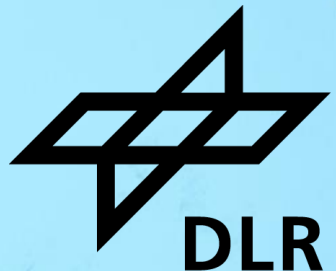


GERMAN ANTARCTIC RECEIVING STATION (GARS) O'HIGGINS

German Aerospace Center (DLR)
German Remote Sensing Data Center (DFD)



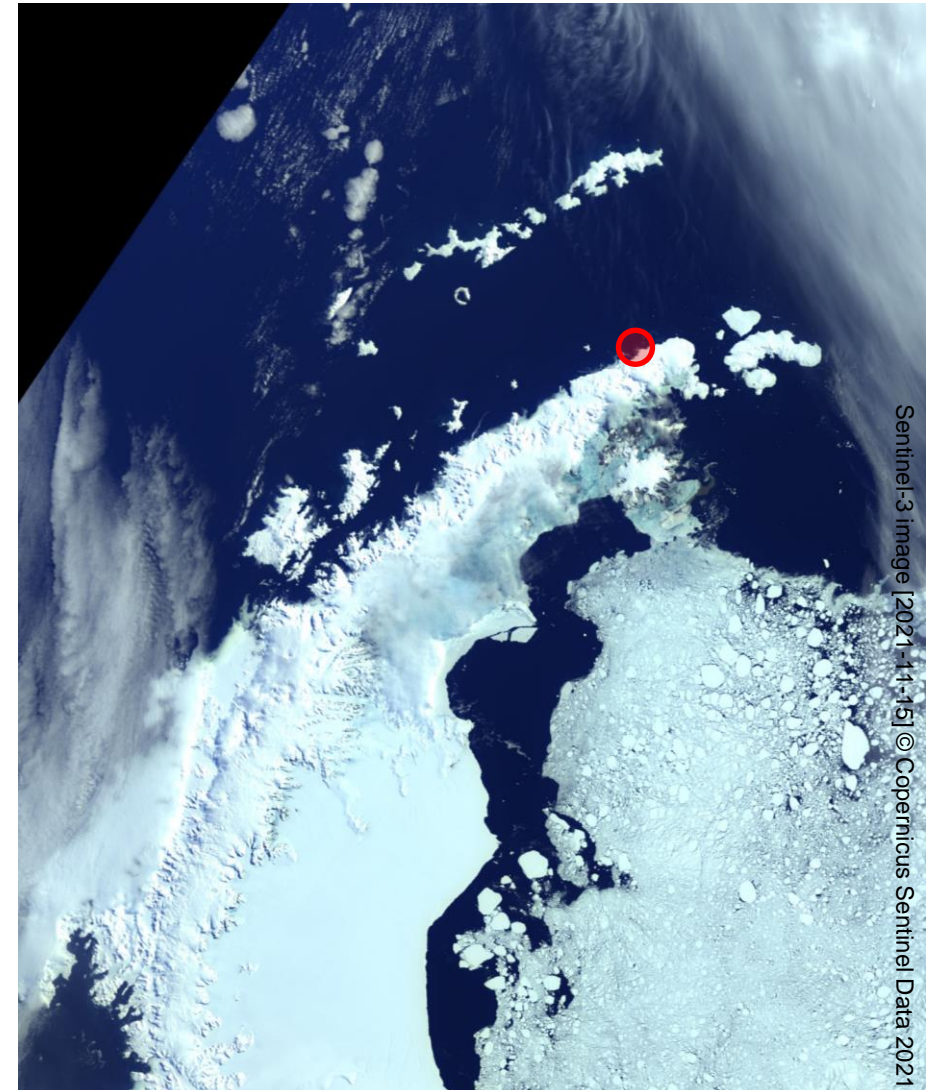
GARS O'HIGGINS

Introduction



General Information

- Location: northern tip of the Antarctic Peninsula, $63^{\circ}19'16.04''\text{S}$ - $57^{\circ}54'4.31''\text{W}$
- Funded by the “Bundesministerium für Forschung und Technologie, BMFT” (today BMBF)
- Operated by
 - German Aerospace Center (DLR)
 - since 1991 operational, since 2010 year-round
- in cooperation with
 - Federal Agency for Cartography und Geodesy (BKG)
- South American cooperation partners
 - INACH, Ejercito and Armada de Chile, FACH, ...
 - PROANTAR (Brazil)



