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Utilization of satellite data in the recent volcanic disaster at Mt. Semeru, Indonesia

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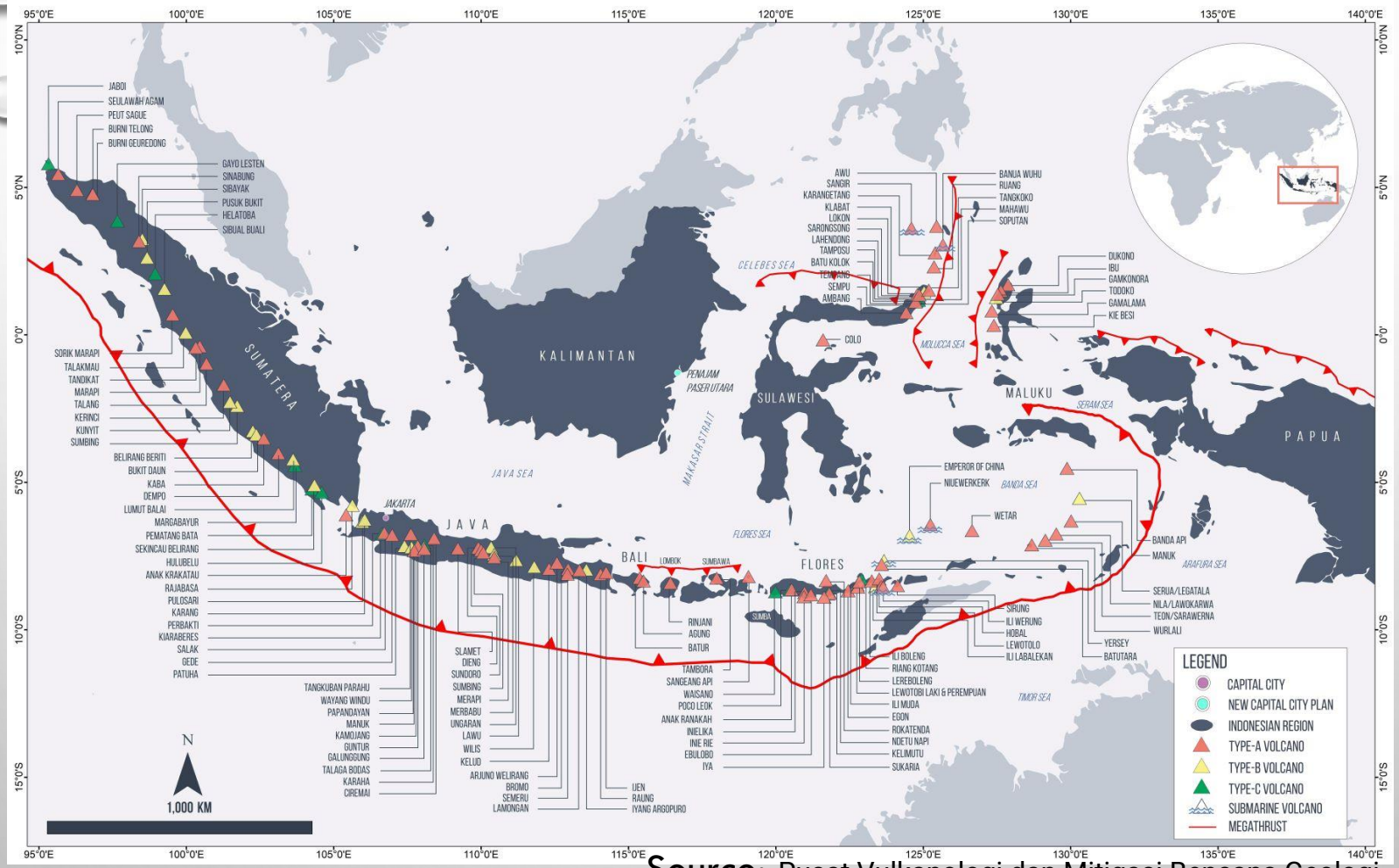
Outline of Volcanoes in Indonesia



