



Area of Interest: Fentale Volcano, Ethiopia
Date Covered: 22 January – 3 February 2025
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Purpose/Caveats: This event response report was produced to assist situational awareness and rapid response efforts, it represents best endeavours at the time of issue. Analysis and interpretation of the data is preliminary, which may not reflect the most up-to-date or complete information due to the evolving situation.

Data Used:

- InSAR images collected by the European Sentinel-1 satellite and processed using the COMET LICsAR system (<https://comet.nerc.ac.uk/comet-lics-portal/>)
- InSAR images acquired by the COSMO-SkyMed (CSK) satellites, provided through the CEOS GVEWERS programme and processed at the University of Bristol using GAMMA.
- USGS Earthquake Catalogue (<https://earthquake.usgs.gov/earthquakes/search/>)

Recent Activity:

Continued slowdown in activity

Unrest is ongoing, but continuing at a slower rate than December 2024. Based on the latest 12-day descending Sentinel-1 interferogram spanning 22 January to 3 February, line-of-sight (LOS) displacement associated with dyke opening is > 20cm. In comparison, LOS displacement was > 65 cm from 10-22 January, and > 1 m from 29 December to 10 January (Fig 1). At Fentale, displacement away from the satellite was ~14 cm. This is a decrease from the ~ 33 cm observed during the previous 12-day period from 10-22 January, and ~ 45 cm from 29 December – 10 January.

We previously reported (refer to Event Report 1.5) that the dyke opening was localised to a 13 km long segment just south of Dofen, based on a COSMO-SkyMed (CSK) interferogram spanning 24-25 January. However, a more recent interferogram from 25 January to 2 February shows opening along a ~ 33 km long dyke (Fig 3). This highlights that the rate of opening is variable throughout the entire length of the dyke, and caution should be exercised when interpreting short-temporal baseline interferograms.

The USGS reported 10 >M4 earthquakes from 22 January to 3 February.

Forward Look:

Plumes within the crater of Fentale continue to be visible in satellite optical imagery (e.g., Sentinel-2).

We will continue to monitor surface deformation with the upcoming Sentinel-1 and COSMO-SkyMed images. This, in combination with other data, observations and models, will provide evidence on which the potential evolution of the event can be considered. A scientific committee comprising scientists from Addis Ababa University (IGSSA and School of Earth Science), the Geological Institute of Ethiopia and other relevant institutions is monitoring the events and keeping the Ethiopian Disaster Risk Management Commission (EDRMC) and the public continuously informed. The government has reminded citizens to follow precautionary messages given by professionals.