Introduction



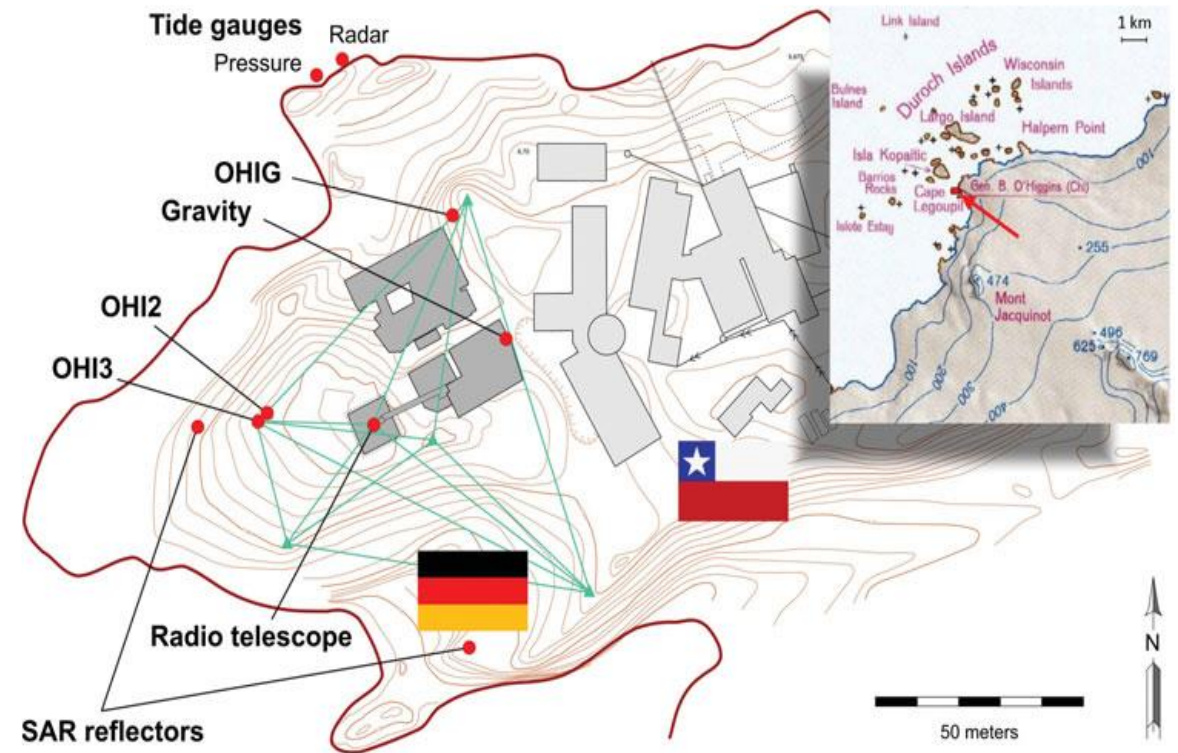
Instrumentation

9 m Auto-Tracking S/X-Band antenna system and Radio Telescope

- Satellite data acquisition
- Part of the international VLBI Service (BKG)
 - continental drift,
 - earth rotation

further instrumentation

- International GNSS observations since 1996
- Corner reflectors since 2013
- Meteorological station since 1995