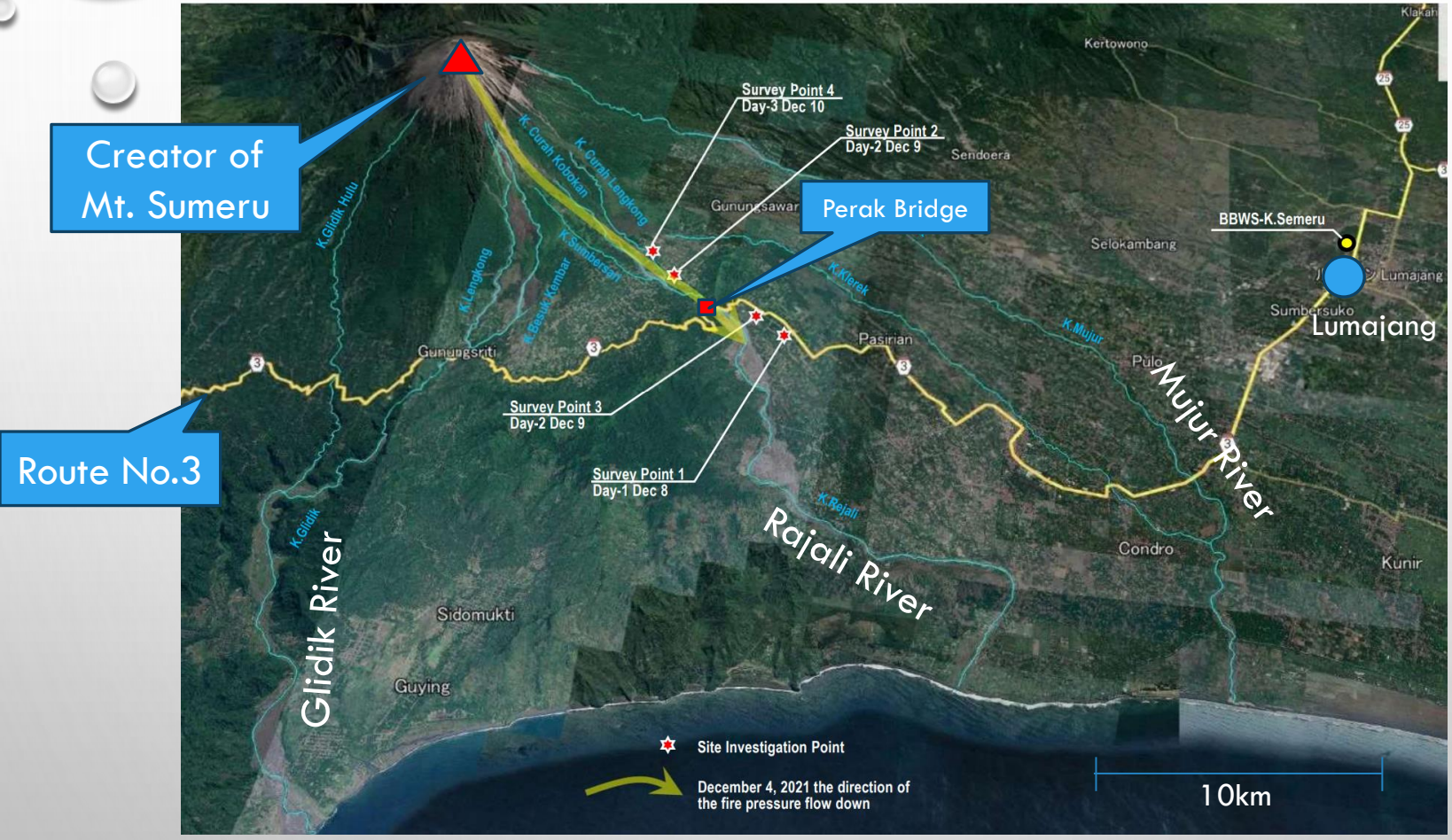
Source: Pusat Vulkanologi dan Mitigasi Bencana Geologi

There are 128 active volcanoes in Indonesia, 16% of all world volcanoes.

Outline of Mt. Semeru Volcano(1)

Location of Mt. Semeru

Outline of Mt. Semeru Volcano(2)



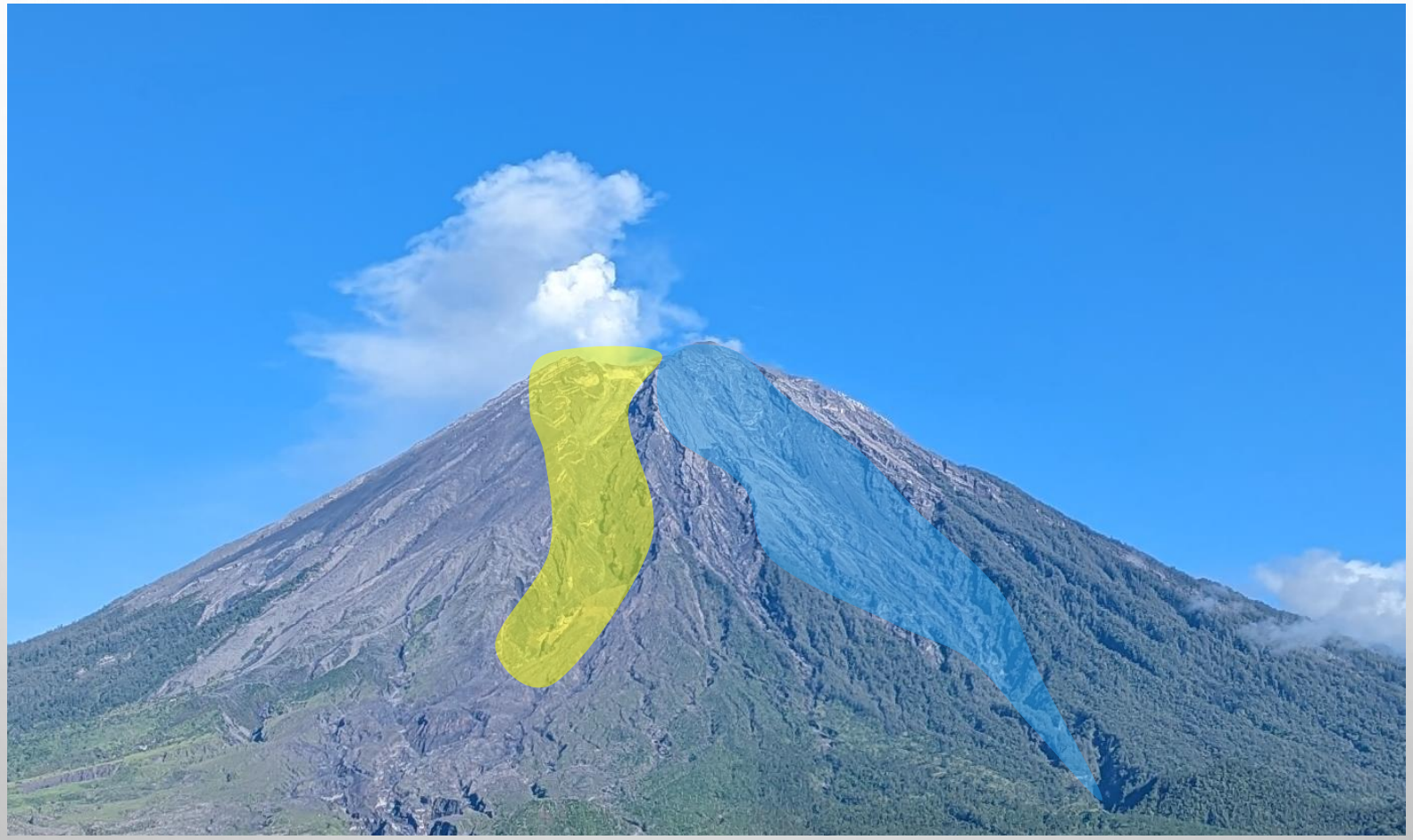
Source: Yachiyo Engineering Co.Ltd.

