



TANDEM-X: THE NEW DEM PRODUCTS

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TerraSAR-X-add-on for Digital Elevation Measurements

Launched: 21-Jun-2010

Satellite Status

- **Hydrazine:** TSX: 39% TDX: 34%
- **Battery Capacity:** TSX: 62% TDX: 68%
- **Instrument Performance:**
(stability of the measured radar cross section):
TSX and TDX: $\sigma \approx 0.2 \text{ dBm}^2$ - still excellent!
- Both TerraSAR-X and TanDEM-X satellites are fully functional
- Irretrievable on-board resources allow operations at least until 2029



TanDEM-X DEM












It is the basis for the Copernicus DEM!

- Global Coverage (150 Mio. km²)
- Posting: 12 m x 12 m
- Absolute Height Accuracy: ~1 m
- Acquisition Dates: 2011 – 2015
- Completed: Sep. 2016

TanDEM-X DEMs and value-added products



Acquisitions from 2010-2014	DEM products	Acquisitions from 2017-2021 (mainly)
 TanDEM-X DEM		Value-added DEM products
 TanDEM-X PolarDEM 90m of Antarctica		
 TanDEM-X 30m Edited DEM	Value-added products	TanDEM-X 30m DEM Change Maps
 TanDEM-X Forest/Non-Forest Map		
 GUF® - Global Urban Footprint® v1		
 World Settlement Footprint (WSF) 3D - Global, 90m		
 TanDEM-X Coastline		
 HydroSHEDS	 <p>https://geoservice.dlr.de/web/maps</p>	

NEW TanDEM-X Products

TanDEM-X DEM 2020

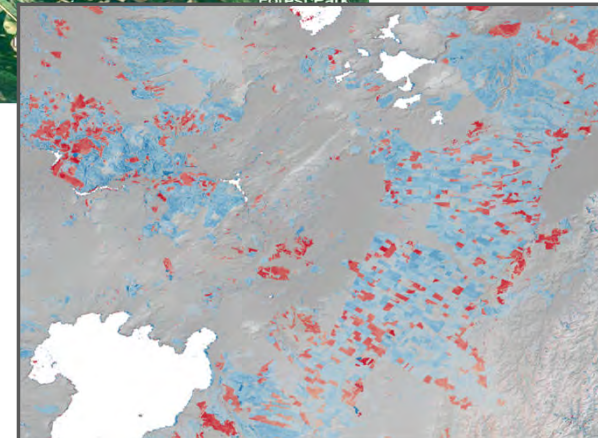
- Contains absolute elevations measured from 2017 to 2021 and represents an update of the Global TanDEM-X DEM (period 2010 - 2015).
- Provision by means of the well-known proposal process
- Completion mid-2024

TanDEM-X DEM Change Map

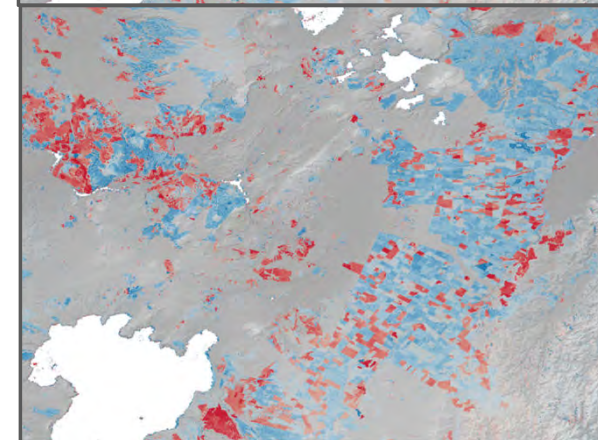
- Change between 2010-2015 and 2017-2020 - 30m-DEM (edited)
- Two versions are provided with different vertical reference systems:
 - 1. WGS84-G1150 (ellipsoidal heights, TanDEM-X DEM reference frame) and
 - 2. EGM2008 (geoid heights, Copernicus-DEM reference frame)
- DEM Change Map (DCM) will be included in the product
- Completion November 2023



2018
versus
Global
DEM

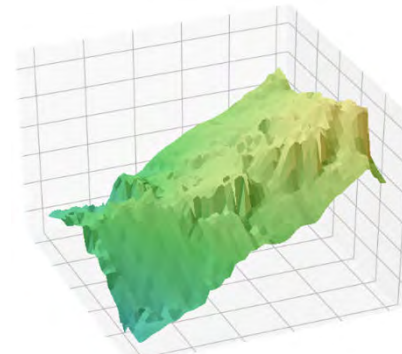


2019
versus
Global
DEM

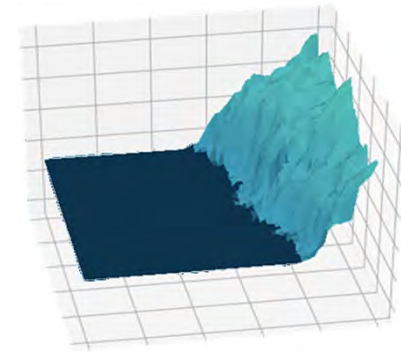


Why an Edited DEM?