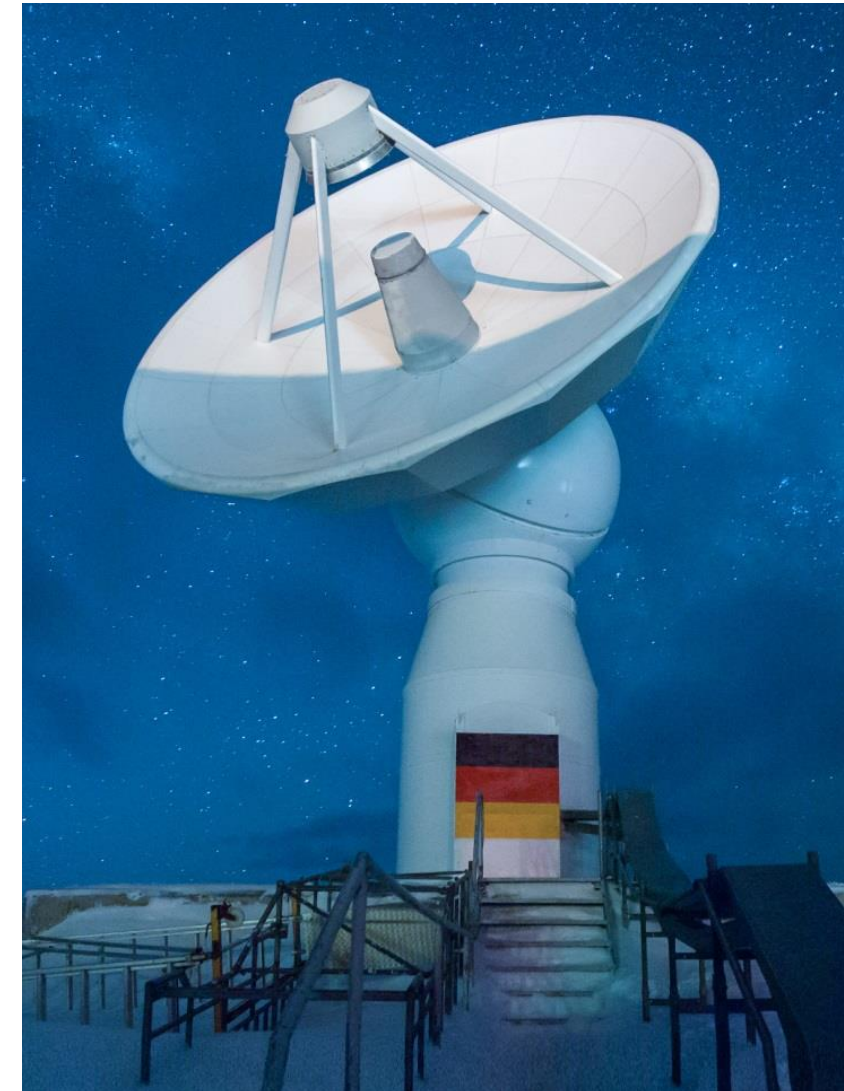
For details see: [Klügel et al., 2014.](#)

SATELLITE OPERATIONS & APPLICATIONS

Satellite operations



- Data acquisition from EO Satellites:
TerraSAR-X, TanDEM-X, GFO-1, GFO-2, Cassiope,
[TET-1, BIROS, ERS-1 & ERS-2 (past mission)]
 - Global TanDEM-DEM (freely available @90 m res.):
[EOC Geoservice Map Contexts \(dlr.de\)](#)
- Telecommanding TerraSAR-X, TanDEM-X, GFO-1,
GFO-2, Cassiope, BIROS, [Grace1, Grace2, NEOSSat,
TET-1, FLP (past missions)]
- LEOP-Support for new satellite missions
- Launcher Tracking: Virgin Orbit [LauncherOne](#)
- TSX NRT support for Antarctic Research Vessels



TSX Near real-time science support

- On demand provision of NRT image products
- Received, processed and delivered at GARS
 - reduced file size (~2 MB)
 - easy to interpret,
 - support ship route planning
 - 15 min – 120 min after acquisition
- Available for interested scientists onboard and/or after the expedition (e.g. Polarstern expeditions)
 - Contact: PS Chief-Scientist
- Detection and monitoring of crevasses
 - Laclavere Plateau, Thwaites Glacier, Union Glacier



