

# InSAR grounding line mapping with the TSX/TDX/PAZ constellation for fast Antarctic glaciers

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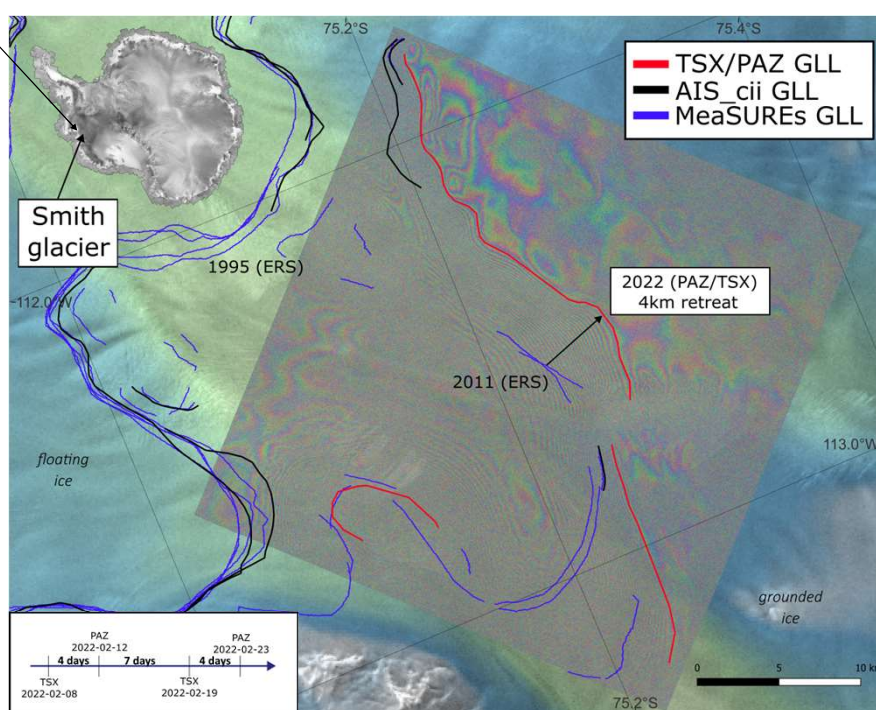
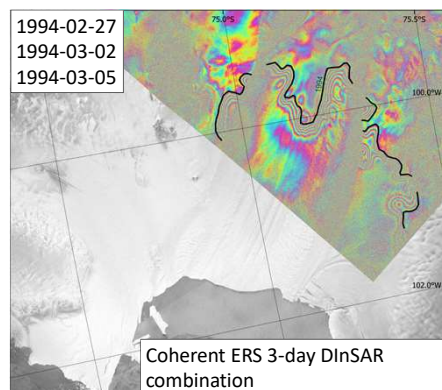
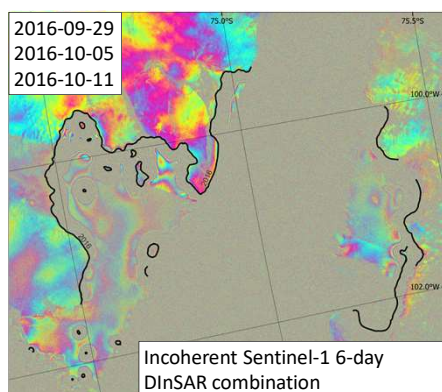
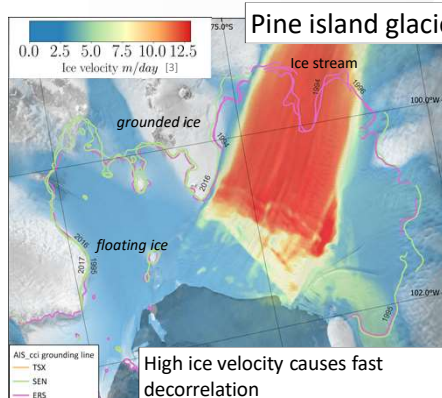
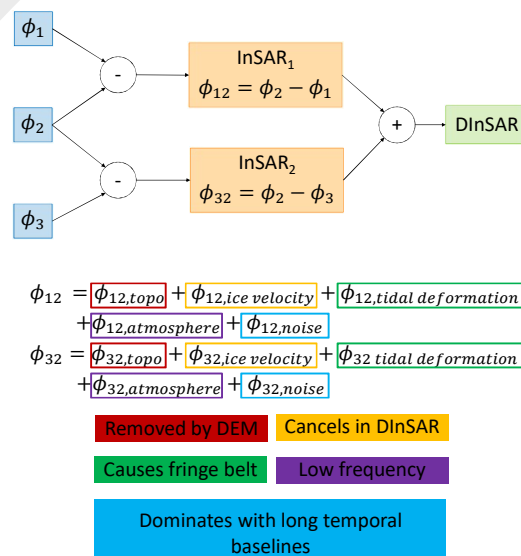
## Background

InSAR-derived grounding line mapping is usually performed on a coherent DInSAR combination of two interferograms to eliminate phase contributions from horizontal ice displacement (ice velocity) and separate the vertical displacement of the ice shelf due to the ocean tides.

Especially for some of the faster glaciers, the only available InSAR observations of the grounding line have been acquired during the ERS Tandem phases (1991/92, 1994 and 1995/96).

## Joint DLR-INTA Scientific Announcement of Opportunity

In May 2021, a joint AO of DLR and the Spanish National Institute of Aerospace Technology (INTA) was released which offers the possibility of a common scientific evaluation of SAR acquisitions of the German TerraSAR-X/TanDEM-X and the Spanish PAZ satellite missions. These platforms are almost identical and are operated together in a constellation therefore offering the possibility of combining their acquisitions to SAR interferograms with short temporal baselines of 4 days.



Constellation	Repeat pass time interval [days]	Description	Resolution [m]	Band
Sentinel-1	6/12		5m x 20m	C-band
TerraSAR-X (TSX)	11		3m x 3m	X-band
ERS	3/1*	*Ice&Tandem phases (1991/92, 1994 and 1995/96)	8m x 4m	C-band
<b>TSX/PAZ</b>	<b>4/7</b>		<b>3m x 3m</b>	<b>X-band</b>
COSMO-SkyMed	1*	*See [1] and [2]	3m x 3m	X-band
Radarsat-2	24		12m x 5m	C-band

[1] Brancato, V., E. Rignot, P. Millillo, M. Morlighem, J. Mouginot, L. An, B. Scheuchl, u. a., "Grounding Line Retreat of Denman Glacier, East Antarctica, Measured With COSMO-SkyMed Radar Interferometry Data". *Geophysical Research Letters* 47, Nr. 7 (2020): e2019GL086291. <https://doi.org/10.1029/2019GL086291>.

[2] Millillo, Pietro, Eric Rignot, Paola Rizzoli, Bernd Scheuchl, Jérémie Mouginot, J. Bueso-Bello, and P. Prats-Iraola, "Heterogeneous Retreat and Ice Melt of Thwaites Glacier, West Antarctica". *Science Advances* 5, Nr. 1 (1. Januar 2019): eaau3433. <https://doi.org/10.1126/sciadv.aau3433>.

[3] Nagler, Thomas, Helmut Rott, Markus Hetzenecker, Jan Wuite, and Pierre Potin, "The Sentinel-1 Mission: New Opportunities for Ice Sheet Observations". *Remote Sensing* 7, Nr. 7 (Juli 2015): 9371–89. <https://doi.org/10.3390/rs70709371>.

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