Mt. Semeru and Surroundings

Outline of Mt. Semeru Volcano(3)

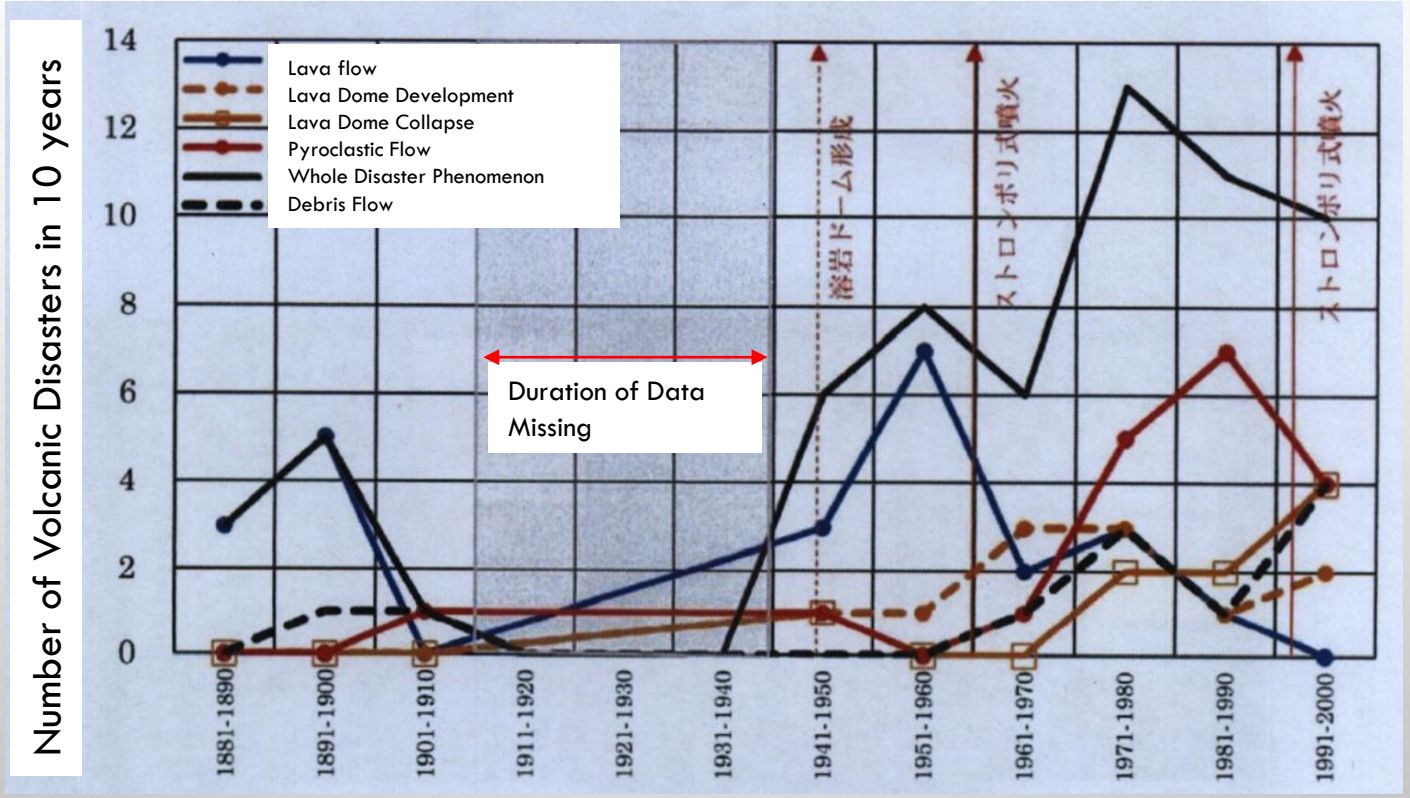
Mt. Semeru (3675.7m)