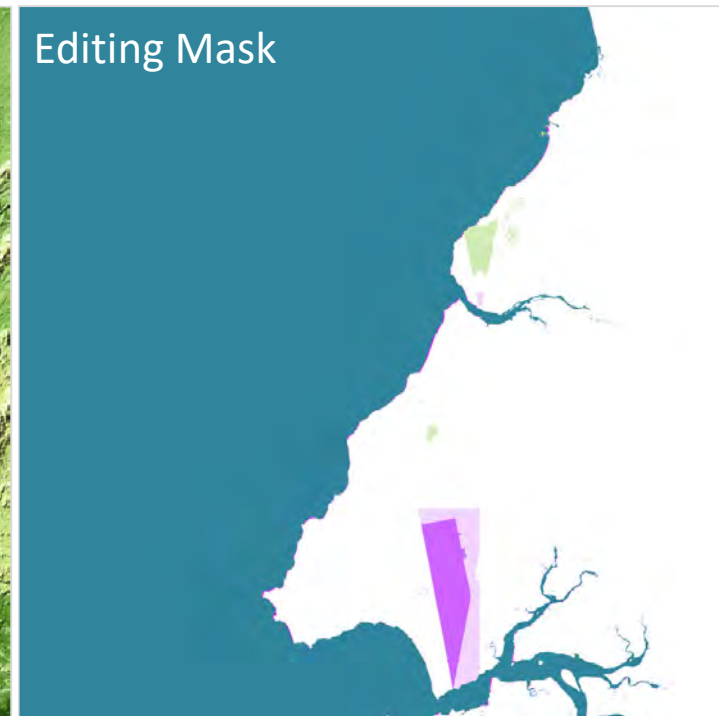
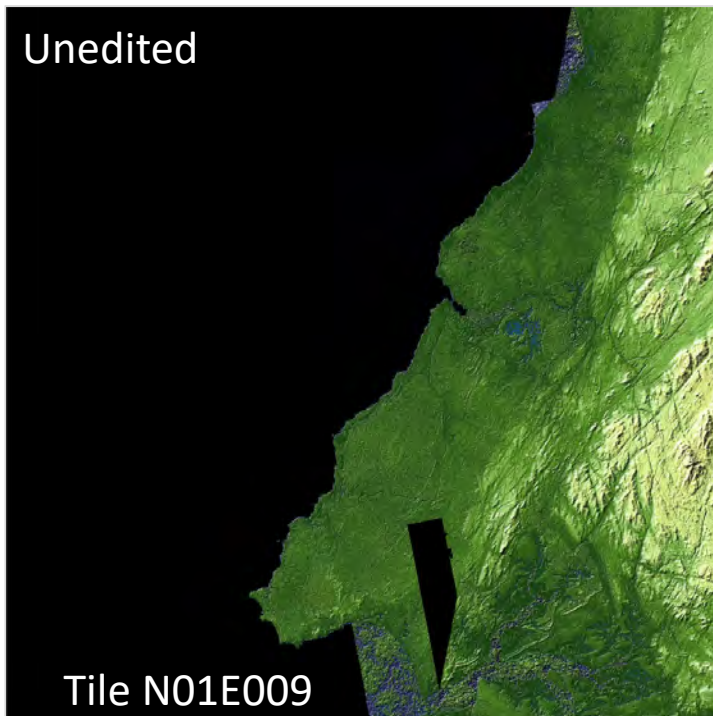
TanDEM-X 30m Edited DEM



land – void - land



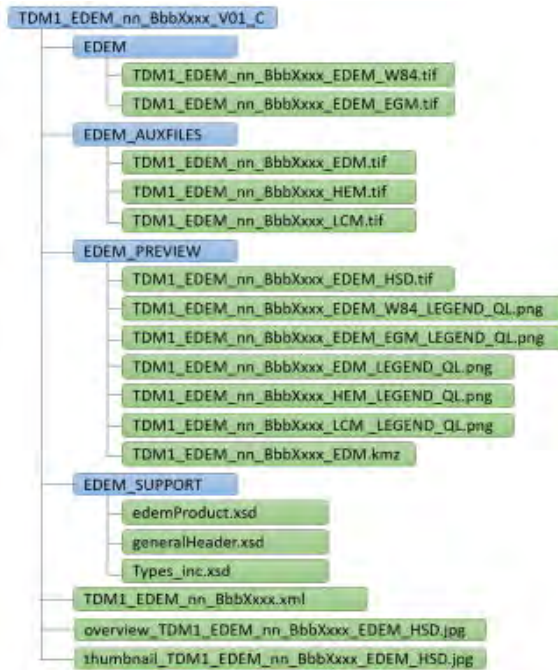
water - land



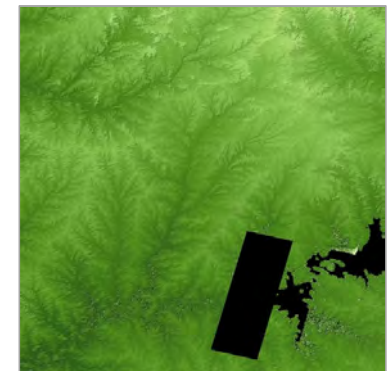
TanDEM-X 30m Edited DEM Product Description



- 30m posting
- extent, pixel spacing and grid as TanDEM-X DEM in 1"/30m
- two vertical datums (WGS84 Ellipsoid & Geoid EGM 2008)



Unedited DEM
(tile S33W057)



