



BELGIAN DEFENCE GEOSPATIAL CENTRE
COOL SIEBE

24 March 2026



DEFENCE

Overall Classification

RELEASABLE TO PUBLIC (PUB)



TREX Program

Tandem-X High Resolution Elevation Data Exchange Program

Overview

TanDEM-X High
Resolution Elevation Data
Exchange



International project supported by:

- the NGA : National Geospatial Intelligence Agency – USA
- the BGIC : Bundeswehr Geoinformation Center – DEU

Production started in 2017 (BEL in 2018)

To end in december 2028

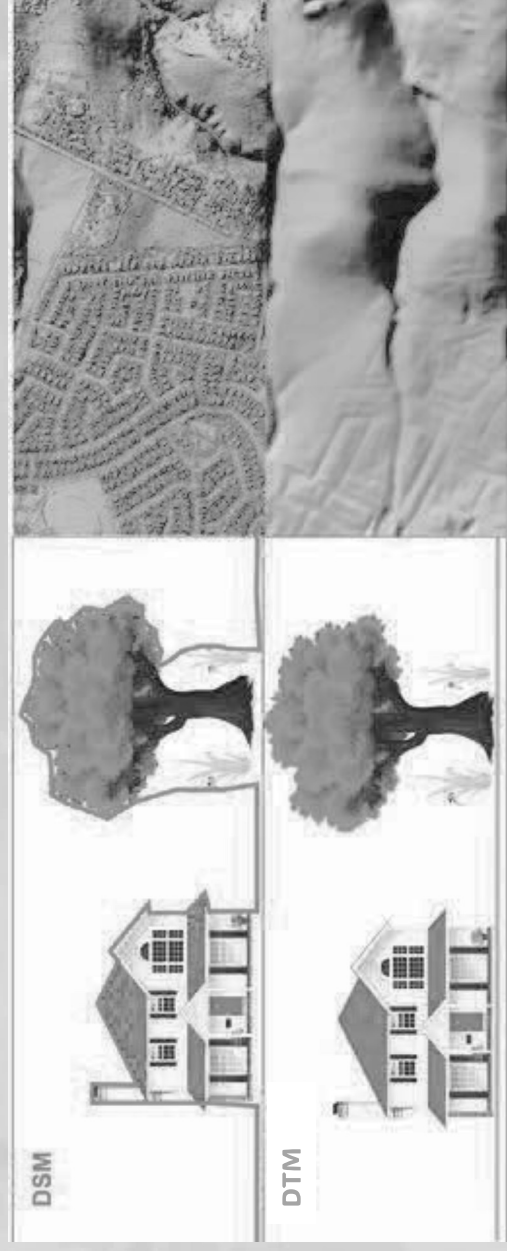


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Objective

Producing a **global** and **homogeneous** Digital Elevation Model (DEM), more specifically a DSM (Digital Surface Model)



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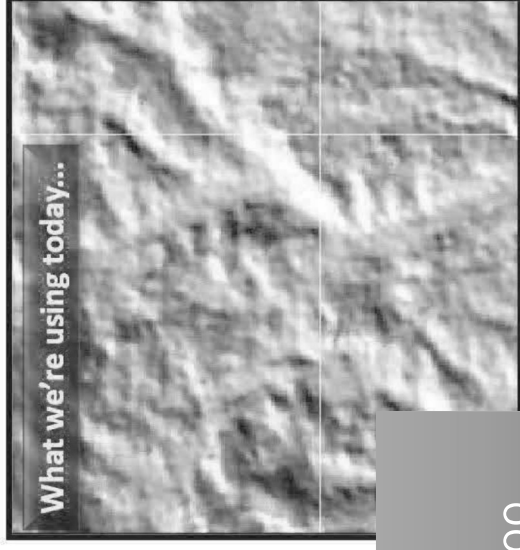
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Objective



Producing a global and homogeneous Digital Surface Model (DSM)
with a resolution of 12m.

