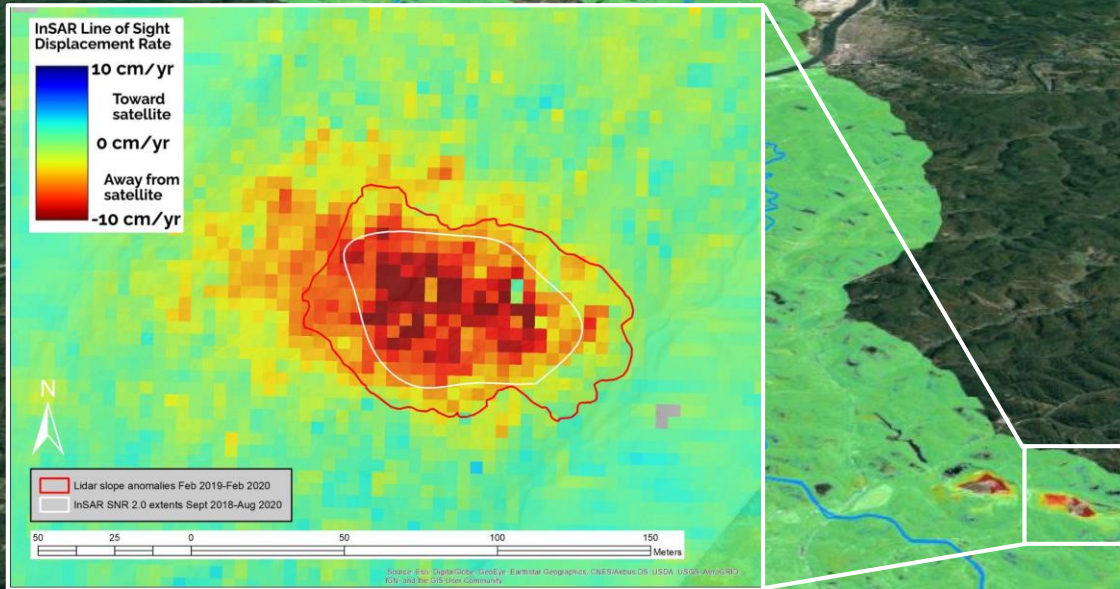
X-band

C-band

L-band



22.5 km de l'air port

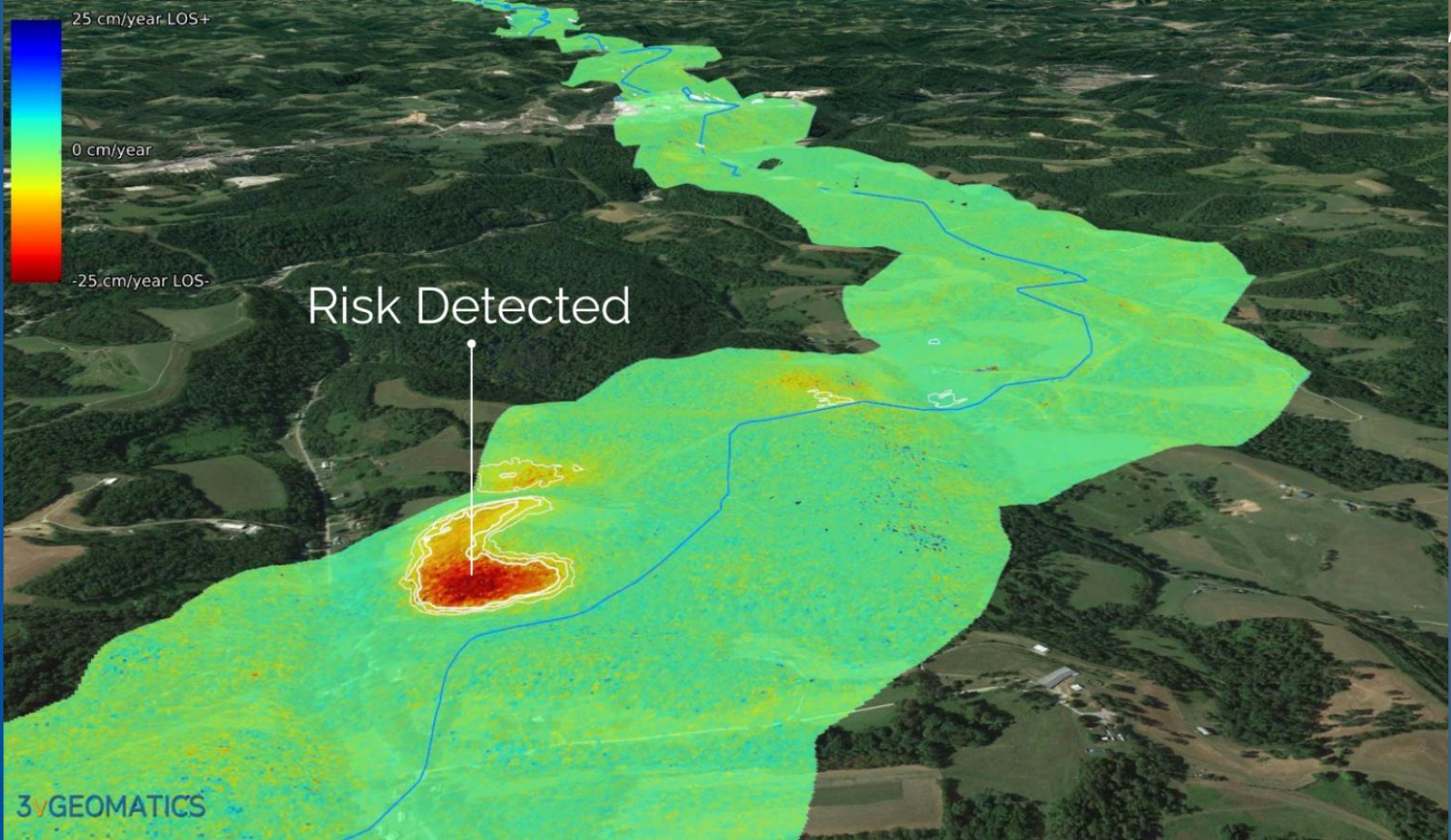


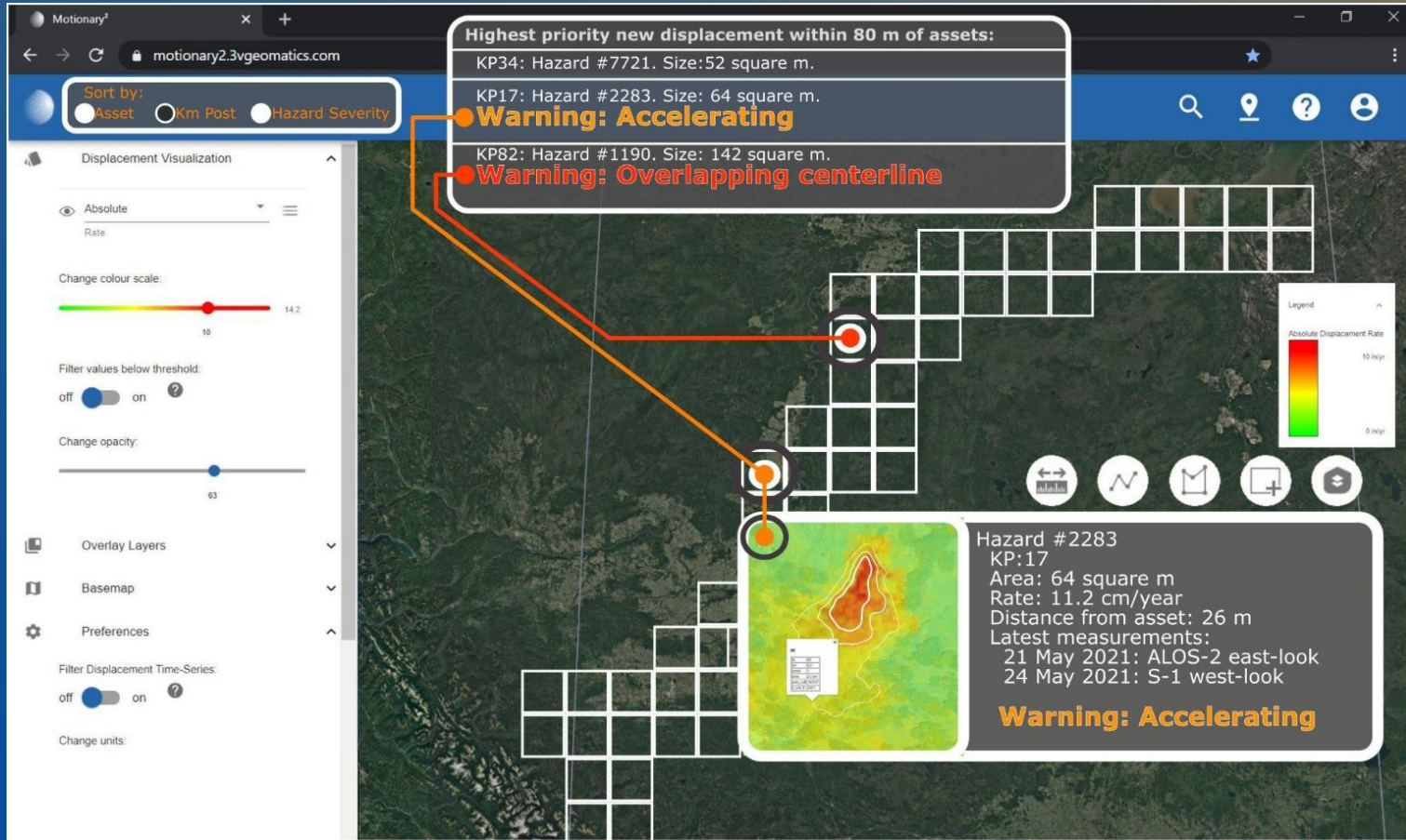


