



Committee on Earth Observation Satellites

WGDisasters-14 Meeting

Michael Poland

U.S. Geological Survey

Susi Ebmeier

University of Leeds

CEOS Volcano Demonstrator

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- Extensive tasking of TSX data over volcanoes in SE Asia and Latin America
- Evaluation of “what tool for which volcano”
- Growing use of Pleiades data in Latin America (example of Nevados de Chillán)
- Reclus volcano, Chile — what’s going on?
- COVID-19 has limited capacity-building activities

- Since late 2019, the Volcano Demonstrator has tasked TSX acquisitions over 19 volcanoes in Latin America and 17 volcanoes in SE Asia
- From early May until late July, data were not posted to the DLR Supersites server, where a number of investigators had been accessing them; this disrupted regular use of these data.
- The ability to task TSX on demand has been exceptionally important, as it has allowed for flexible and rapid responses to episodes of unrest and eruption at a number of volcanoes
 - Sangay, Ecuador
 - Nevados de Chillán, Chile
 - Sinabung, Indonesia



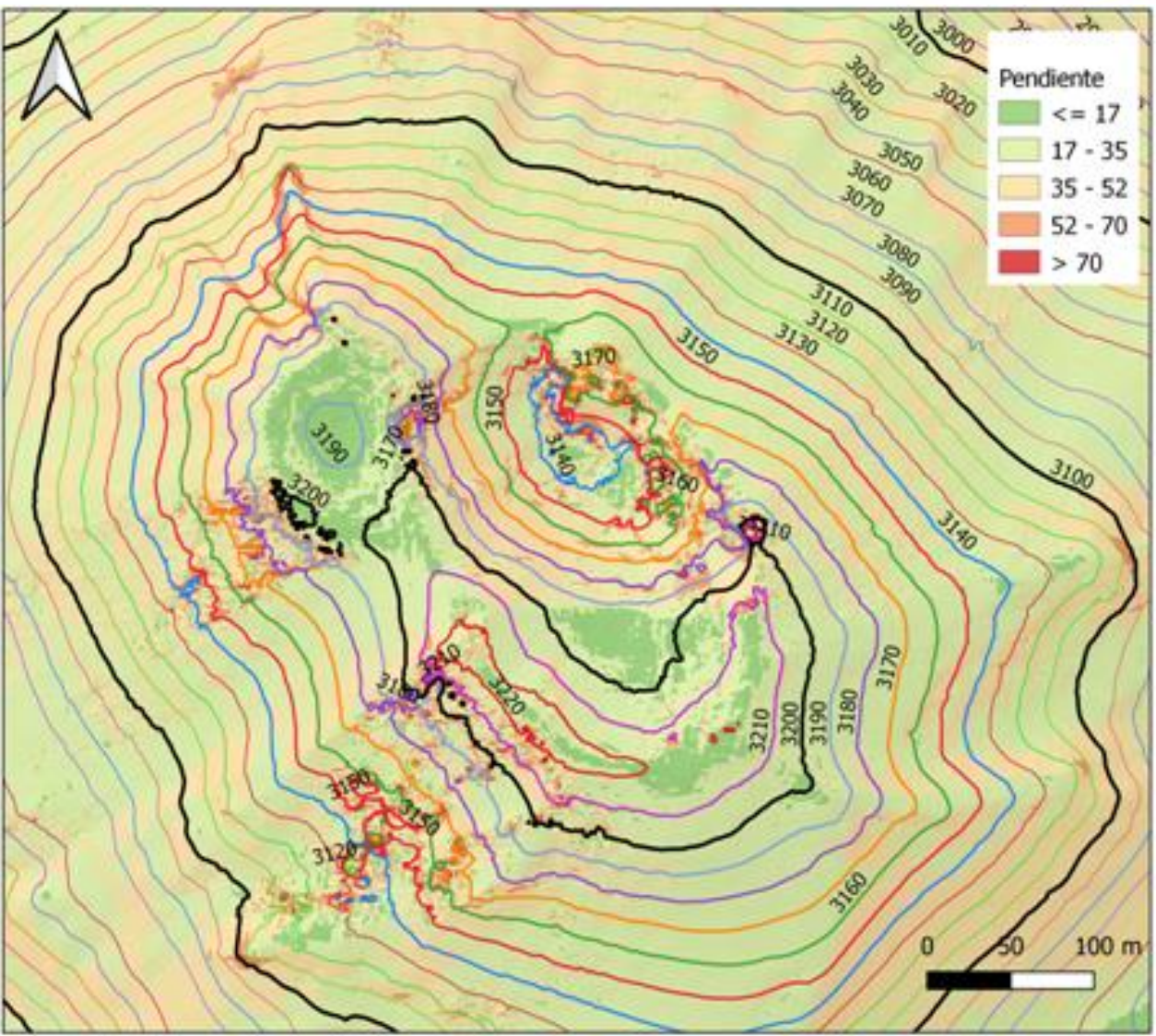
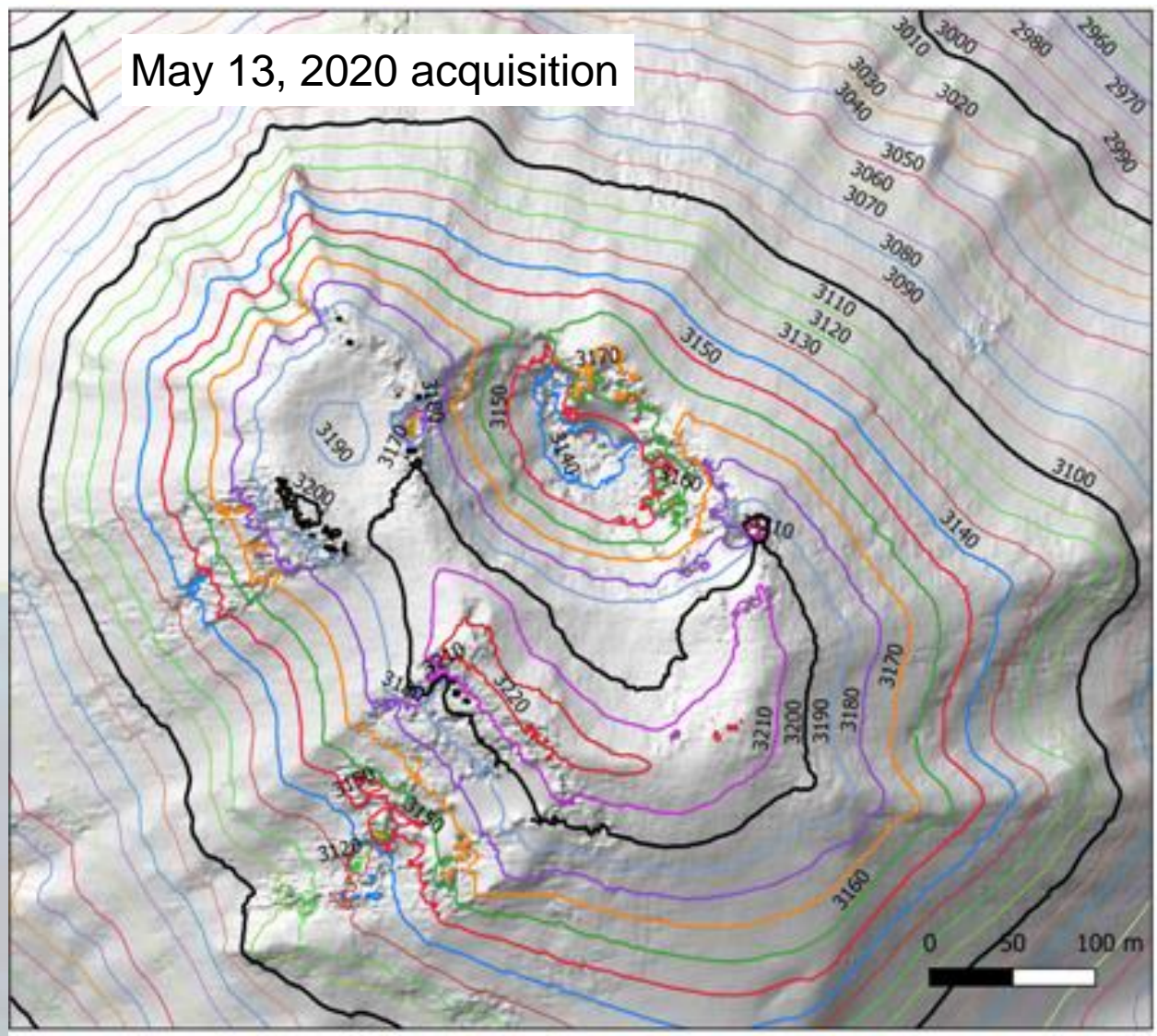
- Graduate student Edna Dualeh (University of Leeds) has analyzed TSX data acquired at a number of volcanoes to evaluate their utility. Are we getting the right data at the right volcanoes?
- Coherence at many volcanoes is very poor, even with 11-day repeats; however, TSX acquisitions at these volcanoes provide amplitude information that can be used to detect changes. Annual acquisitions at these sites are recommended.
- For interferometry, acquisition repeats should be based on:
 - Coherence (arid environments allow for longer repeat intervals; areas with vegetation or snow/ice need shorter repeat intervals)
 - Rates of change (areas of faster change need shorter repeat intervals)