Polarstern Expedition PS124 at iceberg A74

TSX Near real-time science support



- On demand provision of NRT image products
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Expedition	Region	NRT-Products
PS96 (12/2015 – 02/2016)	Weddell Sea	42
PS103 (12/2016 – 01/2017)	Weddell Sea	33
PS104 (02/2017 – 03/2017)	Amundsen Sea	44
NBP* 17-04 (04/2017 – 05/2017)	Ross Sea	43
PS111 (01/2018 – 03/2018)	Weddell Sea	48
IODP Exp. 374** (01/2018 – 02/2018)	Ross Sea	36
PS117 (12/2018 – 02/2019)	Weddell Sea	17
Weddell Sea Expedition*** (01/2019 – 03/2019)	Weddell Sea, Larsen C	32
PS118 (02/2019 – 04/2019)	Weddell Sea, Larsen C	12
IODP Exp. 379** (01/2018 – 03/2018)	Amundsen Sea	39
NPB* 19-02, Thwaites Proj. (01/2019 – 03/2019)	Amundsen Sea	10
PS123 & PS124 (01/2021 – 03(2021)	Weddell Sea	44
PS128 & PS129	Cooperation Sea – Weddell Sea	

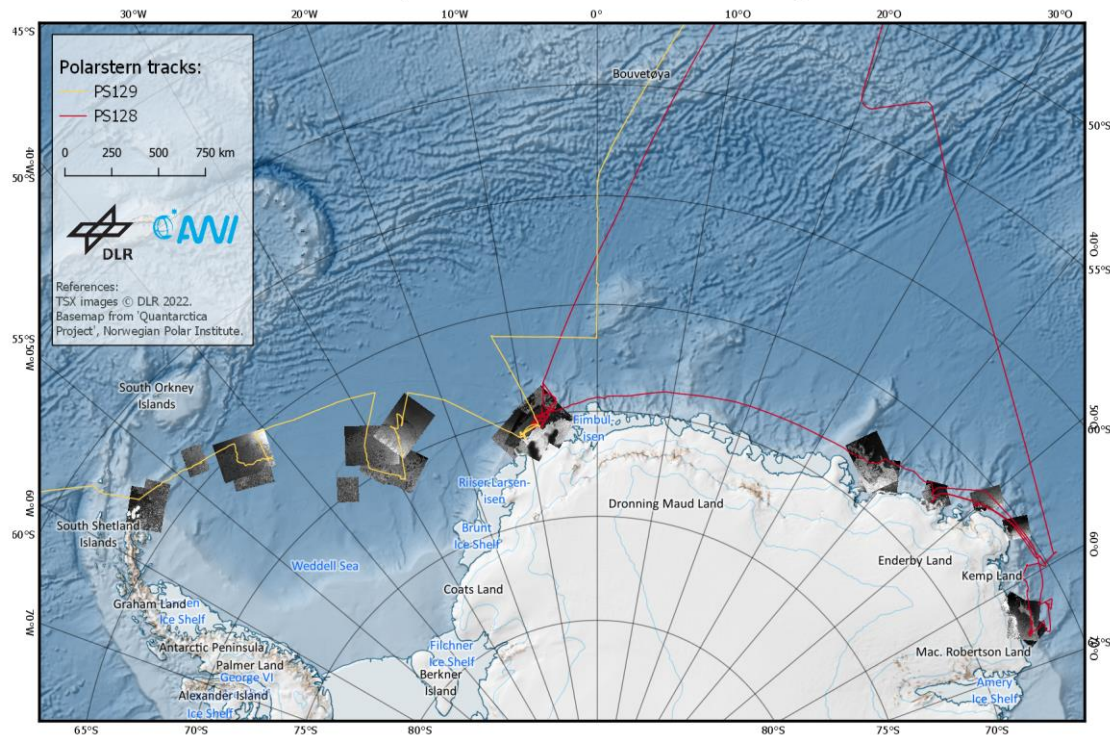
*Nathaniel B. Palmer ; **JOIDES Resolution ; *** S.A. Agulhas II