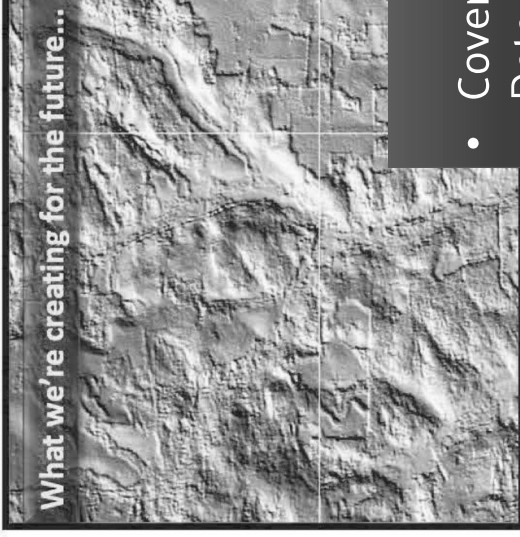
SRTM lv2 collected in 2000 (30m resolution)



SRTM

- Coverage : 60N, 56S
- Data collected in 2000
- Resolution : 30 m

TanDEM-X collected in 2011-14 (12m resolution)



TREx

- Coverage : global
- Data collected in 2011-2014
- Resolution : 12 m

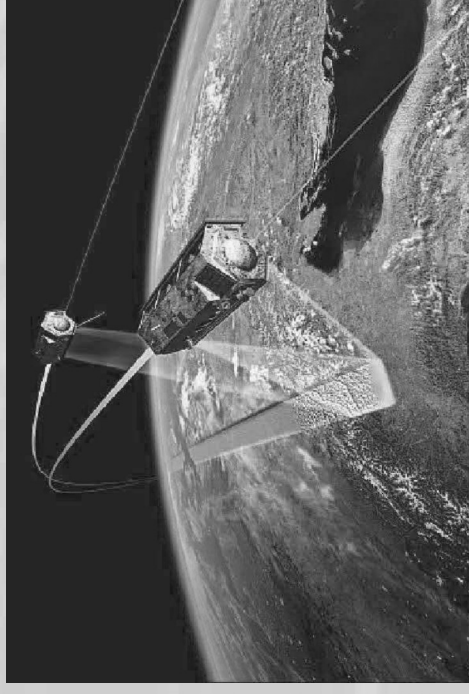
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Data acquisition

Between 2011 and 2014

By two radar satellites (= active):