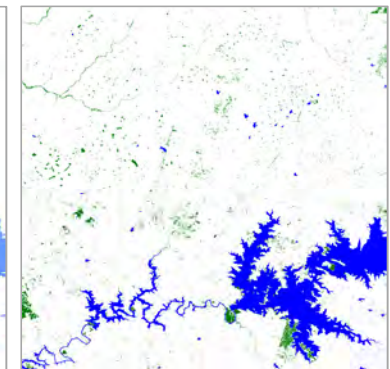
Edited DEM



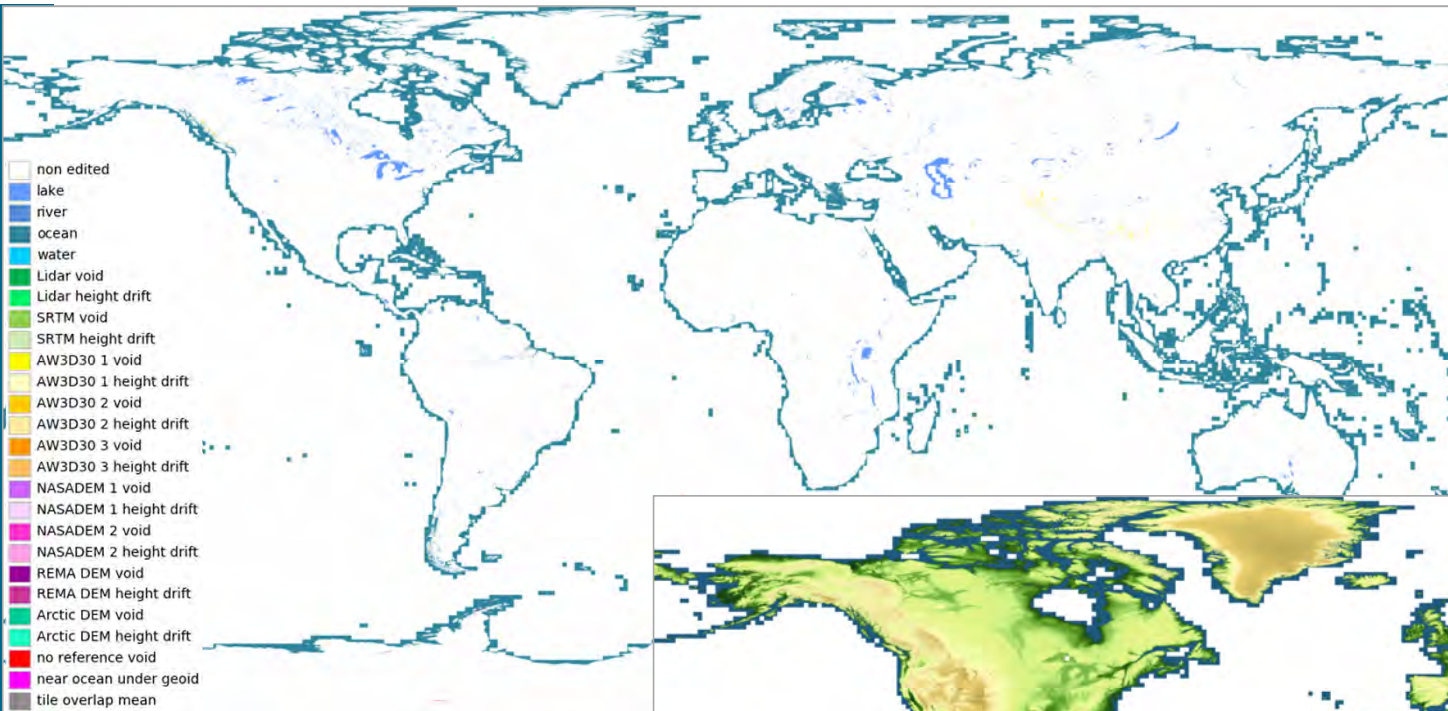
Height Elevation Mask



Editing Mask

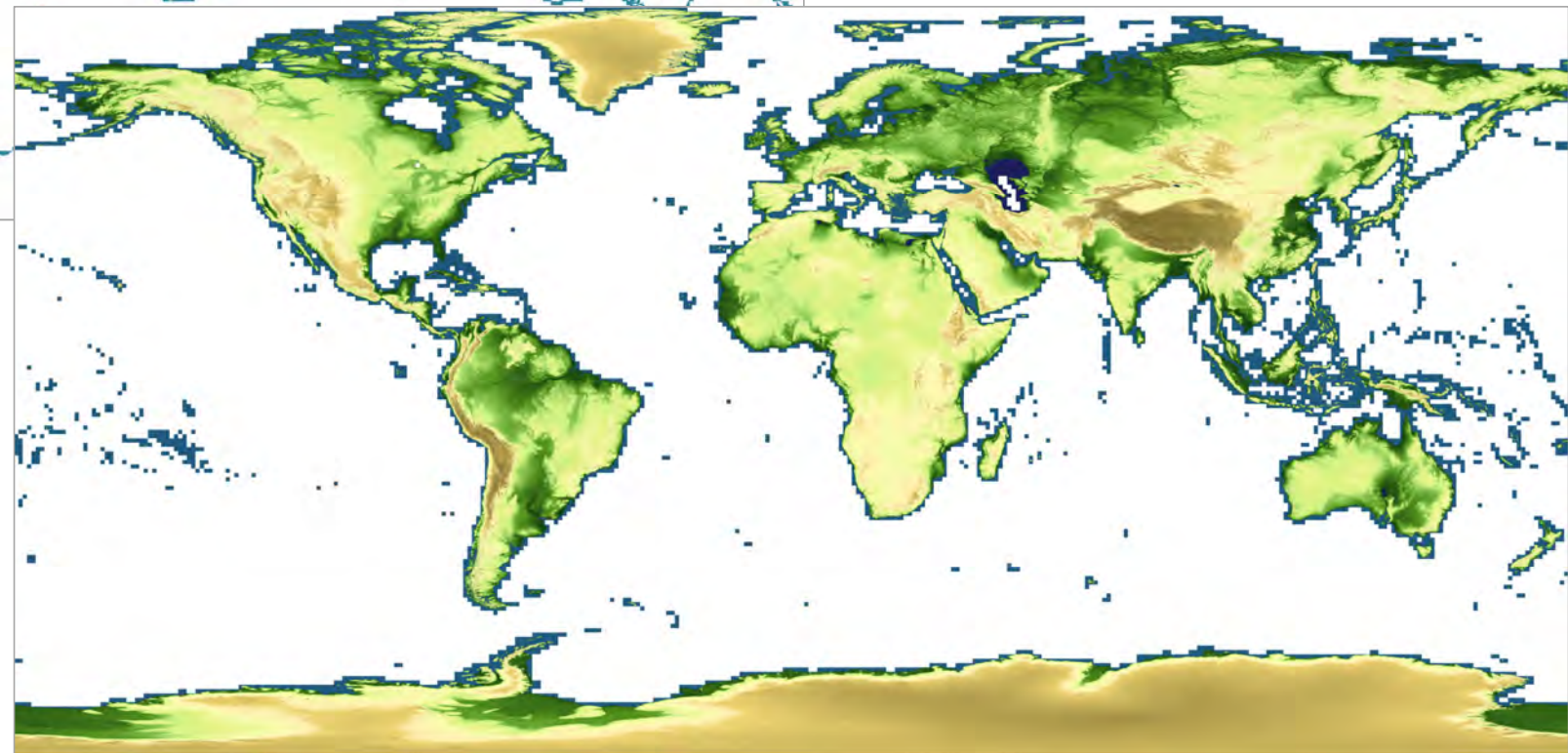


Land Cover Map



Editing Mask

over land combination of used edition algorithm and external reference used