Latest support for Polarstern expeditions PS128 & PS129



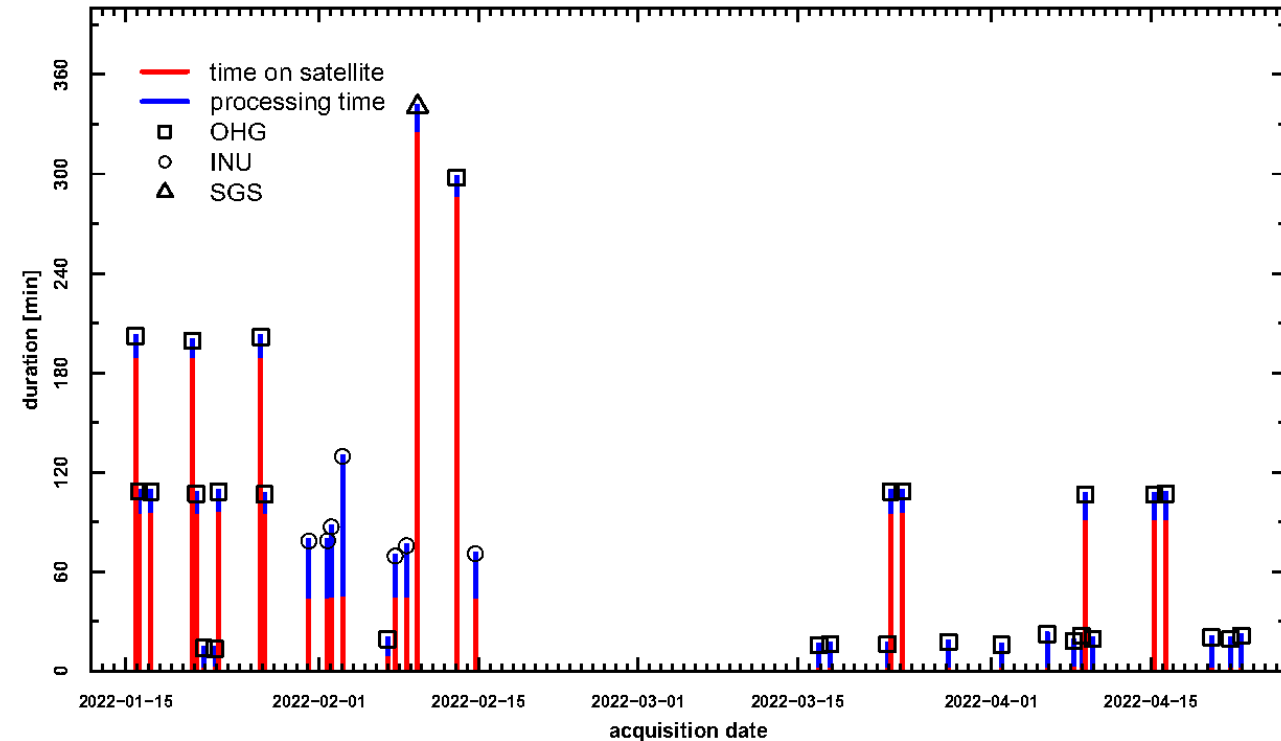
- Fast availability of TSX NRT images onboard Polarstern using:
 - GARS O'Higgins (OHG) for data reception in Antarctica and
 - occasionally complemented by data reception at Arctic receiving stations in Inuvik (INU) or Svalbard (SGS).

TSX-NRT data acquisitions for PS128 & PS129, Jan. - Apr. 2022



(a)