2012 pipeline explosion



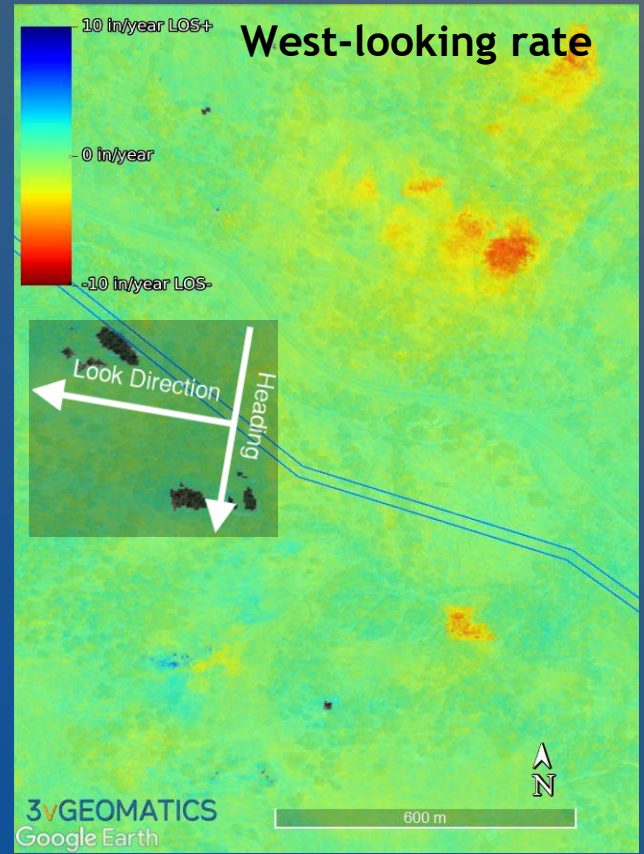
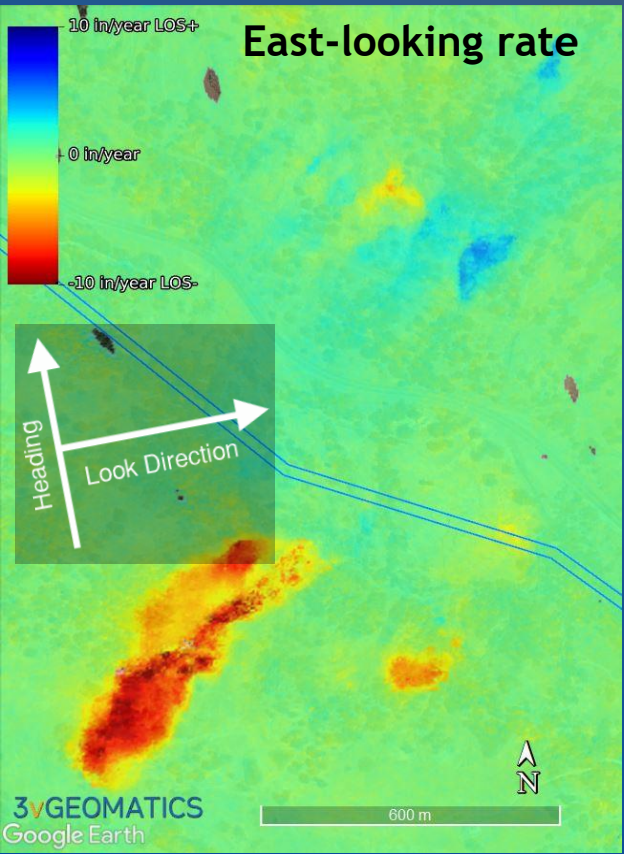
2015 landslide at airport runway