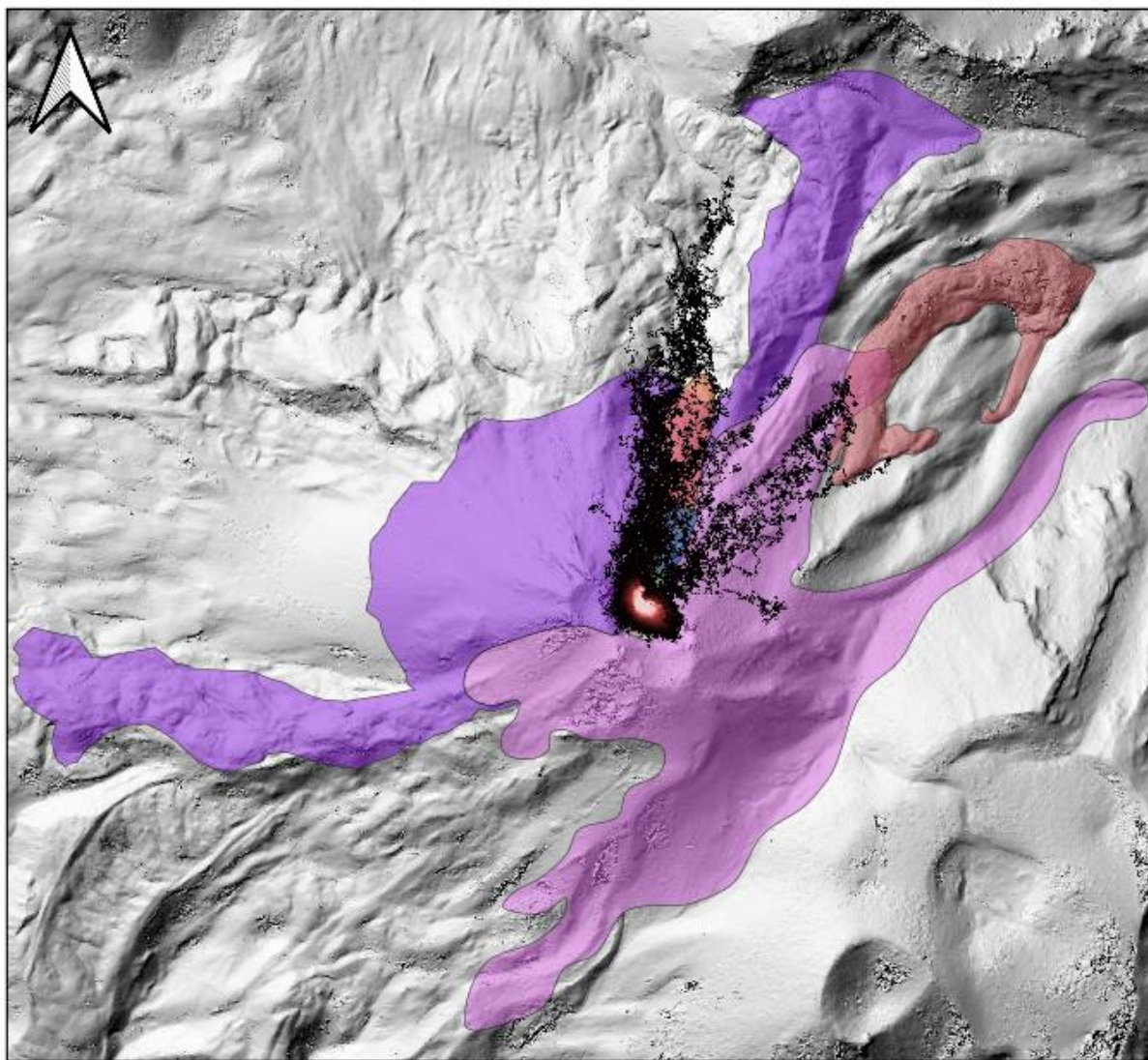


- Pleiades data are being tasked for Nevados de Chillán (Chile), Sabancaya (Peru), and Nevado del Ruiz (Colombia)
- At Nevados de Chillán (the 4th most hazardous volcano in Chile):
 - Knowing the volume of the current lava flow allowed SERNAGEOMIN to estimate the effusion rate, the highest during the current eruptive cycle (which started in 2016), but still not high enough to expect large explosions, dome collapses or triggering of lahar flows
 - The DEMs have been used for 1) modelling lava inundation zones; 2) inspection of the crater's morphology; and 3) to estimate thickness variation along the lava flow
 - Photointerpretation has been very useful to identify characteristics of the crater area, active fissures, and the evolution of the lava flow and a dome within the crater