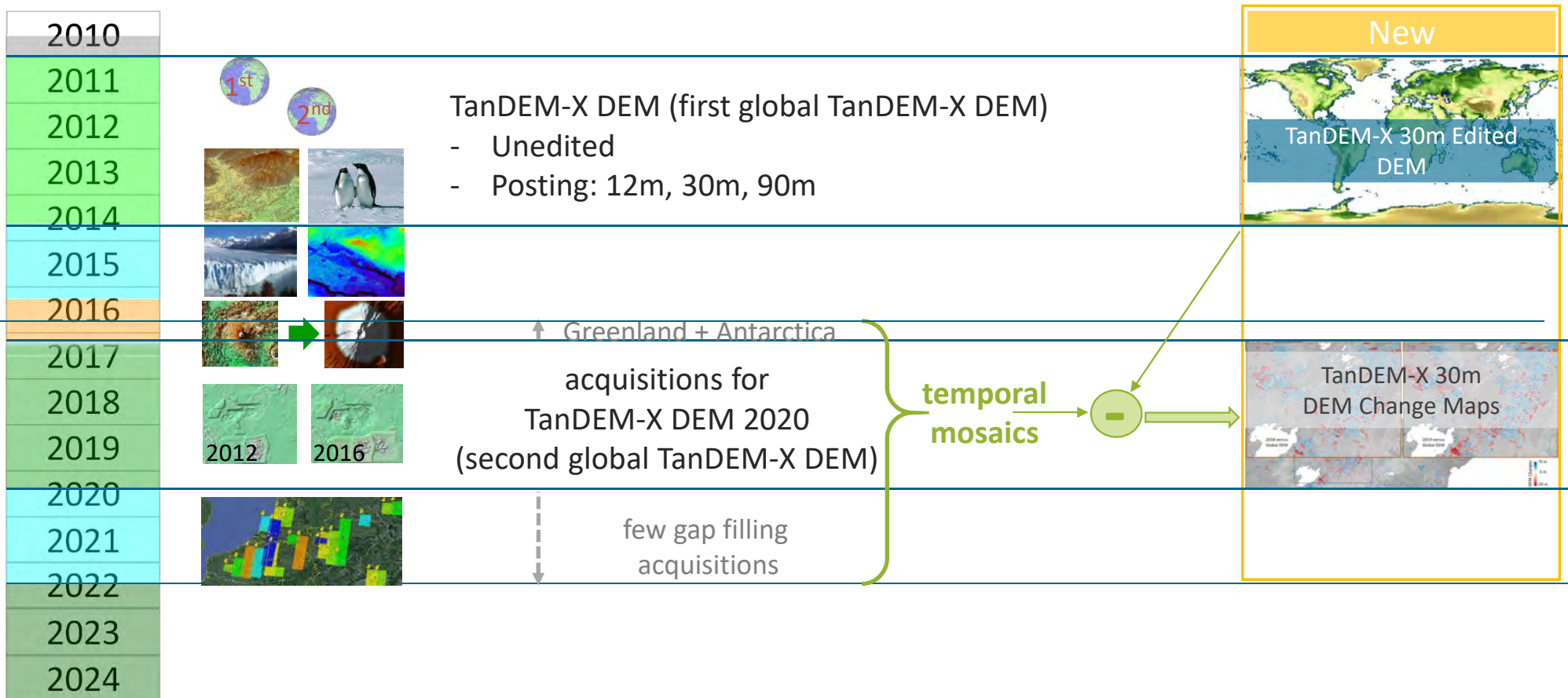


Edited DEM with two vertical coordinate systems:

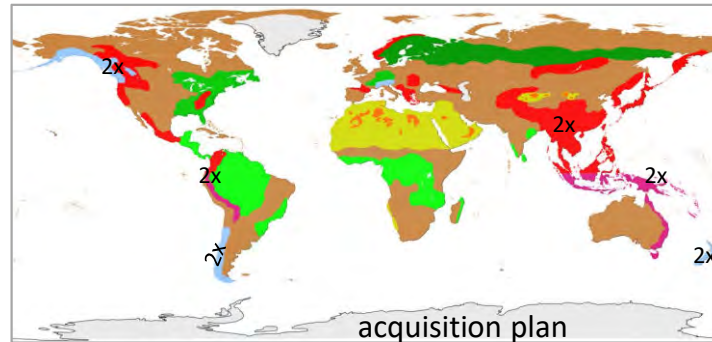
- Ellipsoid WGS84 (TDM DEM like)
- Geoid 2008 (CopDEM like)

Hillshade display