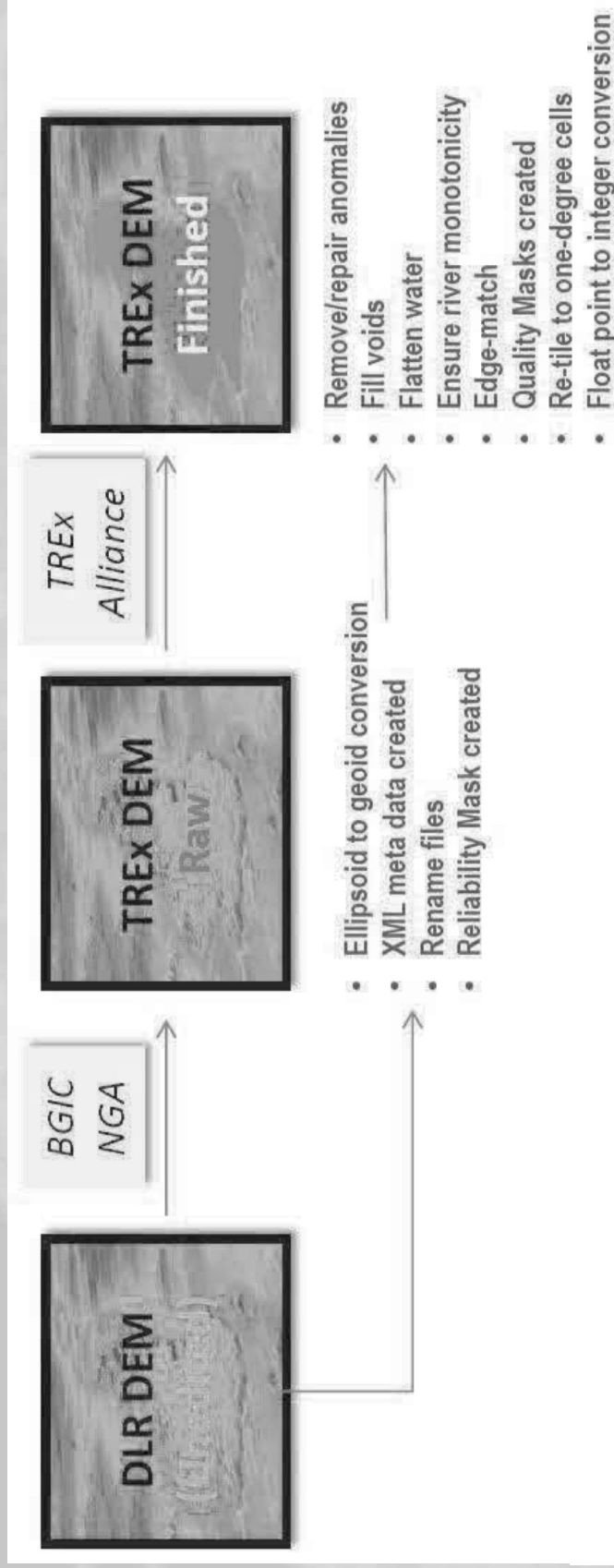
- TerraSAR-X launched in 2007
- TanDEM-X launched in 2010



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Rework of raw data



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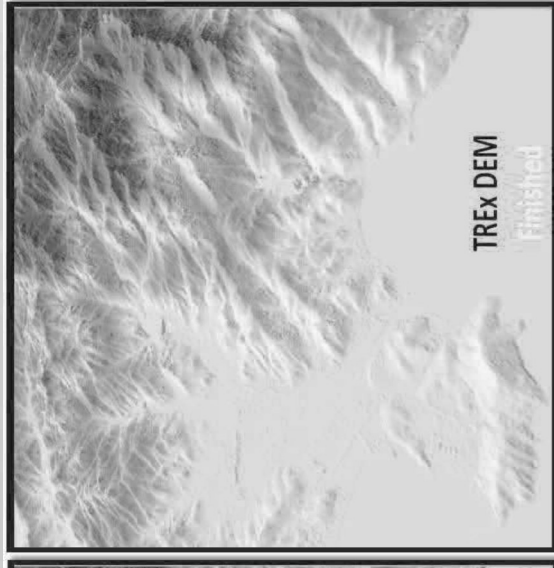
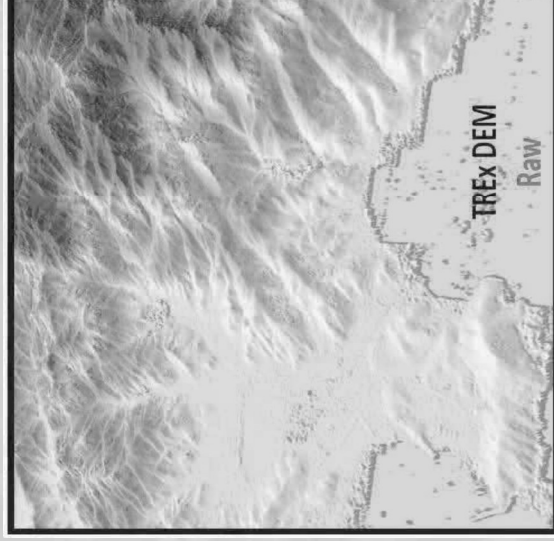
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Rework of raw data