May 13, 2020 acquisition





Leyenda

Modelación decrec_800f

- 0.000244769
- 0.04916007675
- 0.0980753845
- 0.14699069225
- 0.195906

• centros de emisión abril 2020

- 2019 L4
- 2019 L2 y L3
- 2019 L1
- Sebastián 2008

Geología

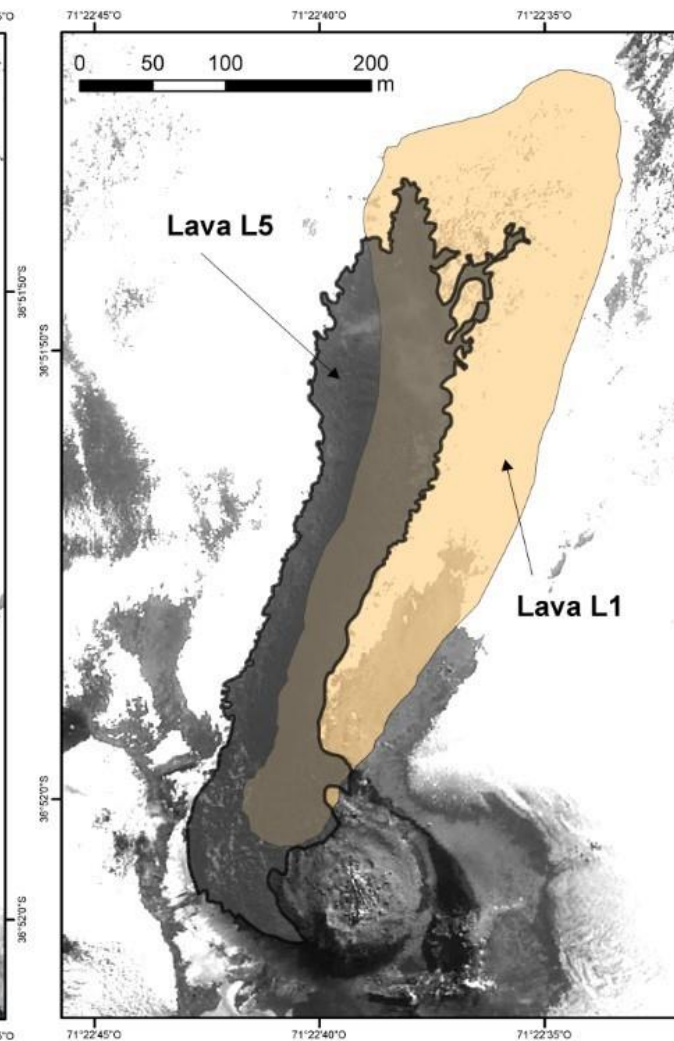
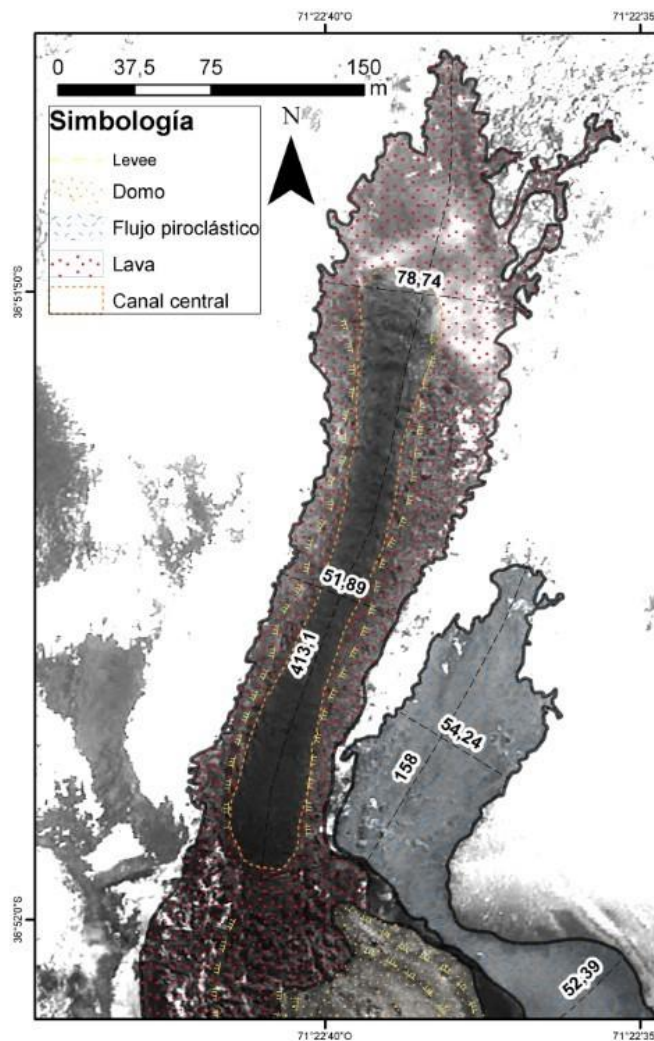
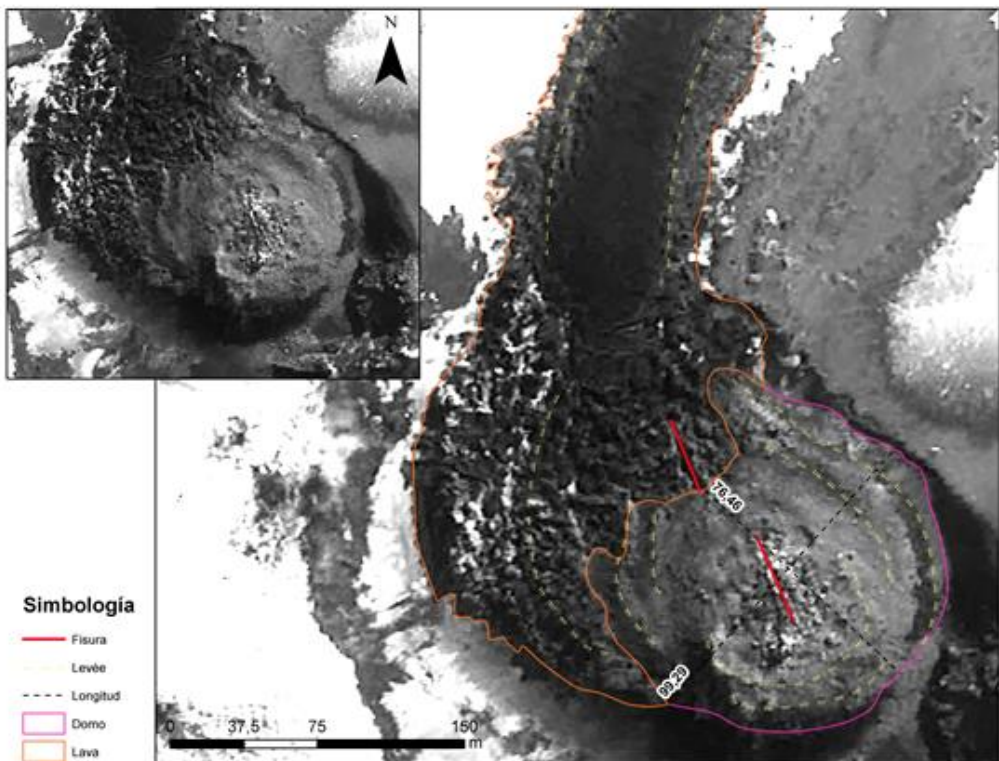
- Las Termas 1973-1986
- Volcán Nuevo 1906-1948