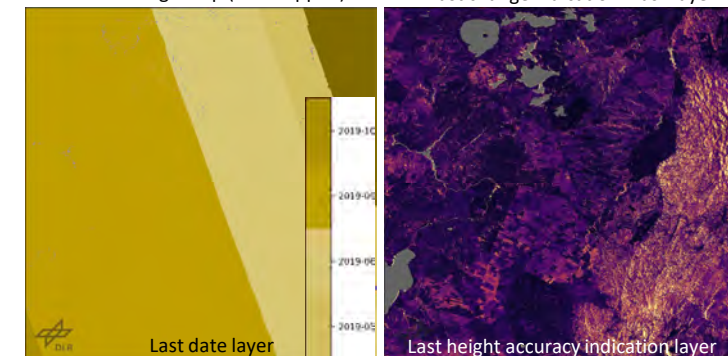
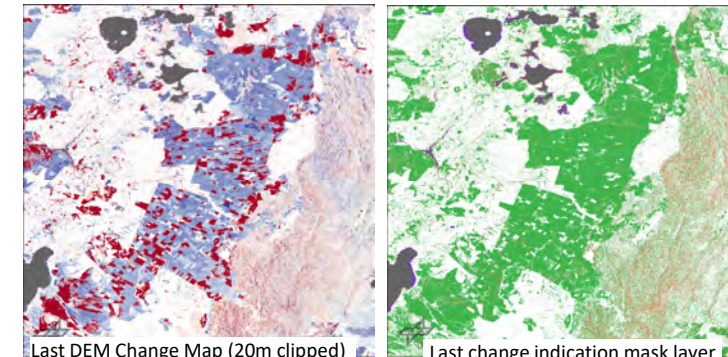
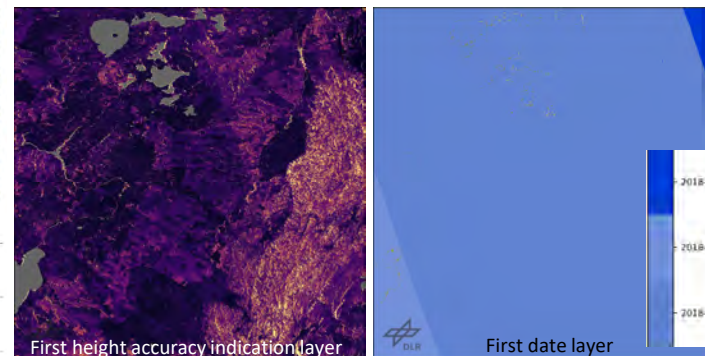
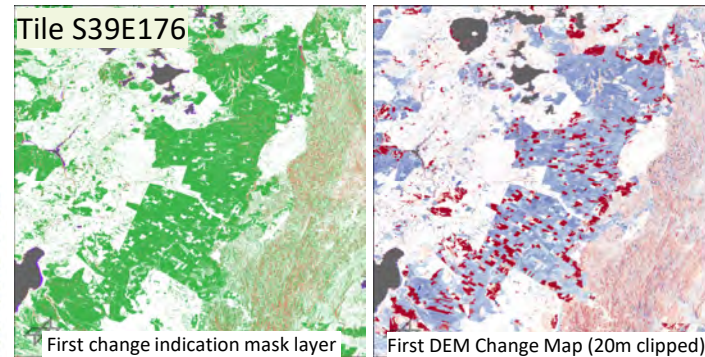
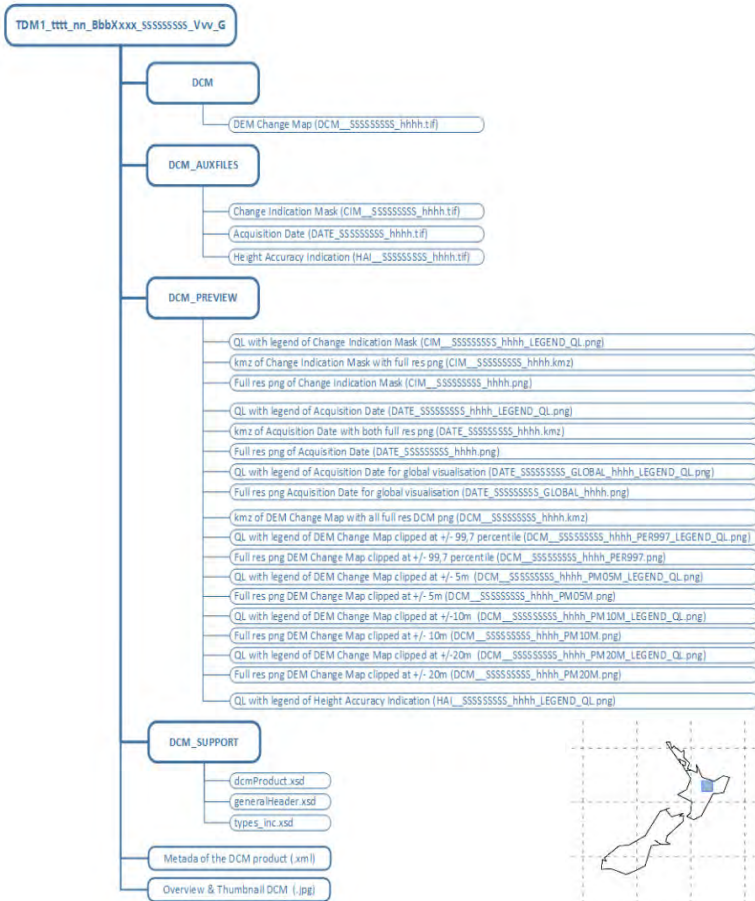
What are the TanDEM-X 30m DEM Change Maps?