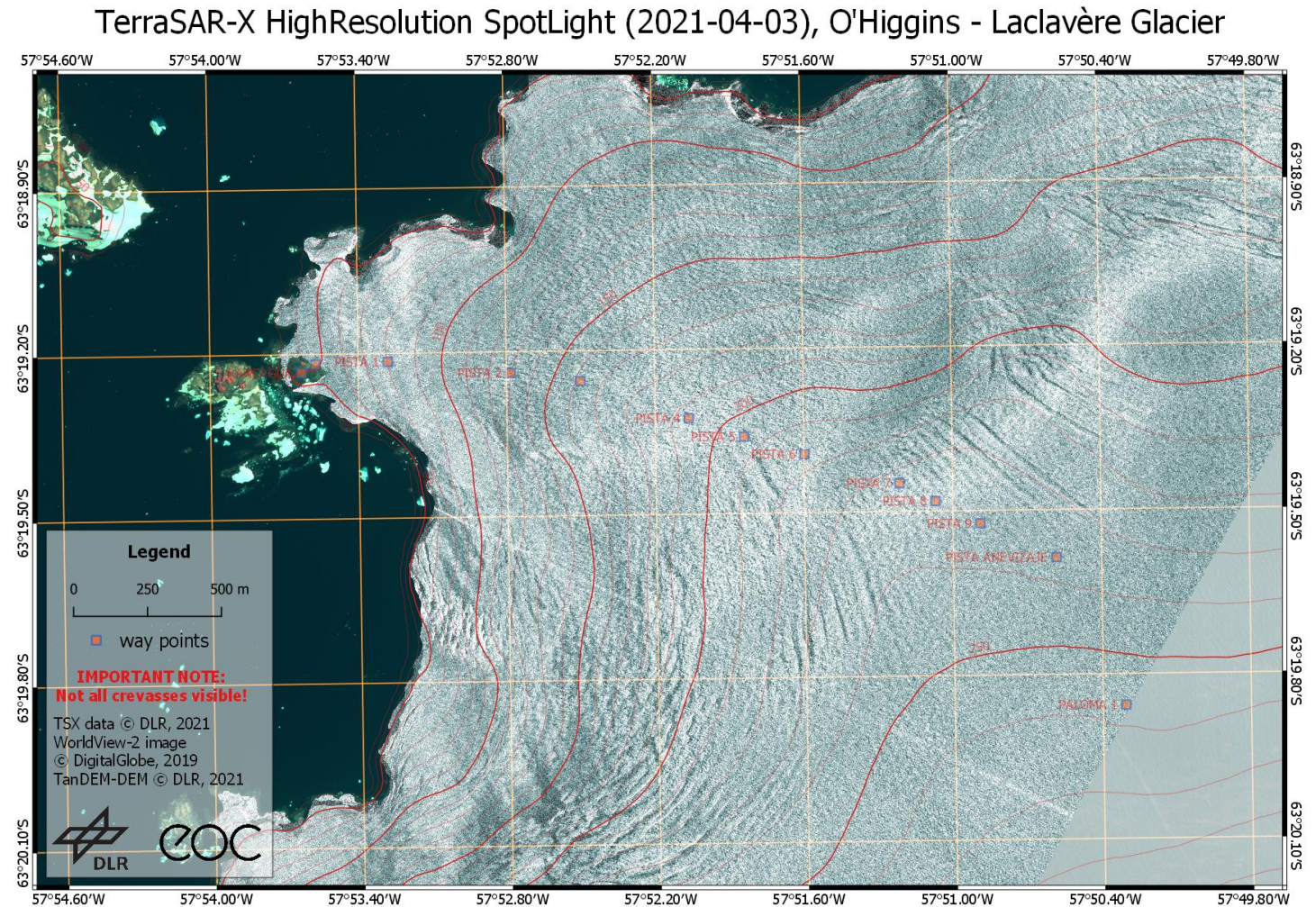
TSX-NRT statistics, PS128 & S129 Jan.-Apr. 2022



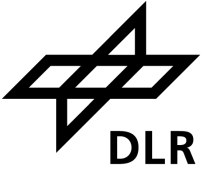
TSX high-resolution images

Crevasse monitoring

- TSX high-resolution images capable to detect crevasses
 - dependent on (snow) surface properties
 - requires critical review
- support of field expeditions at the northern Antarctic Peninsula and at Union Glacier



Further support at GARS O'Higgins



- AWI: Bernd Krock, Program PACES II, Project APHYCA: monitoring of phytoplankton in Antarctica – since 2015
- Polar Educators: Skype Videoconference with station staff
 - Positive feedback and open for future activities
- Open to support further scientific activities at GARS O'Higgins
 - Limited space and equipment
 - Dependent on time and specific requirements

Links



- DLR
 - <https://www.dlr.de/gars>
 - <https://www.dlr.de/eoc/>
→ see also GARS O'Higgins video
- BKG
 - <https://www.bkg.bund.de/.../radioteleskop-o-higgins.html>
 - <http://ivs.bkg.bund.de/vlbi/ohiggins/>
- Proposals for TerraSAR-X & TanDEM-X:
 - <https://sss.terrasar-x.dlr.de/>
 - <https://tandemx-science.dlr.de/>



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