Raw data contains SAR-specific artifacts such as :

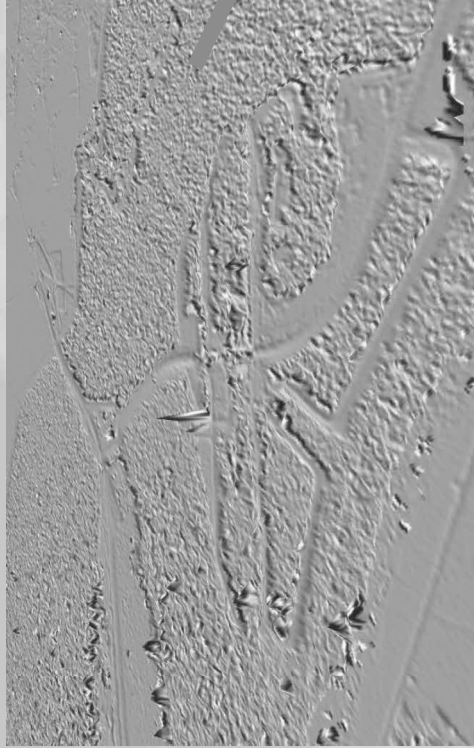
- phase unwrapping (offsets), layover, radar shadow... especially in areas with difficult terrain such as mountains and dense forest
- hydrology noise (oceans, rivers, lakes)

Those artifacts have to be corrected manually.



Rework of raw data

From this...