Outline of Mt. Semeru Volcano(4)



Crater of Mt. Semeru

Outline of Mt. Semeru Volcano(5)



Source: Yachiyo Engineering Co.Ltd.

History of Volcanic Disasters of Mt. Semeru

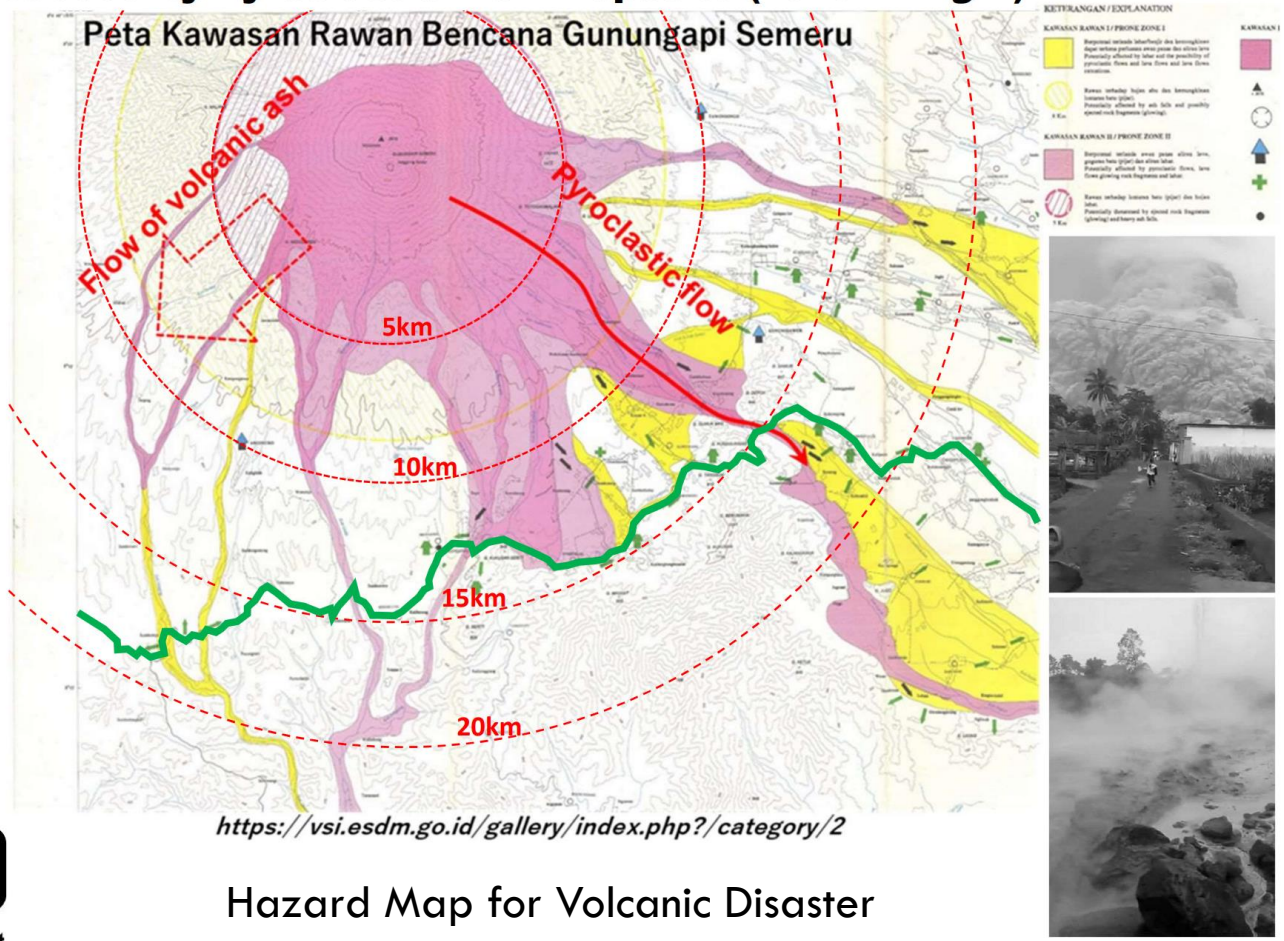
Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

- ✓ On December 4, 2021 at 14:46, Mt. Semeru erupted with pyroclastic flow.
- ✓ Around 50 fatalities and 10,000 evacuees were reported.
- ✓ During the first large-scale eruption, the volcanic plume rose about 1.5 km and pyroclastic flows reached up to 17 km along the river.
- ✓ Immediately after the eruption, two villages near the crater were swallowed by the pyroclastic flow.
- ✓ Perak Bridge at Route No.3 was destroyed by Debris flow.
- ✓ Immediately after the disaster, JICA team issued Emergency Observation Request to Sentinel Asia Secretariat, ADRC.

Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

Status of Pyroclastic Flows (*Awan Panas*) and Debris Flows Caused by Pyroclastic Flow Deposits (*Lahar Dingin*)

YACHIYO Engineering



https://vsi.esdm.go.id/gallery/index.php?/category/2

Hazard Map for Volcanic Disaster

Flood& Sediment

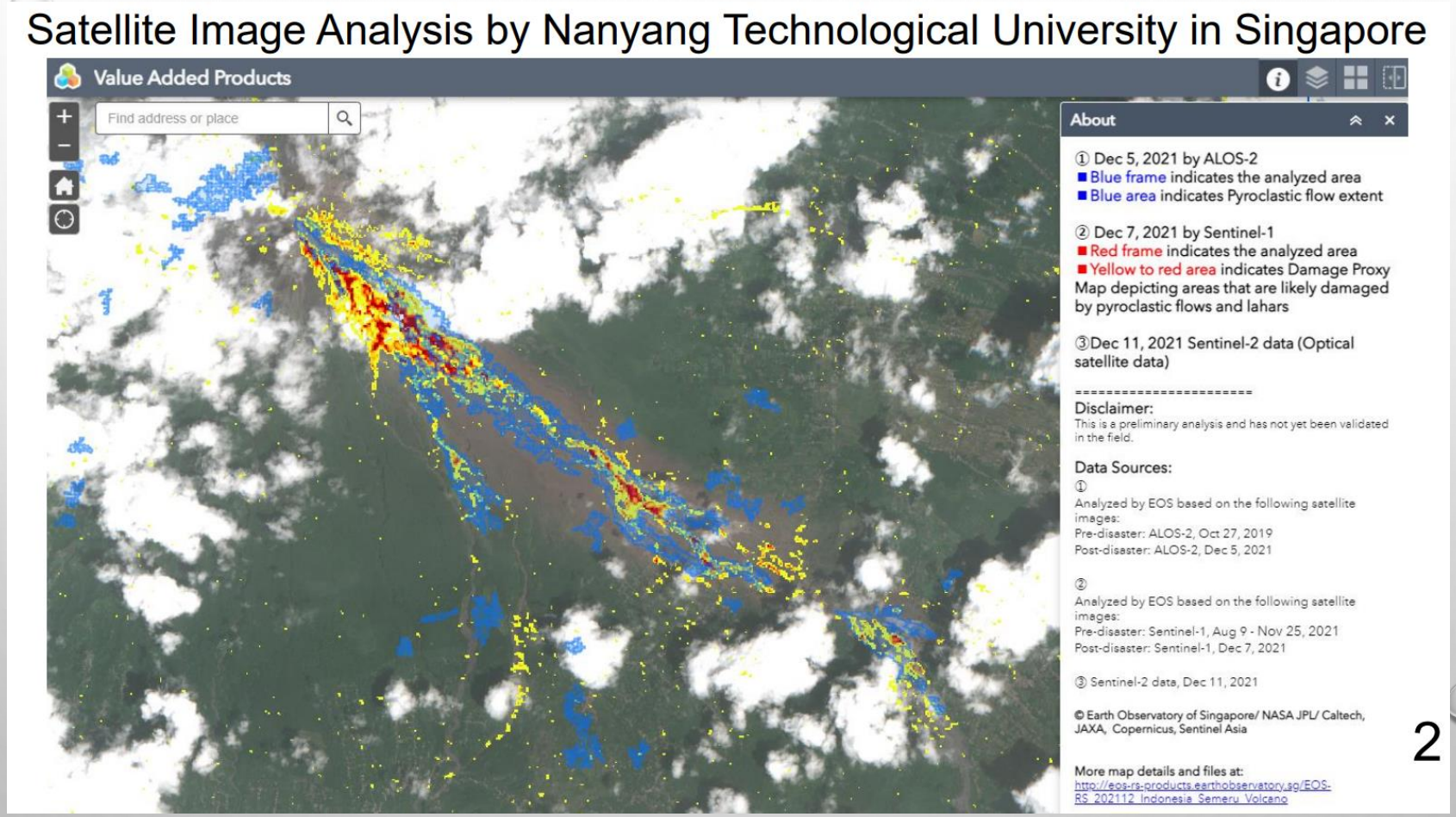
Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

Along Rajali River10km from the summit

Perak Bridge, Route No.3(12km from the summit)

Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

Satellite Image Analysis by Nanyang Technological University in Singapore



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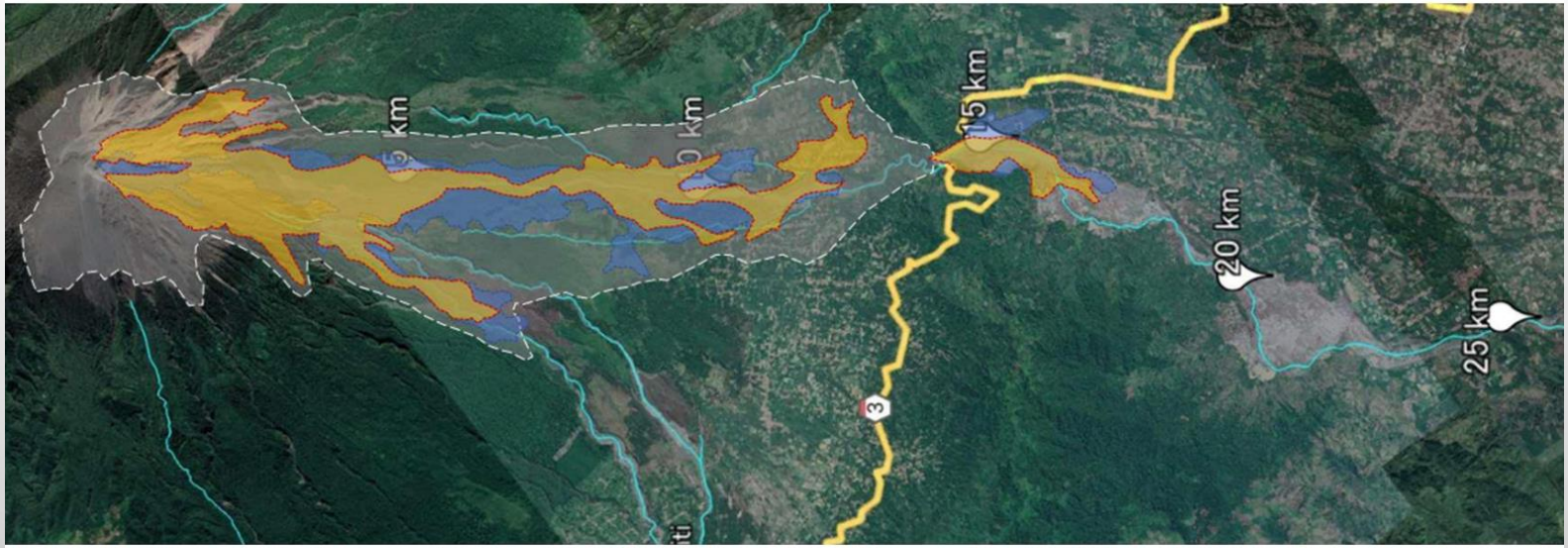
Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

Explanatory map of volcanic products by the consultant team



Note: The blue area is the area of topographic height change as of December 5, 2021, including pyroclastic flow deposits from the 2020 eruption. The red to yellow areas are the topographic height change areas caused by the December 4, 2021 eruption. Therefore, the major area of topographic change due to volcanic ejecta remaining at the present site is estimated to be the composite area of the blue area and the red to yellow area. The gray area is the area burned by volcanic ash and pyroclastic flow estimated from the satellite image (Sentinel2: European Satellite) of December 2021. (Source: Yachiyo Engineering Co., Ltd, EAST JAVA G.SEMERU VOLCANIC ERUPTION SITE DISASTER INVESTIGATION Ver-2)

