13 December 2021

PRELIMINARY SATELLITE-DERIVED DAMAGE ASSESSMENT

Mount Semeru, East Java province, Indonesia

Status: Widespread damage structures and agriculture area observed

Further action(s): Continue monitoring
**MOUNT SEMERU, EAST JAVA PROVINCE**

Population exposed to lahar or living close to affected zones

**LAHAR EXTENT**
- ~ 24 km²

**POPULATION EXPOSED**
- ~ 6,000

Image Center: ALOS Global DSM
Background: National Research and Innovation Agency, Indonesia
Lahar extent: Population data: WorldPop 2020

Population exposed within each radius zone:
- 10 km radius zone: 41,200
- 15 km radius zone: 168,200
- 20 km radius zone: 393,700

Total population within each radius zone:
- 10 km: 3,400
- 15 km: 5,800
- 20 km: 6,000

**Lahar flow**
- Village: Malang, Lumajang, Jember
- City/Town: Kota Malang, Lumajang, Jember
- District boundary: Malang, Lumajang, Jember

Population data: WorldPop 2020
MOUNT SEMERU, EAST JAVA PROVINCE
Affected areas by lahar and ash deposit

Pleiades image acquired on 11 December 2021
Image Center: 112°58'27.489"E 8°9'5.609"S
MOUNT SEMERU, EAST JAVA PROVINCE

Lahar flow track observed in southeastern the Mount Semeru

Sentinel-1 / 25 November 2021

Sentinel-1 / 7 December 2021
Widespread volcanic ash coverage observed over southeastern part the Mount Semeru.
MOUNT SEMERU, EAST JAVA PROVINCE

Over the vent of mount Semeru

Collapsed evidence and Lava flow trail observed

Pleiades / 24 July 2021

Pleiades / 11 December 2021
MOUNT SEMERU, EAST JAVA PROVINCE

~ 10 km southeastern of the crater

Damaged houses, damaged road, and affected agricultural area observed
MOUNT SEMERU, EAST JAVA PROVINCE
~ 9.7 km southeastern of the crater
Damaged houses, damaged road, and affected agricultural area observed

Pleiades / 24 July 2021

Pleiades / 11 December 2021
MOUNT SEMERU, EAST JAVA PROVINCE
~ 10.4 km southeastern of the crater
Damaged houses, damaged road, and affected agricultural area observed

Pleiades / 24 July 2021
Pleiades / 11 December 2021
MOUNT SEMERU, EAST JAVA PROVINCE

~ 11.5 km southeastern of the crater

Damaged houses, damaged road, and affected agricultural area observed

Pleides / 24 July 2021

Pleides / 11 December 2021
MOUNT SEMERU, EAST JAVA PROVINCE

~ 13 km southeastern of the crater

Damaged road, damaged bridges and damaged houses observed
MOUNT SEMERU, EAST JAVA PROVINCE

~ 14 km southeastern of the crater

Damaged road, damaged bridges and damaged houses observed
MOUNT SEMERU, EAST JAVA PROVINCE
~ 16.5 km southeastern of the crater
Potentially affected Sumberwuluh Candipuro bridge and damaged structures observed

Pleiades / 24 July 2021

Pleiades / 11 December 2021
MOUNT SEMERU, EAST JAVA PROVINCE
~ 9.3 km southwestern of the crater
No damage observed
MOUNT SEMERU, EAST JAVA PROVINCE
~ 10.2 km southwestern of the crater

No damage observed
SUMMARY OF FINDINGS

- Hot ash deposits observed in southeastern parts of the mount Semeru as of 8 December 2021.

- Widespread damage to houses, roads, and agricultural lands observed in Lumajang district, East Java province as of 11 December 2021.

- Gladak Perak bridge appears to be destroyed as of 11 December 2021.

- Potentially affected Sumberwuluh Candipuro bridge observed as of 11 December 2021.

- No obvious widespread damage observed in the southwestern parts of the mount Semeru as of 10 December 2021.
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Data sources:

(1) Satellite Image (Post-event)

Sentinel-1 / 7 December 2021 about 10:49 UTC
Resolution: 10 m
Copyright: Contains modified Copernicus Sentinel Data [2021]
Source: ESA / The Charter

Pleiades / 24 July 2021
Resolution: 50 cm
Copyright: CNES (2021), distribution Airbus D&S
Source: Airbus DS / The Charter

(2) Satellite Image (Pre-event)

Sentinel-1 / 25 November 2021 at 10:49 UTC
Resolution: 10 m
Copyright: Contains modified Copernicus Sentinel Data [2021]
Source: ESA

(3) Ancillary data

Pleiades / 10 and 11 December 2021
Resolution: 50 cm
Copyright : CNES (2021), distribution Airbus D&S
Source : Airbus DS / The Charter

Lahar extent : National Research and Innovation Agency, Indonesia
Geological data: USAID - USGS Volcano Disaster Assistance Program
Administrative boundaries: Badan Pusat Statistik (BPS - Statistics Indonesia)
Population data : WorldPop 2020

Analysis: United Nations Satellite Centre (UNOSAT)
Production: United Nations Satellite Centre (UNOSAT)