... To this

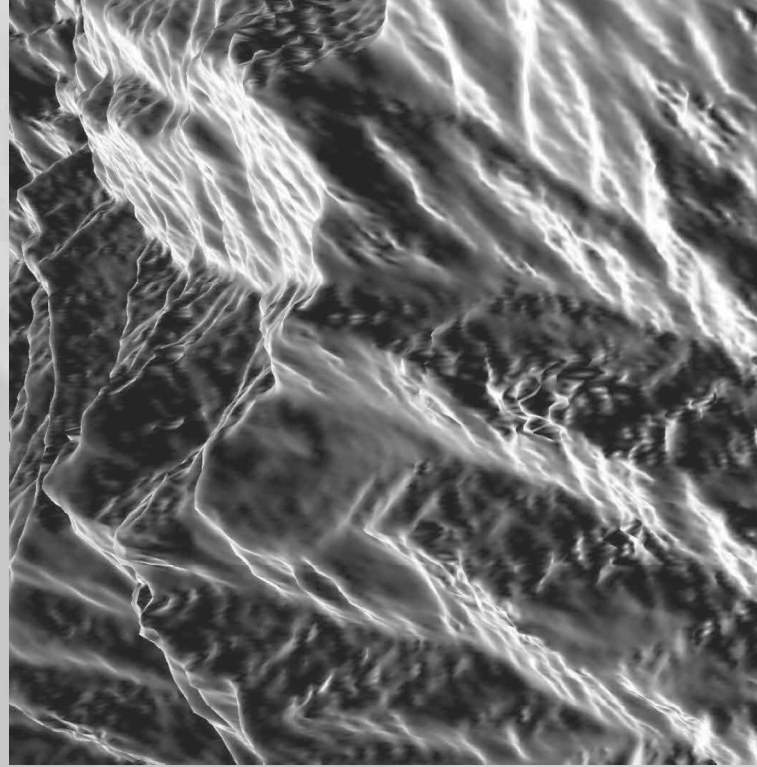


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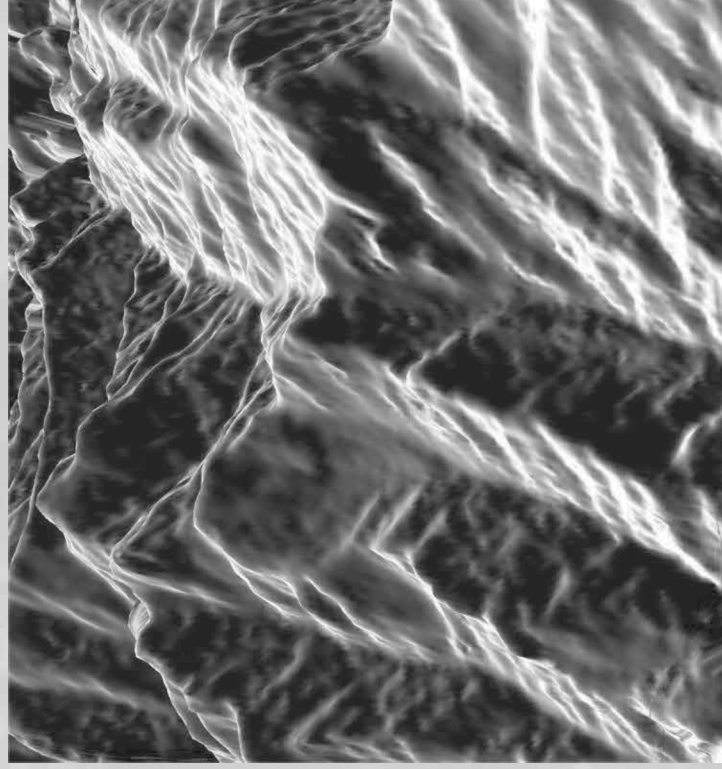
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Rework of raw data

From this...



...To this



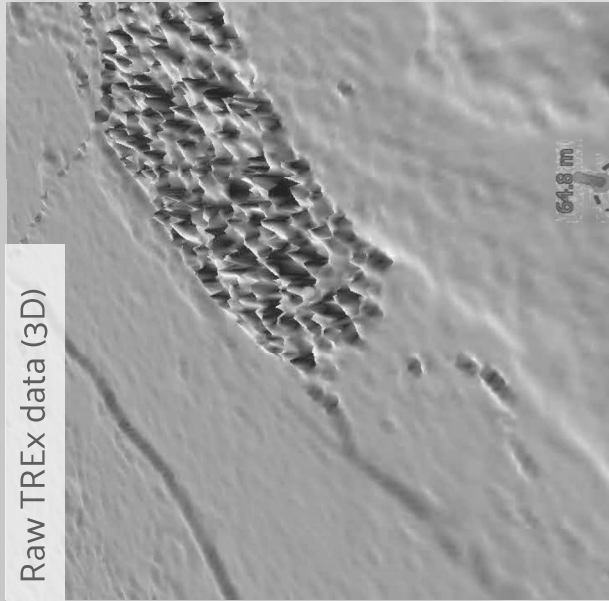
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Work in TReX



Raw TReX data (3D)



AMP (2D)