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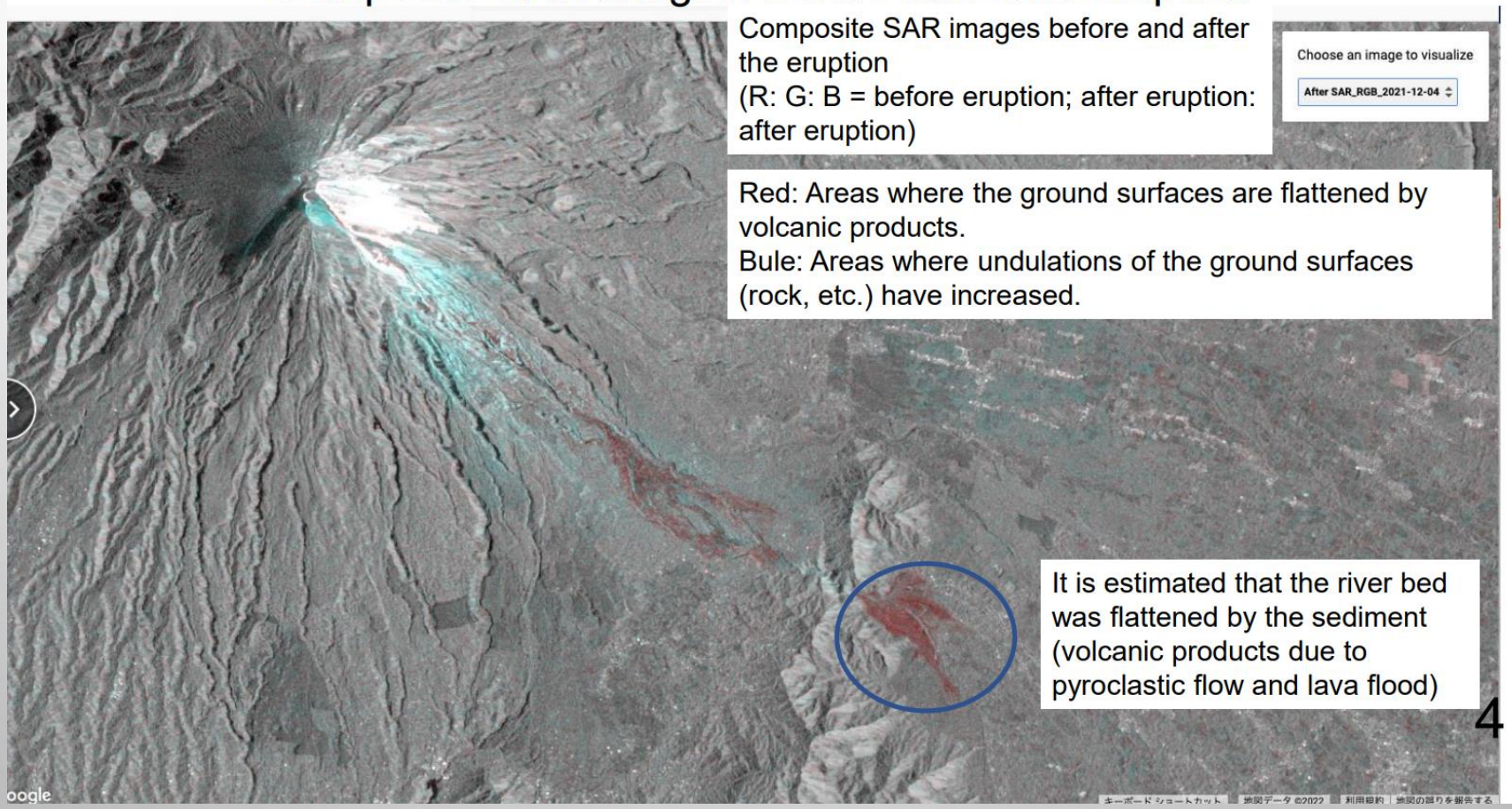
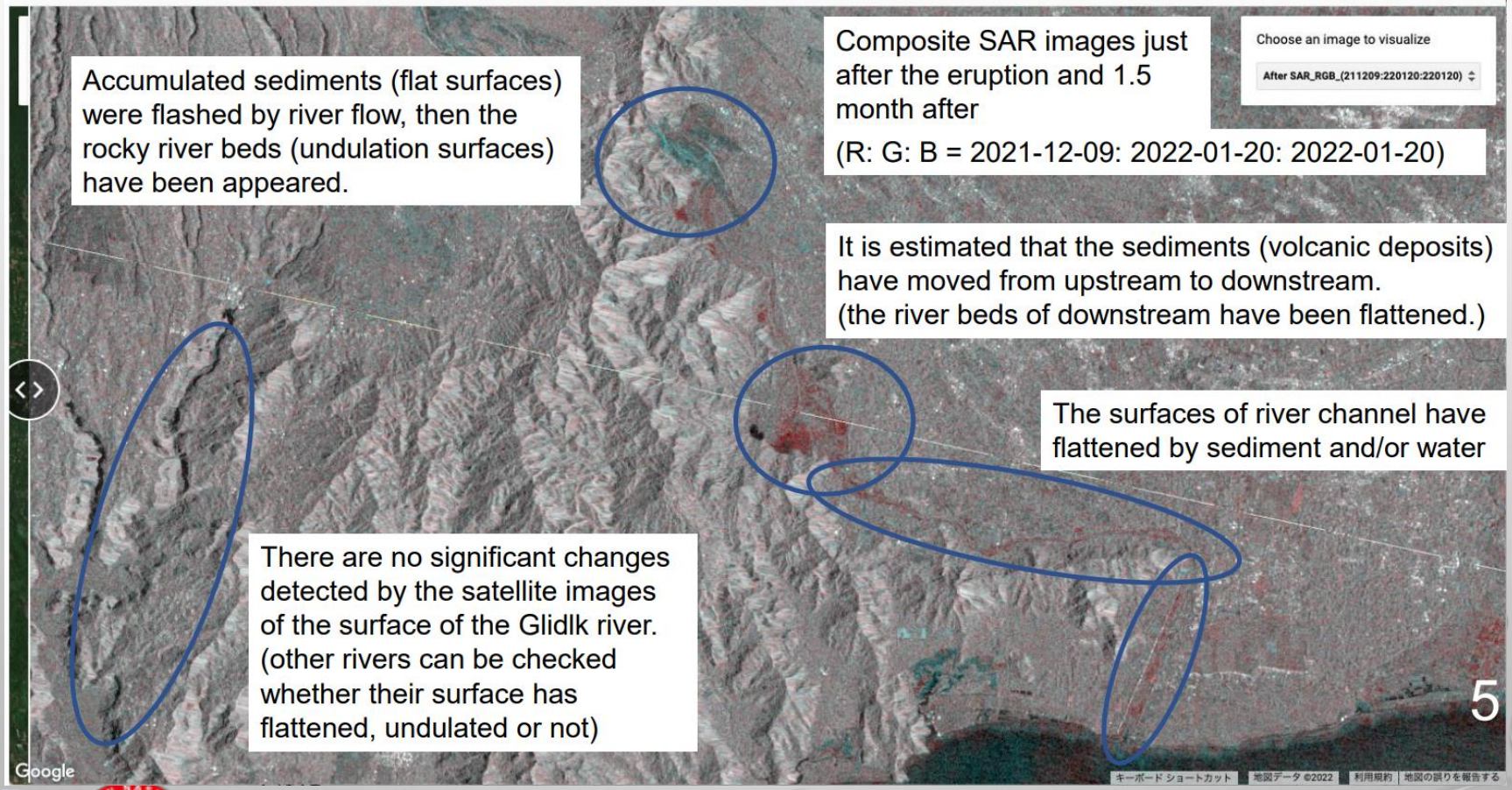
Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