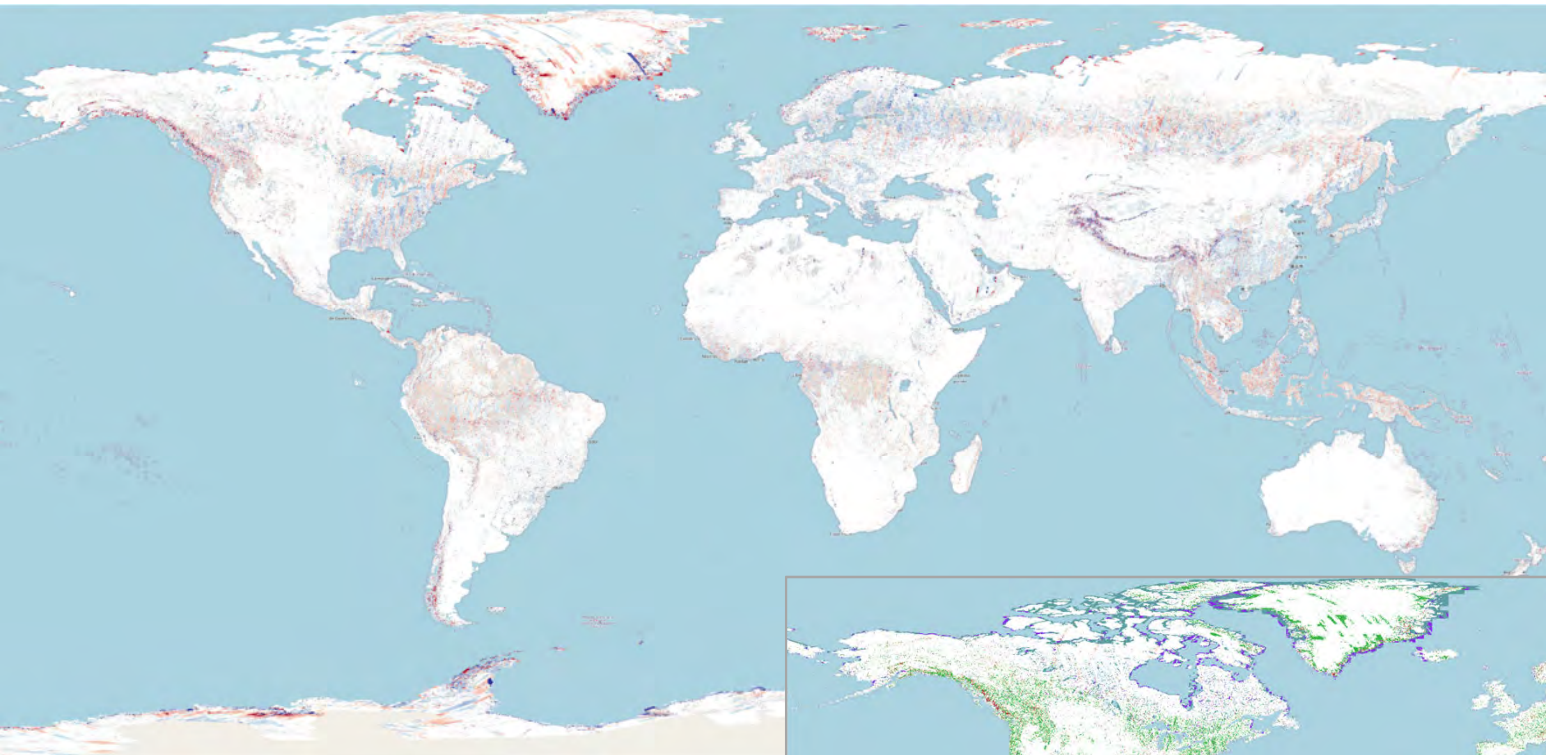


TanDEM-X 30m DEM Change Maps: Product Description



- extent, pixel spacing and grid as TanDEM-X DEM in 1"/30m

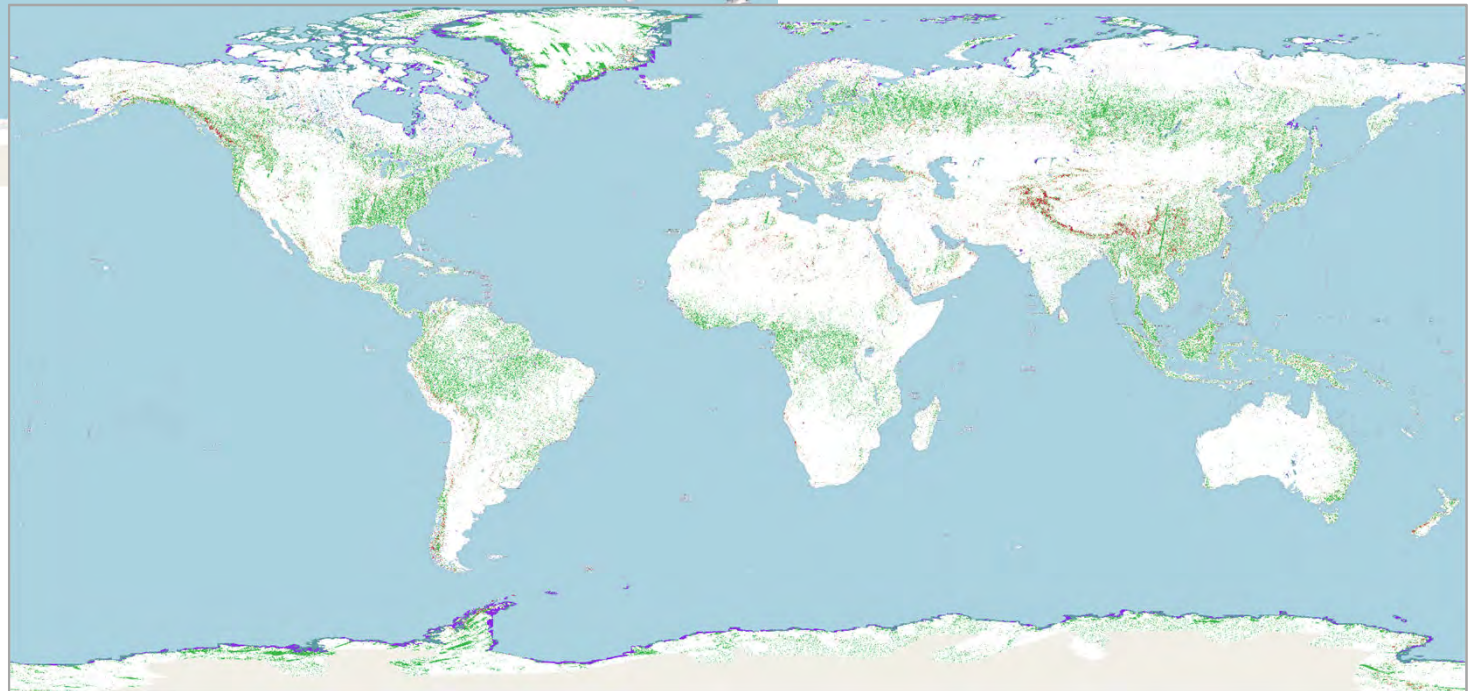




DEM Change Maps

- DEM changes w.r.t. TDM30 EDEM
- First1622 & Last1622

Visualizations with various clipping
(5m, 10m, 20m, 99.7th percentile)



Change Indication Mask

information on DEM change reliability
depending on:

- DEM Change value
- HAI
- Edited DEM

Joint PAZ/TDX/TSX Proposal Submission (since 2022)