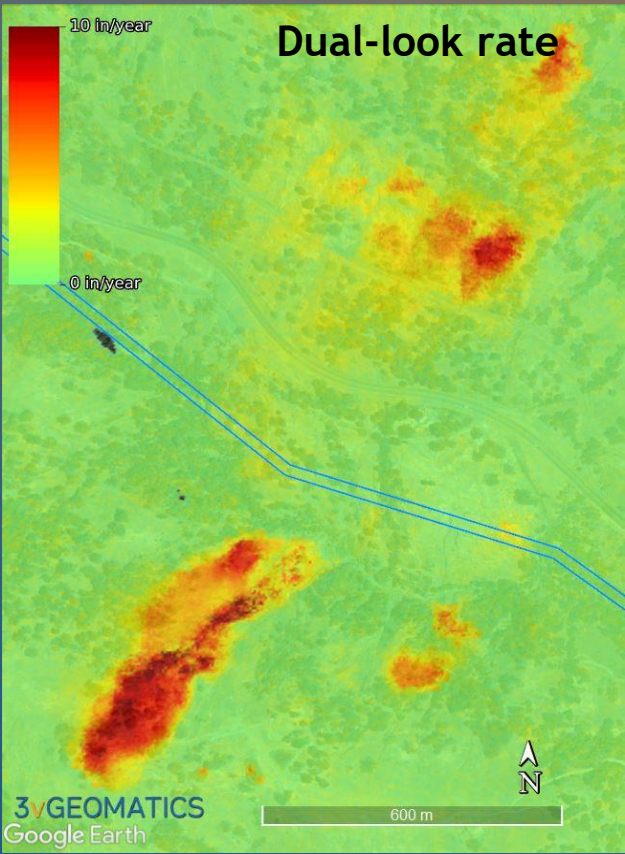
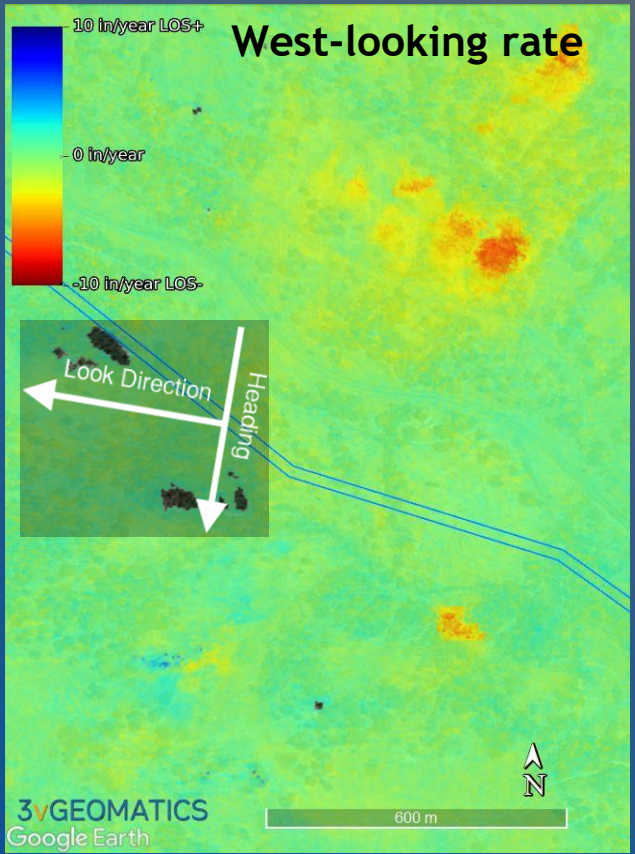
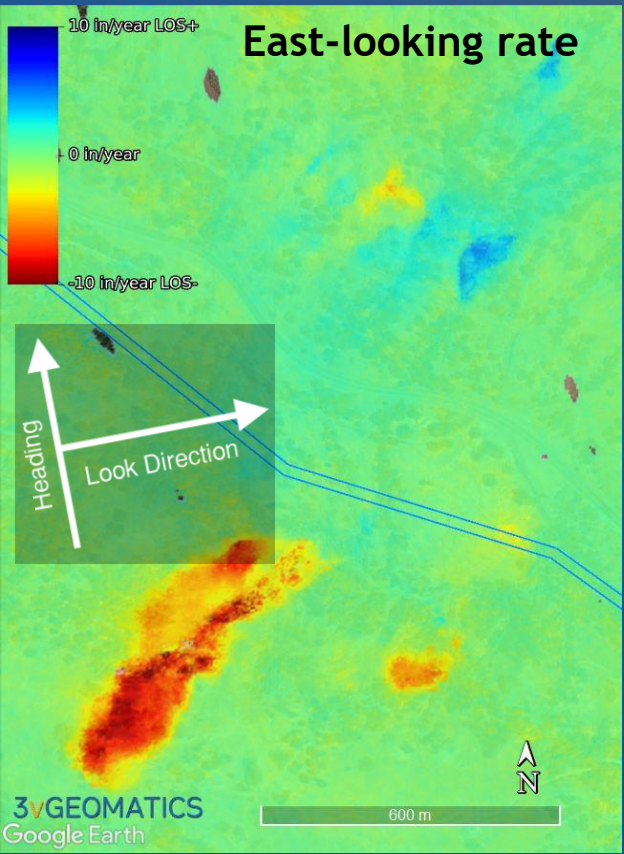