0 250 500 m

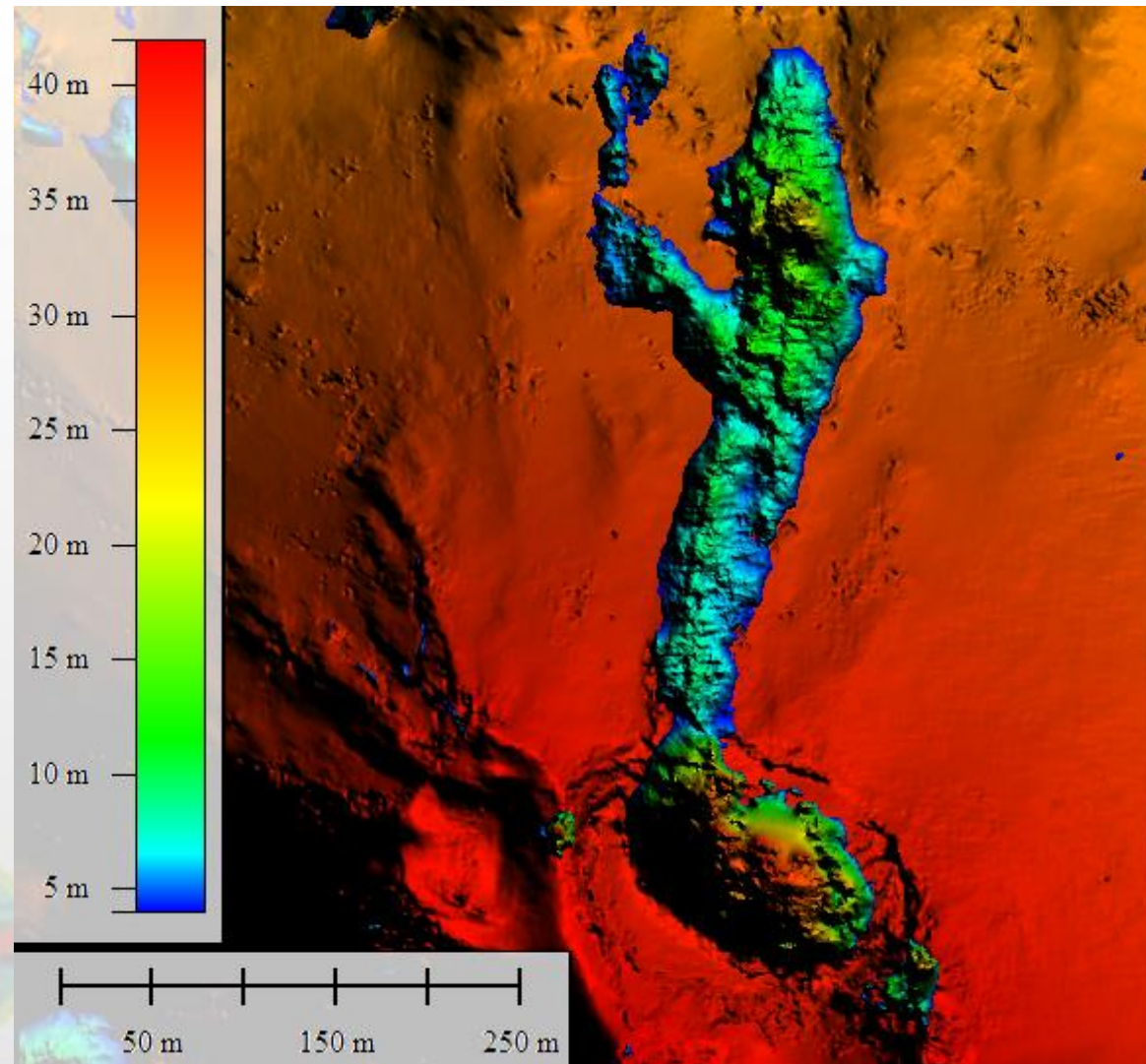




July 29, 2020 acquisition

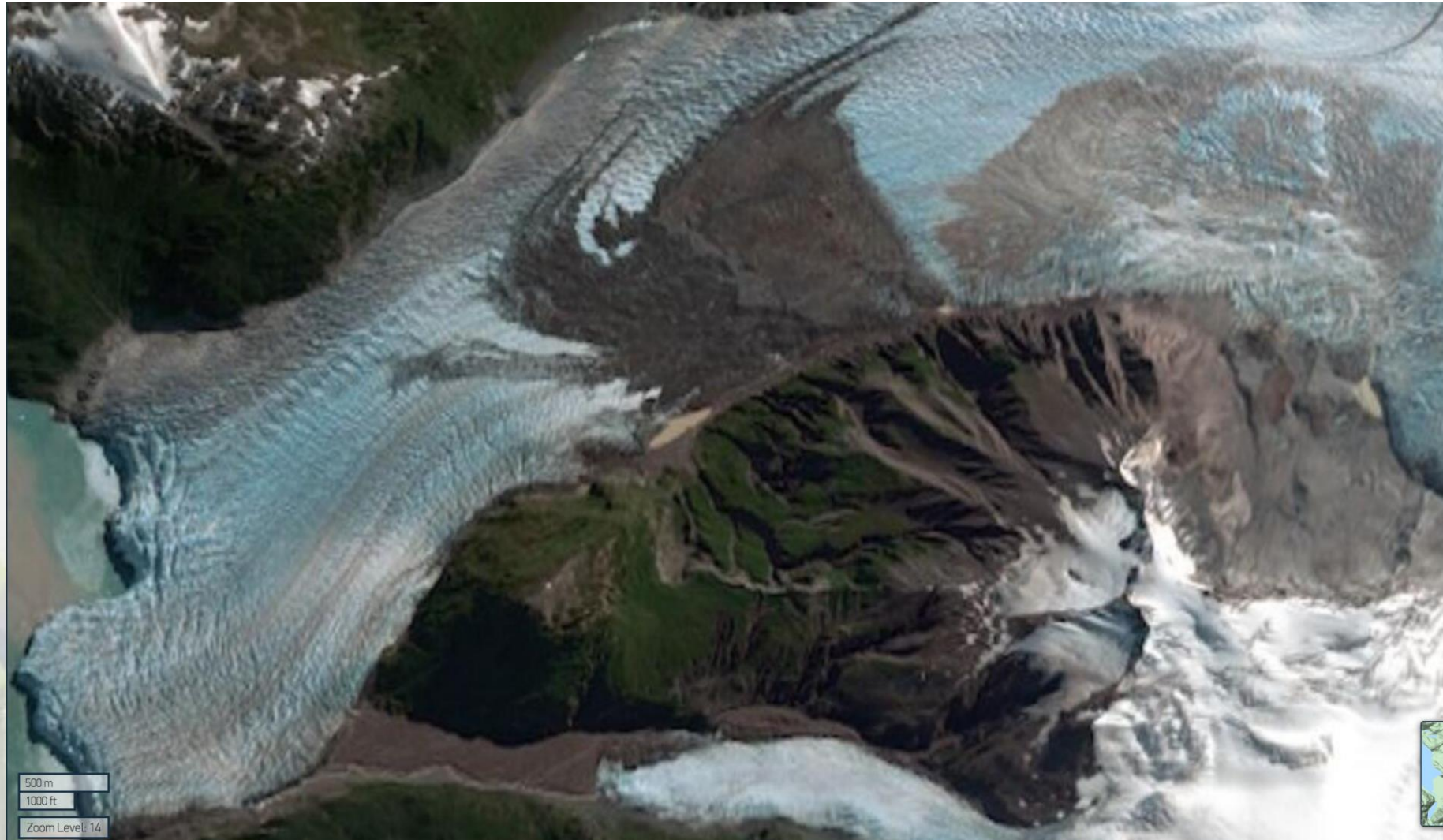


Topographic change between
May 13 and July 29, 2020



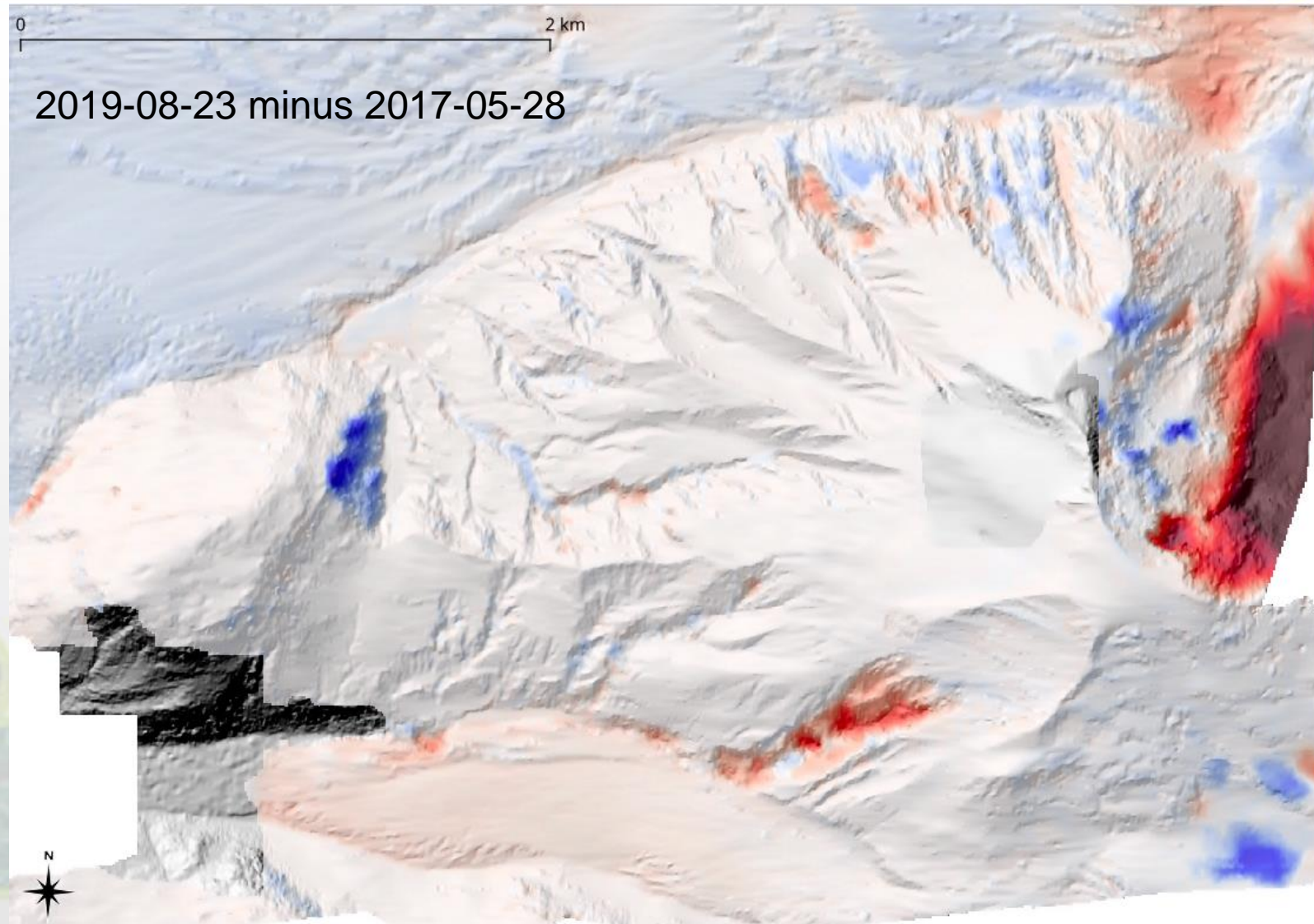


- Reclus volcano, southern Chile (last erupted in 1908).
- Remote sensing data indicate repeated major landslides into the glacier
- ALOS-2 data indicate no apparent deformation





- Worldview (Digital Globe) optical data used to calculate DEMs
- Blue=increase, Red=decrease (color extremes are +/- 200 meters)
- Landslide volume is about 22 million cubic meters
- Mechanism for landslides is uncertain, and further study is planned



- Cities on Volcanoes 11 meeting was scheduled for May 2020, now rescheduled for June 2021
- IAVCEI General Assembly was scheduled for February 2021, now rescheduled for January 2022
- Travel curtailed for PI-driven capacity-building projects — for example, University of Tokyo scientists were scheduled to travel to the Philippines to work with PHIVOLCS scientists on InSAR data, but this has been postponed, and GNS scientists have not been able to leave New Zealand for projects in places like Vanuatu

- Difficult to engage the scientific community
- Lack of students to work on available data at collaborating universities
- Volcano observatory staff are stretched thin and cannot use all available data without support
- Trouble getting funding for projects (VMGD-GNS example)
- CEOS needs (“partners” versus “stakeholders”)
- Interactions with Supersites