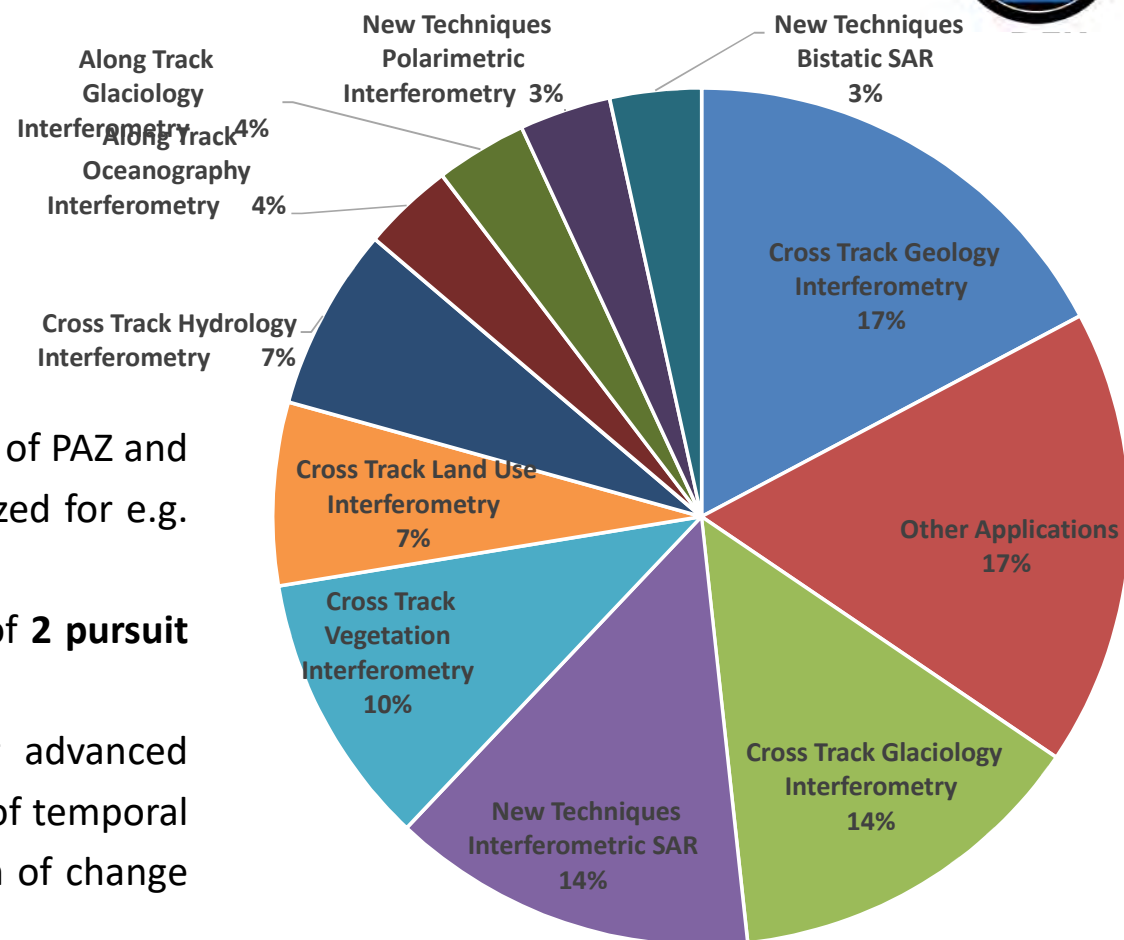


Total approved proposals >50

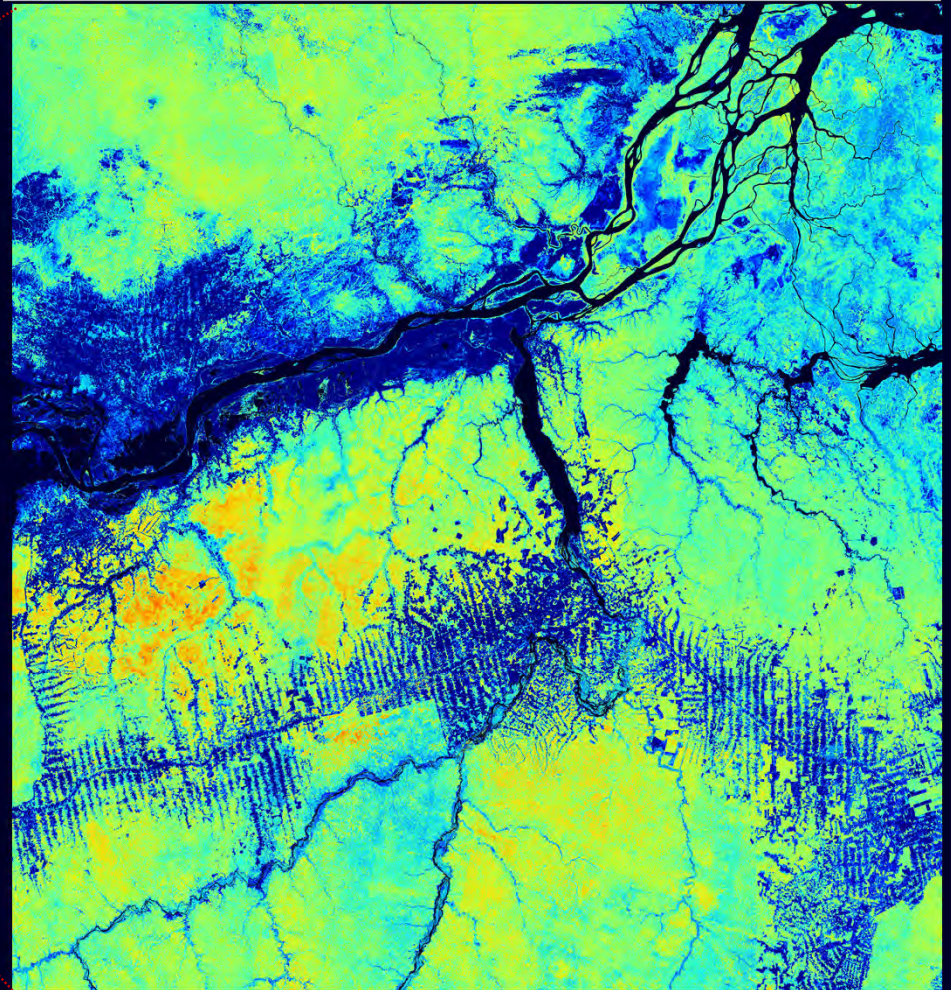
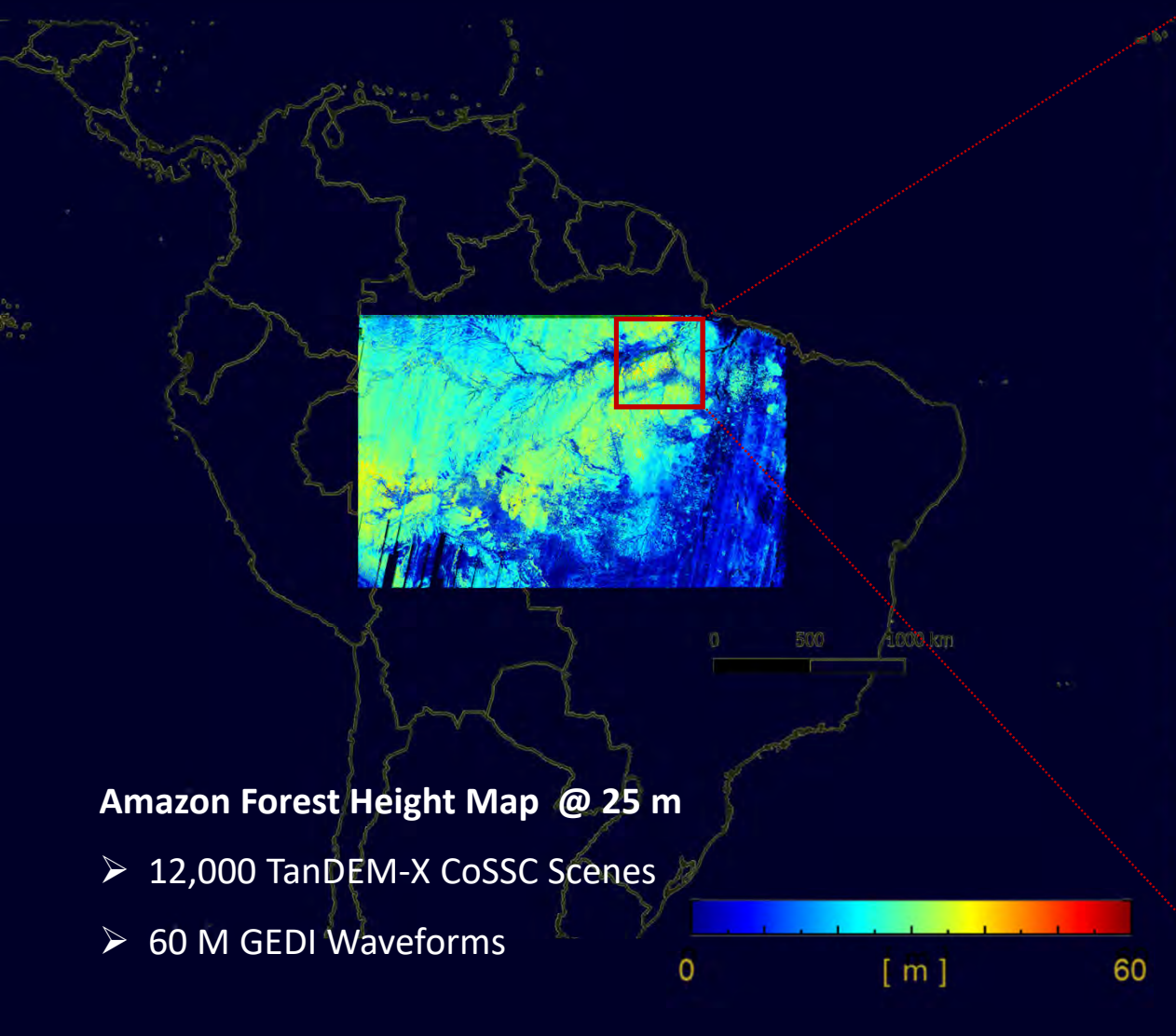
Combination of 3 almost identical satellites for scientific purposes is a unique data acquisition opportunity by the combination of monostatic and bistatic images.