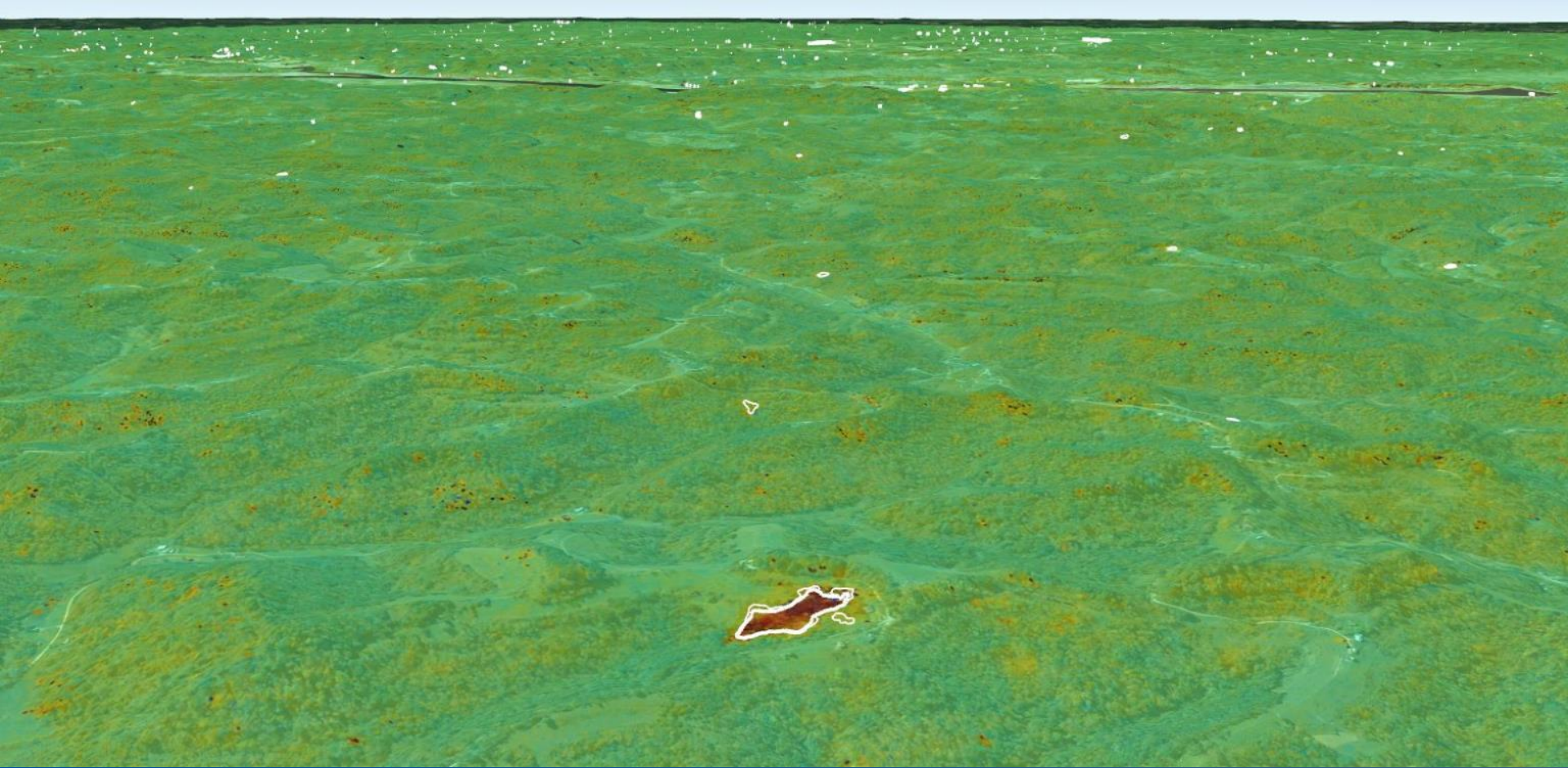


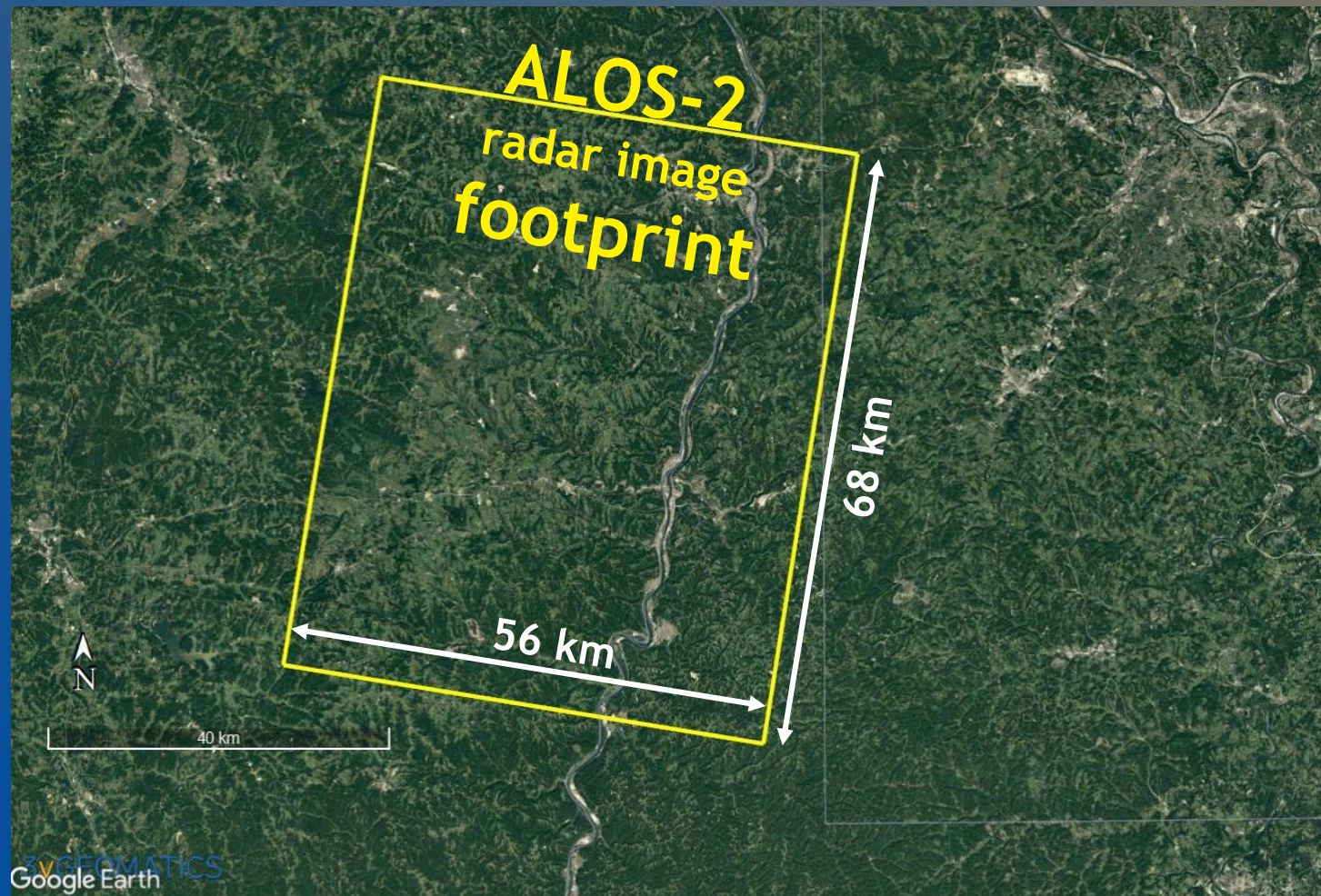
Dual-look rate

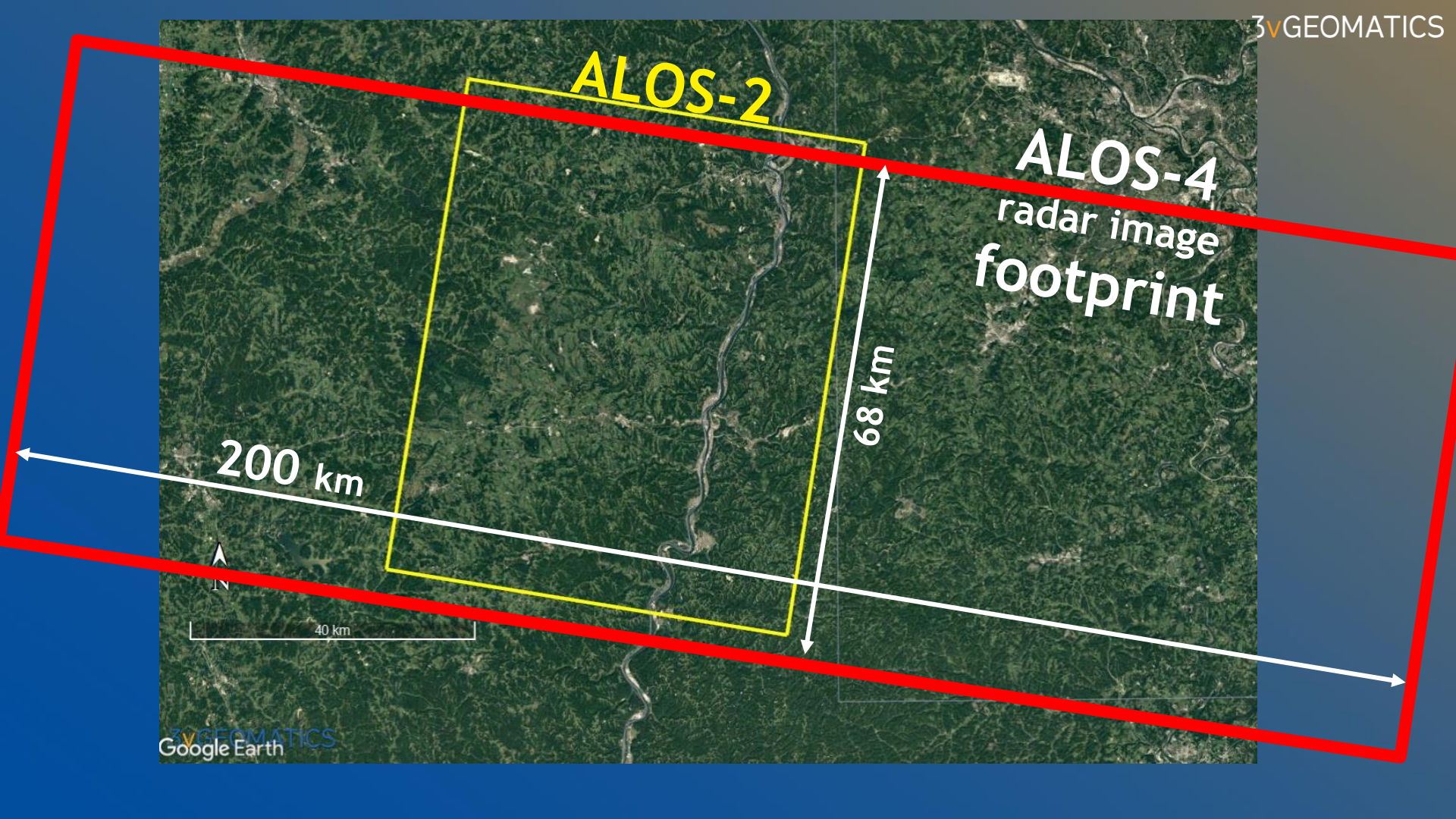




# Future Outlook







ALOS-2

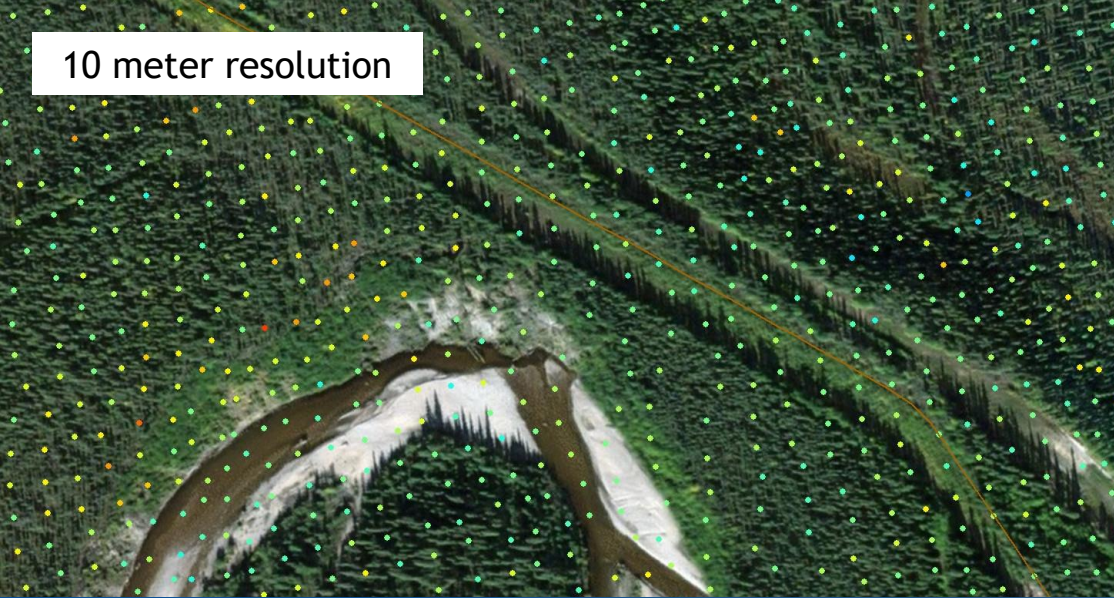
ALOS-4  
radar image  
footprint

200 km

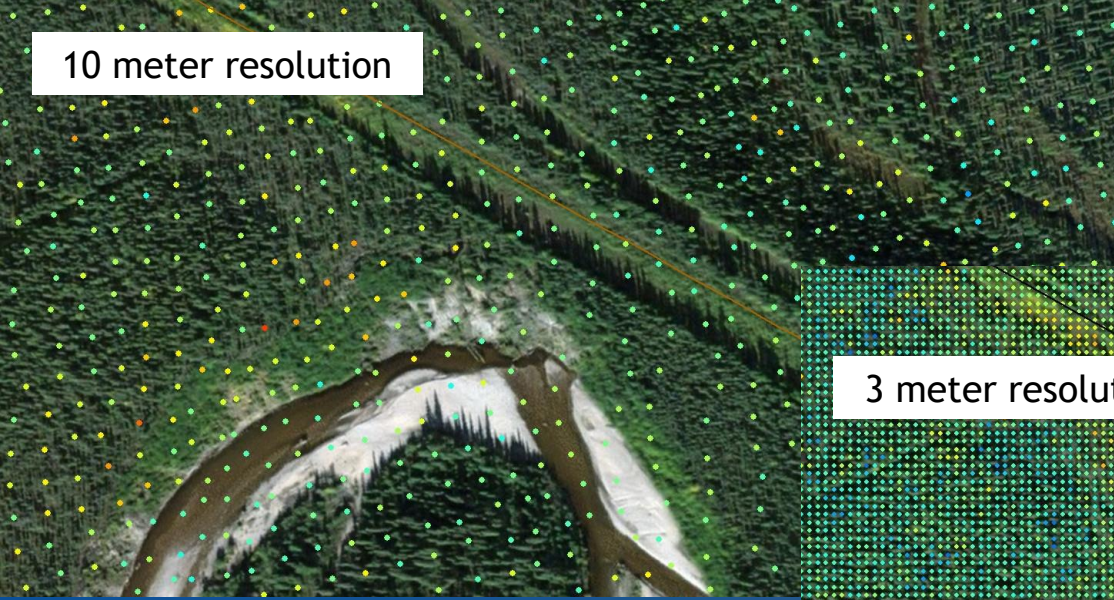