Composite SAR images: before and after eruption



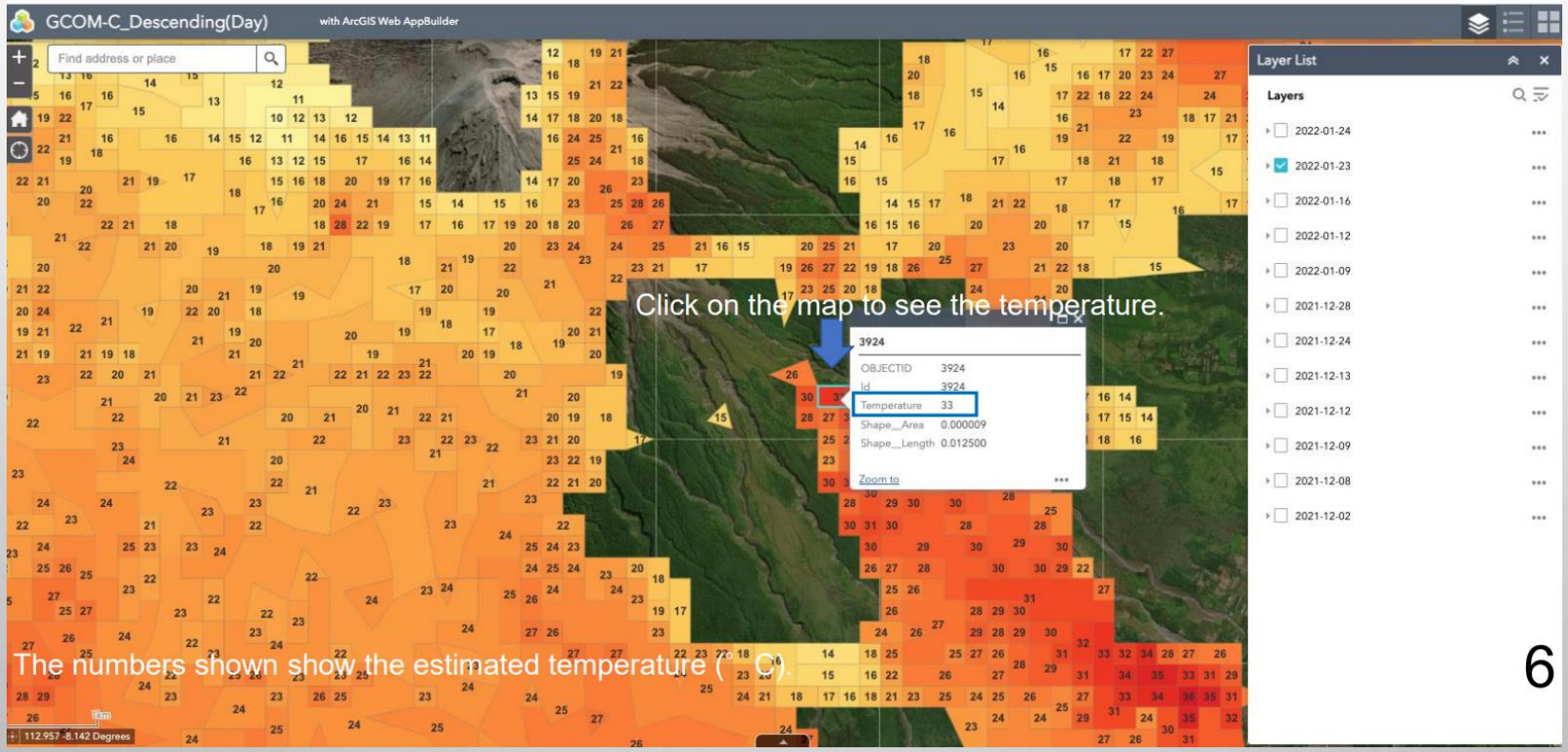
Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

Composite SAR images: just after the eruption and 1.5 month after



Utilization of Satellite Data at Mt. Semeru Volcano Disasters(Dec, 2021)

Surface temperature distribution estimated from satellite image



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Conclusion

1. Immediately after the disaster, several valuable satellite data were provided.
2. These data were much helpful for preparation for field survey.
3. In addition of providing satellite data, advises from experts of satellite data also are helpful.
4. Interpretation of satellite data are difficult for officers in the site, so dissemination of knowledge how to utilize satellite data in case of disaster are expected.