Different scenarios can be considered:

- acquisition of pursuit monostatic data sets (Combination of PAZ and one out of TerraSAR-X or TanDEM-X), which can be utilized for e.g. repeat pass interferometry; (**repeat pass of 4-7 days**).
- combination of all 3 satellites will allow the derivation of **2 pursuit monostatic pairs** (PAZ-TerraSAR-X, PAZ-TanDEM-X)
- and **1 bistatic image pair** (TerraSAR-X-TanDEM-X) for advanced studies. The latter will e.g. allow interferometry studies of temporal decorrelation for natural targets, or allow the derivation of change detection products, or pseudo-quadpol data sets.



TanDEM-X GEDI Fusion: Forest Height



TanDEM-X DEM: Science Service System

<https://tandemx-science.dlr.de>



The screenshot shows the website's header with the TANDEM logo and 'Science Service System' text. A navigation menu includes 'Home', 'Data access', 'Mission', 'Multimedia', and 'FAQ'. A 'News' section is visible, featuring a large red text overlay that reads: 'Joint PAZ / TSX / TDX Announcement of Opportunity is still open! Joint PAZ / TSX / TDX / RCM AO will come soon!'. The left sidebar contains sections for 'Registered User Access', 'Basic User Registration', 'Documents (Download)', 'Demo Data (Download)', 'DEM Gallery', 'Links', and 'News/Related'.



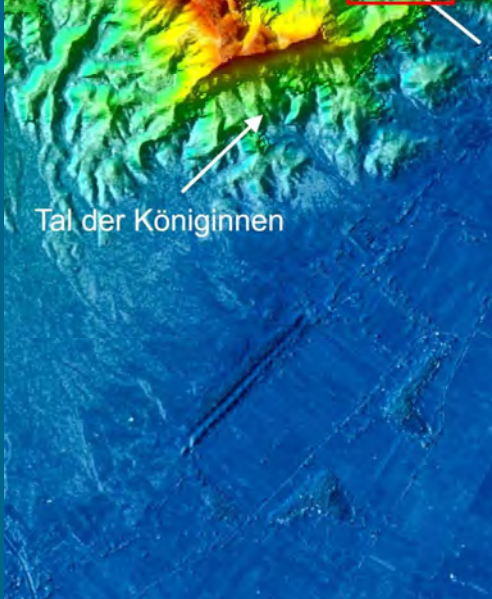
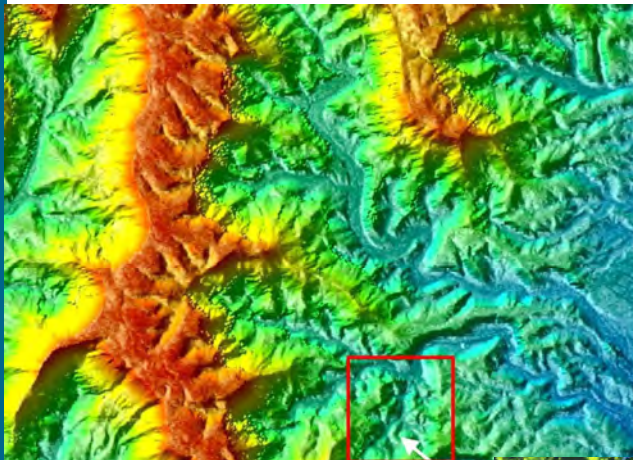
**TerraSAR-X / TanDEM-X
Science Team Meeting**
DLR Oberpfaffenhofen, Germany
October 18 - 20, 2023

Check the TanDEM-X News!

<https://tandemx-science.dlr.de>



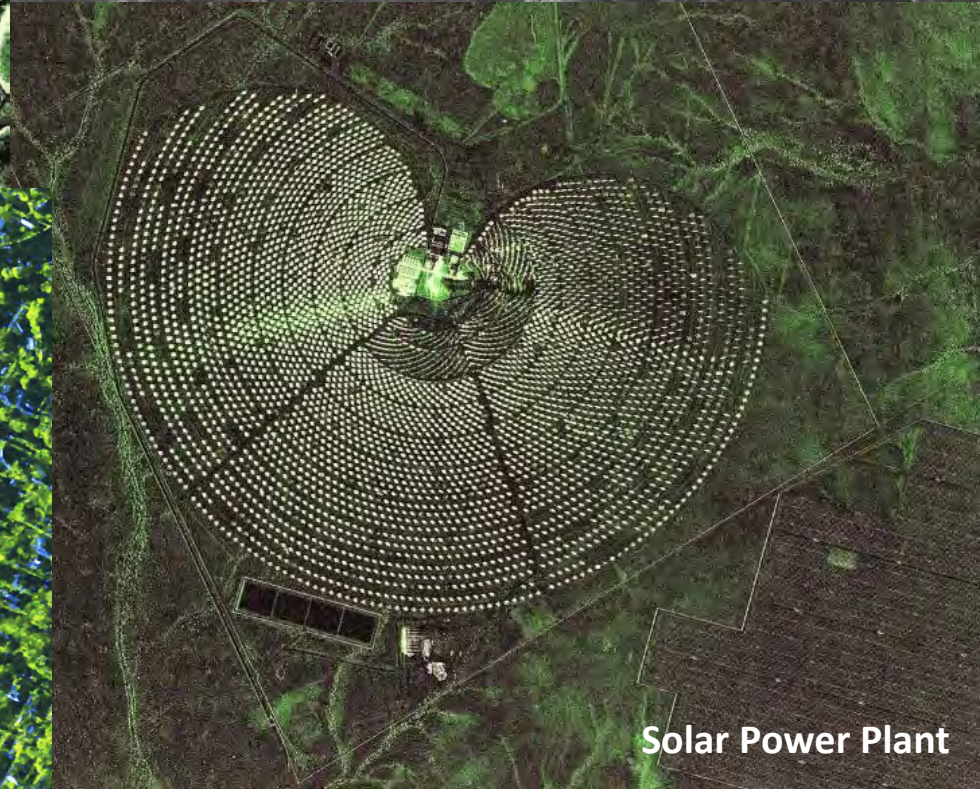
Vulcano Fagradalsfjall eruption



Tal der Königinnen



Eden Park, Auckland
Women's World Cup



Solar Power Plant