Imagery



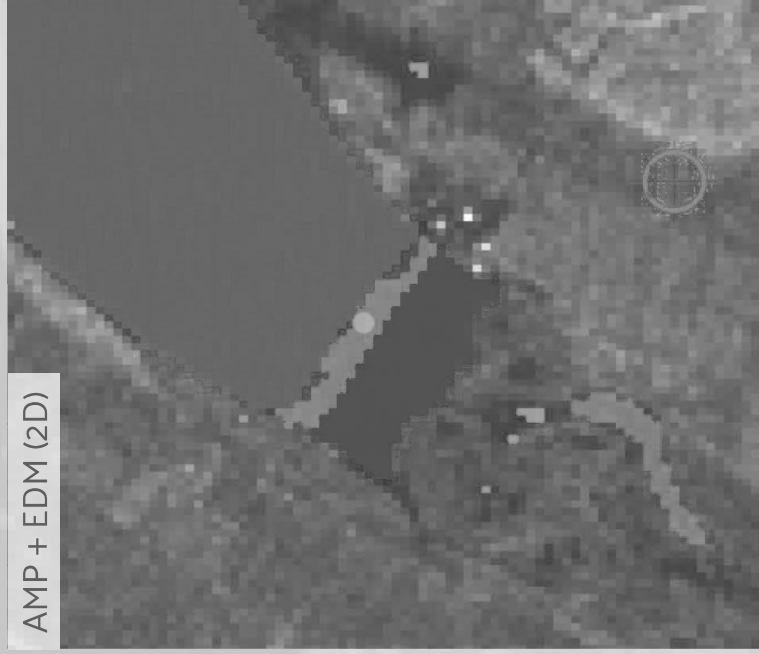
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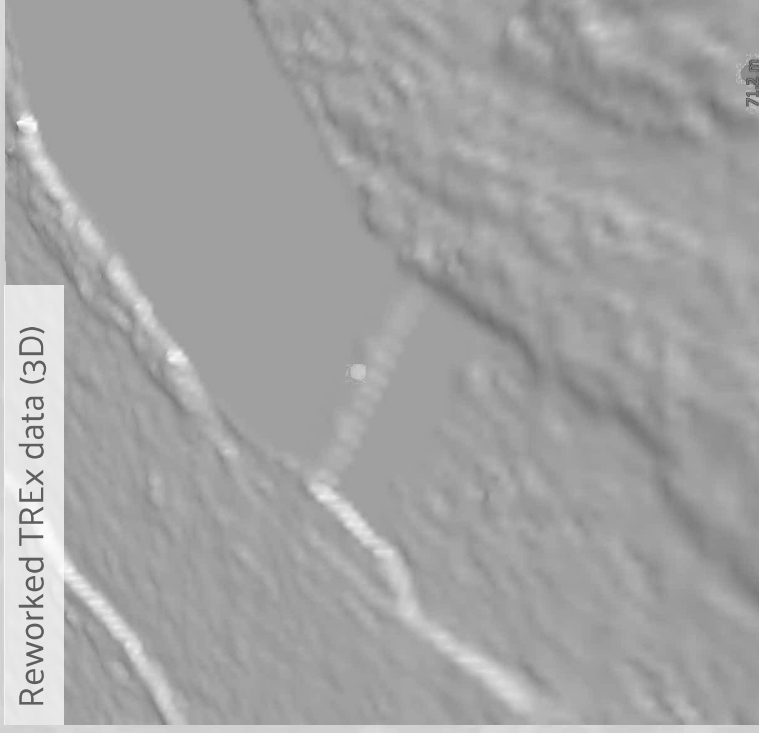
Work in TREx



AMP + EDM (2D)



Reworked TREx data (3D)



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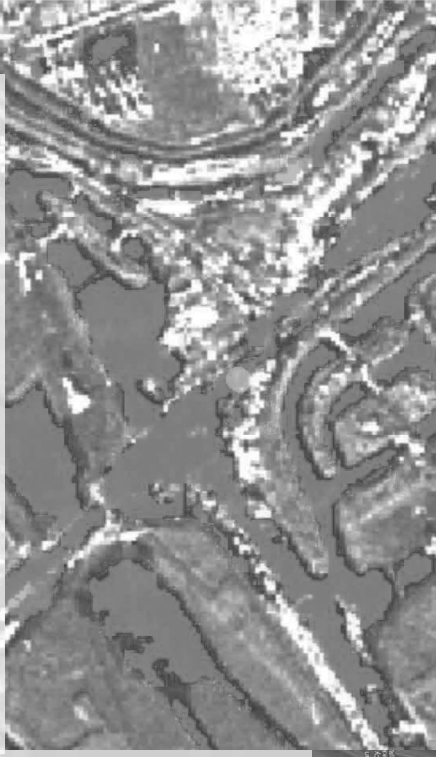
Work in TREx