68 km

40 km

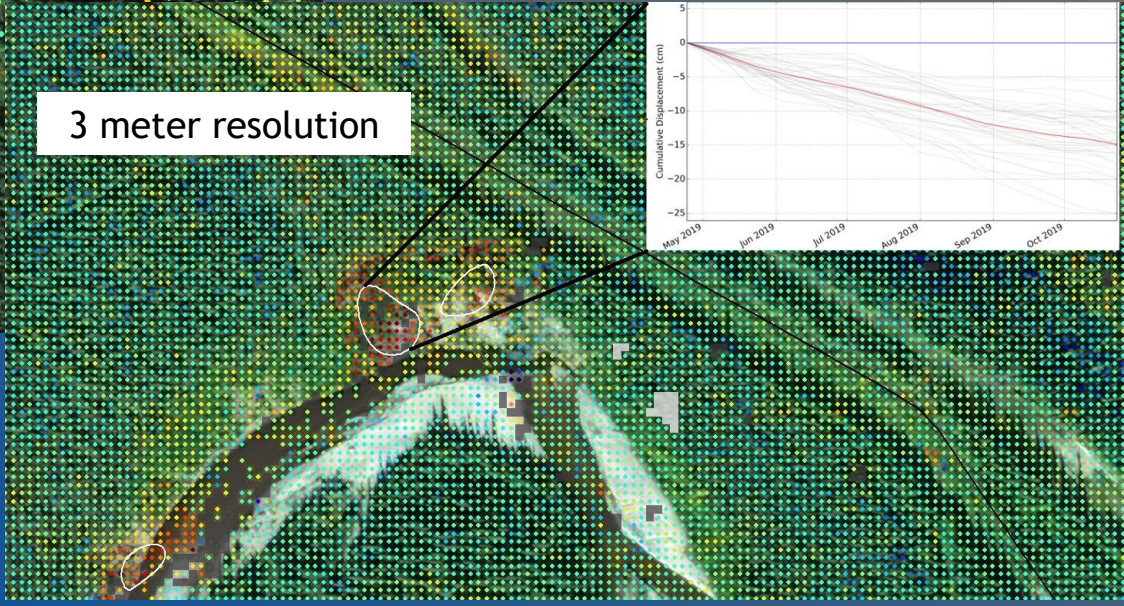
10 meter resolution



10 meter resolution

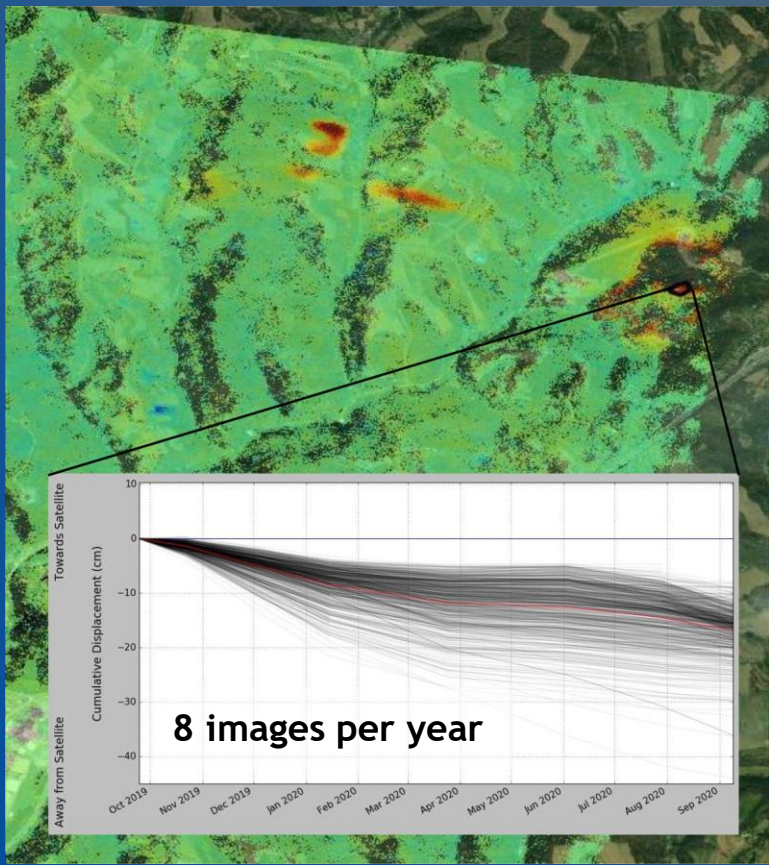


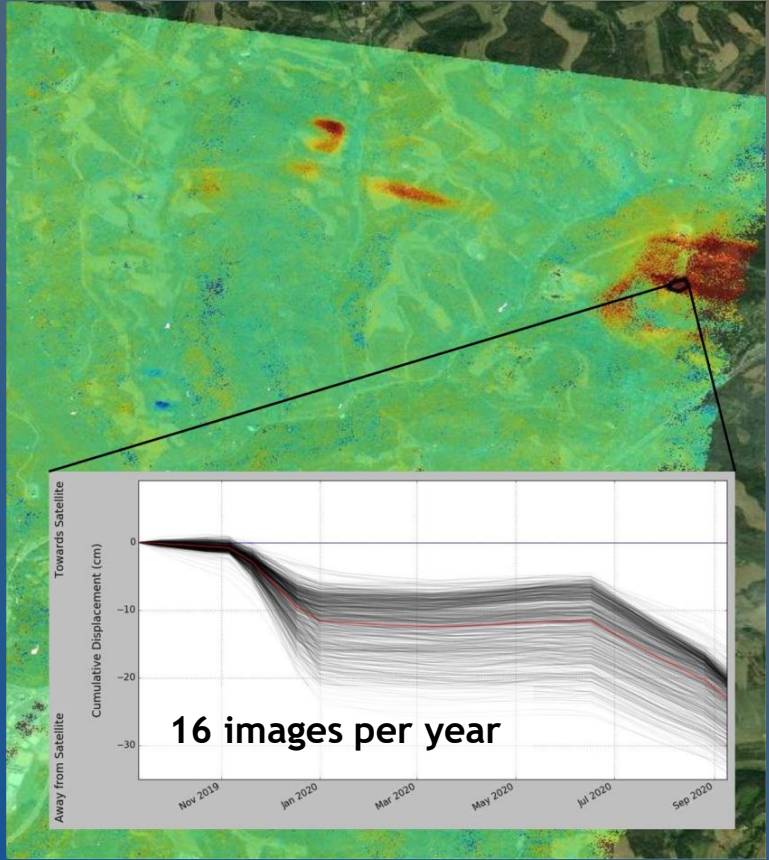
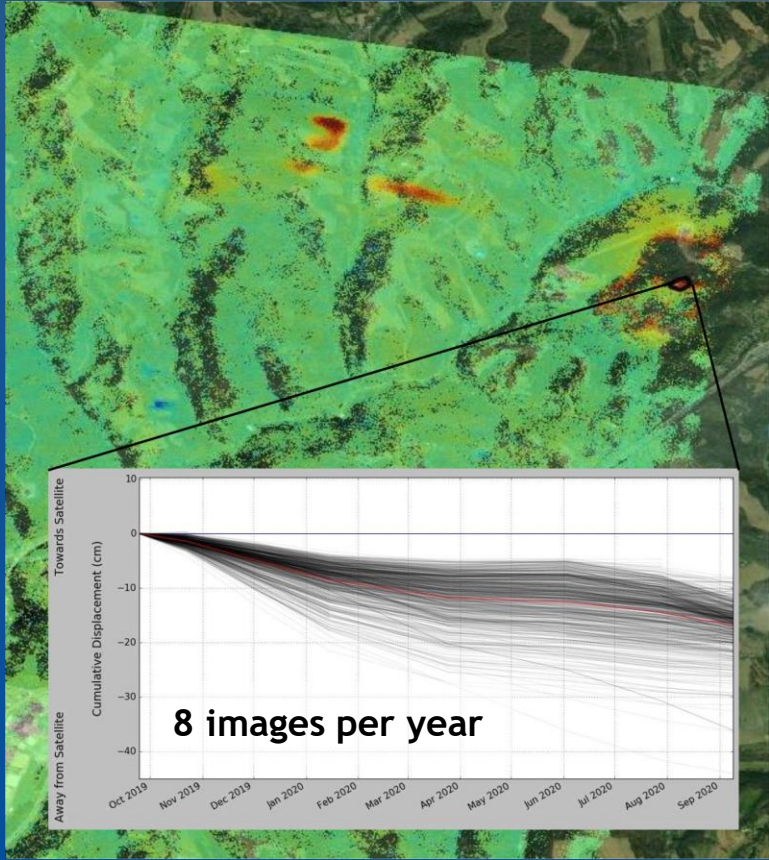
3 meter resolution





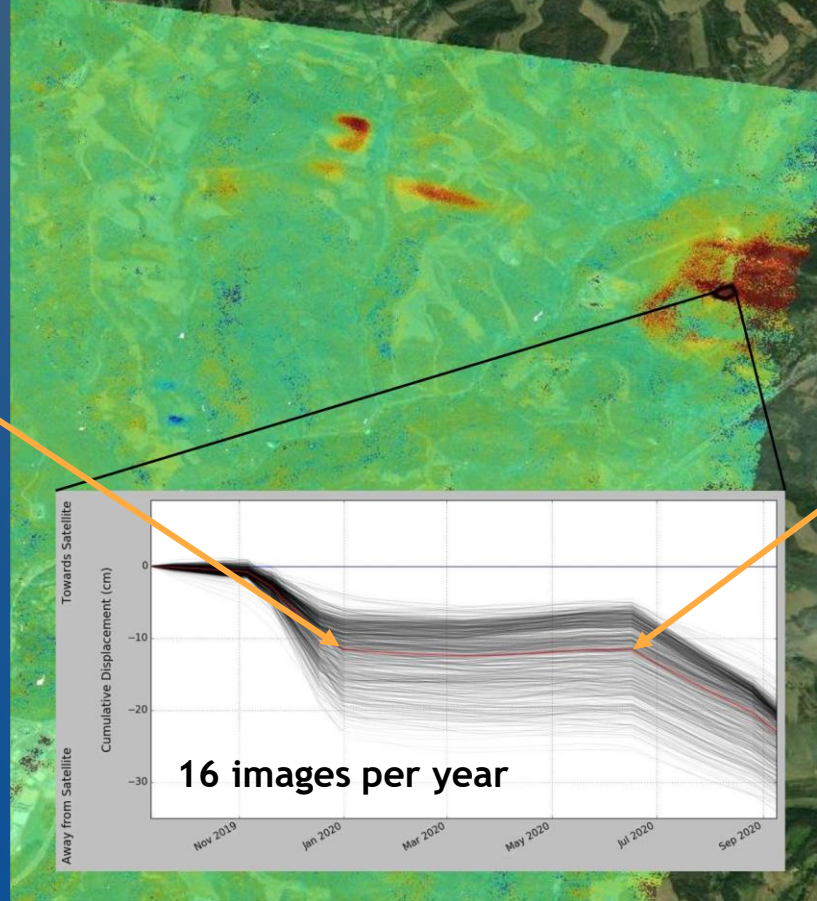






Acceleration 1

Acceleration 2



# ALOS-2 and ALOS-4 InSAR requirements

# ALOS-2 and ALOS-4 InSAR requirements

- Hundreds of footprints globally
- Continue existing footprints and task new ones

# ALOS-2 and ALOS-4 InSAR requirements

- Hundreds of footprints globally
- Continue existing footprints and task new ones
- 3 meter resolution
- 20 images per footprint per year

# ALOS-2 and ALOS-4 InSAR requirements

- Hundreds of footprints globally
- Continue existing footprints and task new ones
- 3 meter resolution
- 20 images per footprint per year
- Online tasking
- Cloud data download



## ALOS-2 and ALOS-4 InSAR requirements

- Hundreds of footprints globally
- Continue existing footprints and task new ones
- 3 meter resolution
- 20 images per footprint per year
- Online tasking
- Cloud data download

= massive impact on operations, safety, and environmental protection

THE END