AMP



Red = bad TREx data that was removed



Imagery



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Work in TREx



AMP



AMP + FTM



AM2

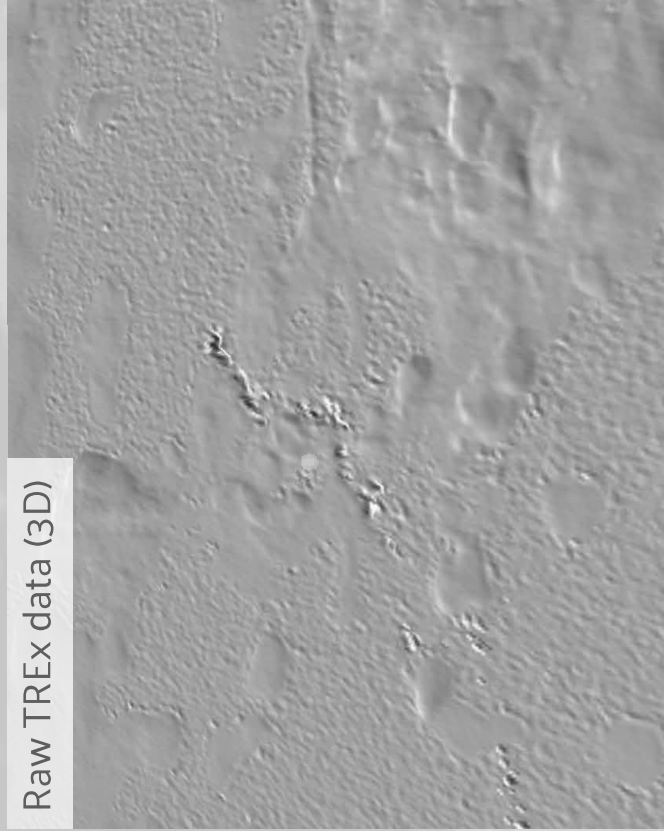


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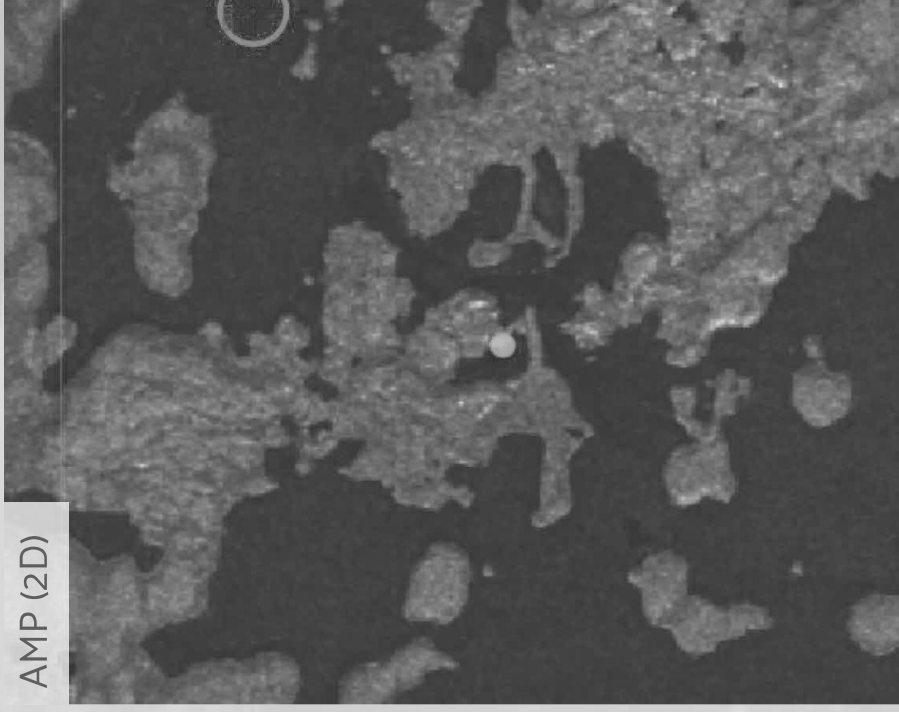
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Work in TREx

Raw TREx data (3D)



AMP (2D)



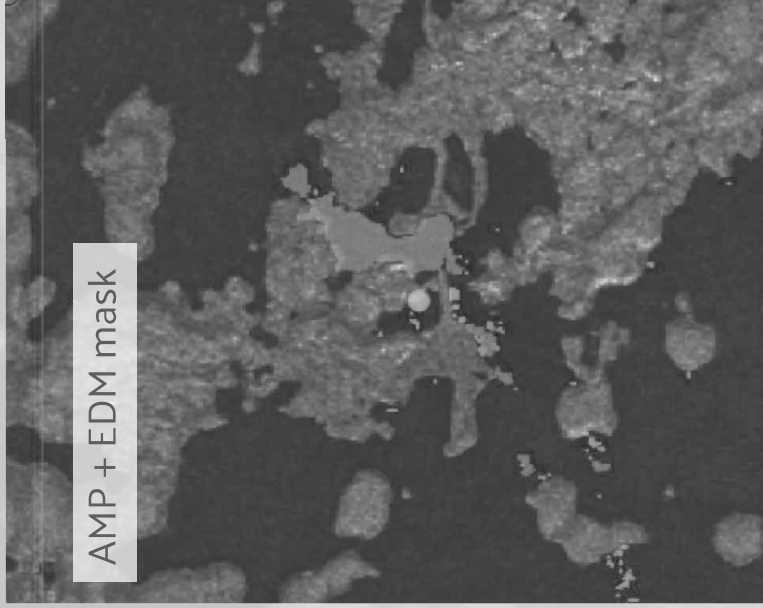
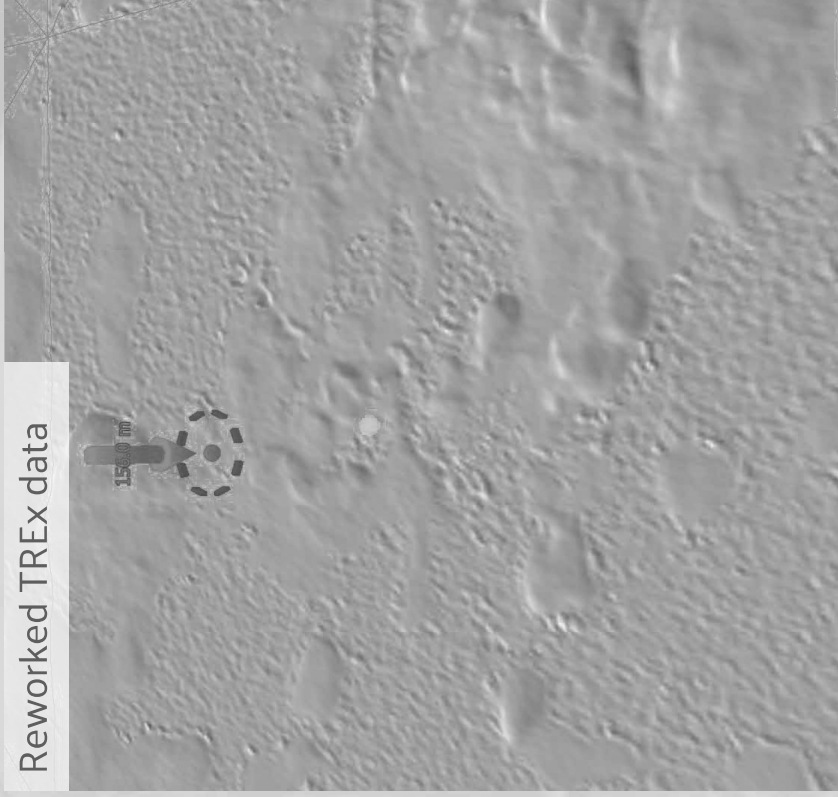
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Work in TREx



Reworked TREx data



AMP + EDM mask



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