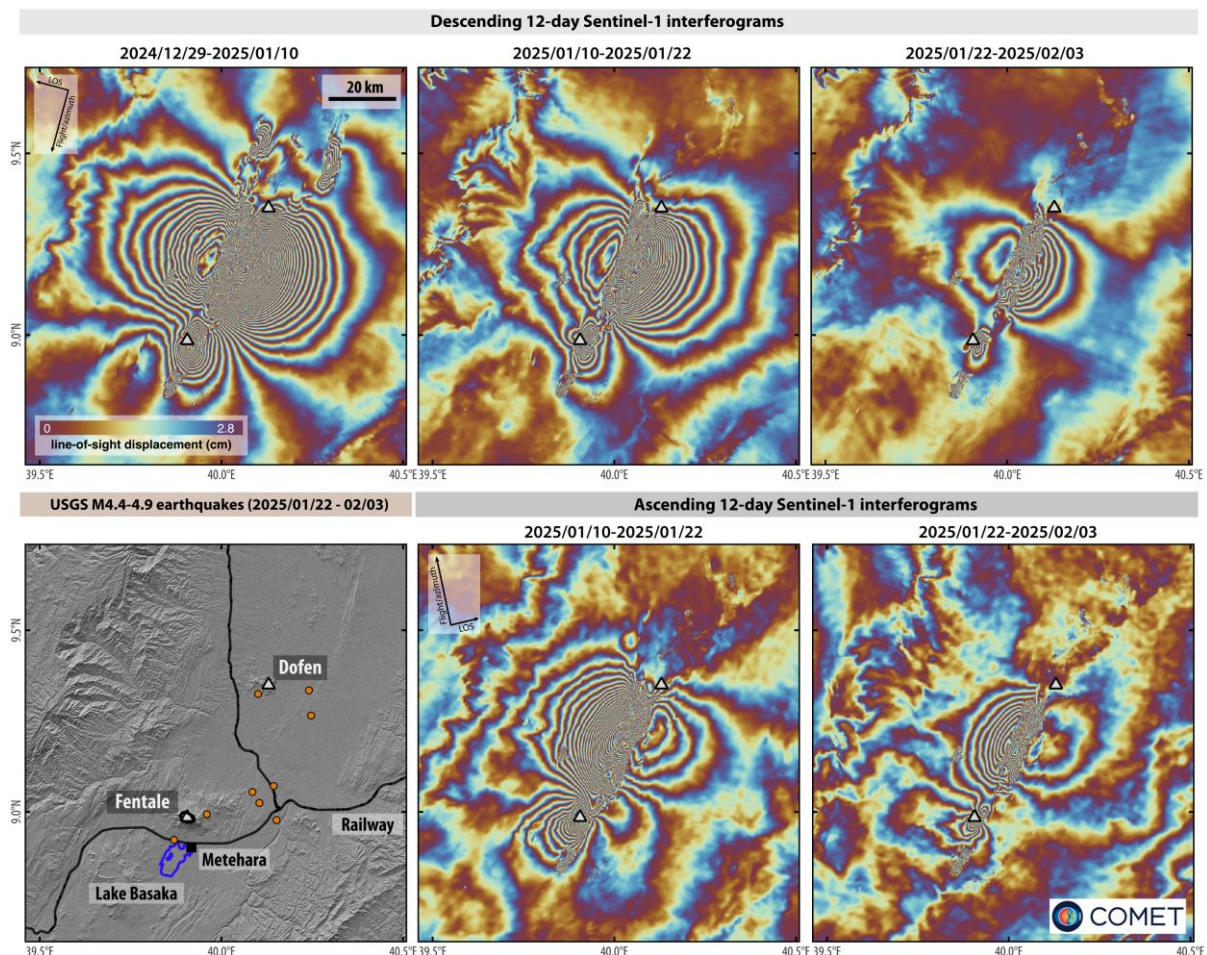


Fig 1. Slowdown in deformation beneath Fentale and dyke opening observed in consecutive ascending and descending 12-day Sentinel-1 interferograms.

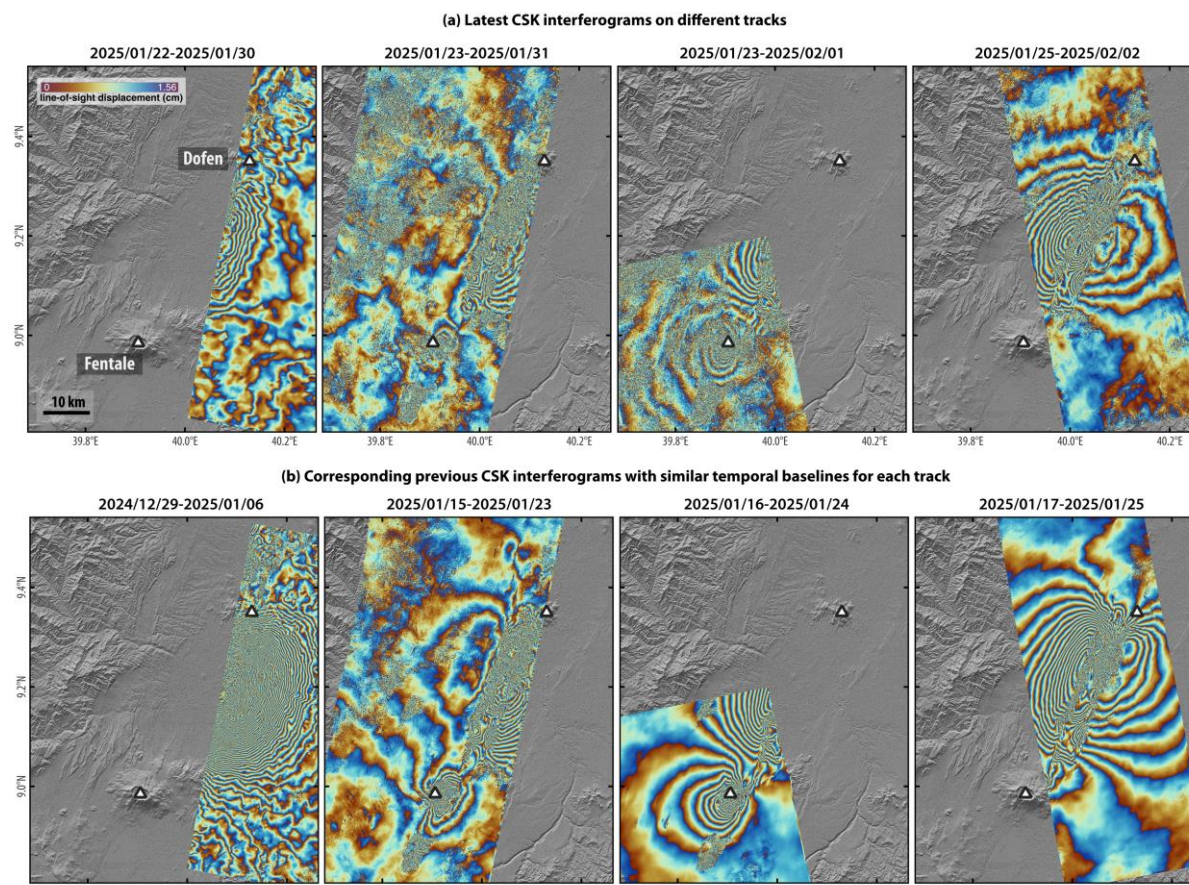


Fig 2. Slower rate of deformation at Fentale and dyke opening seen by comparing (a) the latest 8/9-day CSK interferograms for each track (column) with the (b) corresponding previous 8-day interferograms, where the latest interferograms have a smaller number of fringes and thus displacement across a similar timespan.

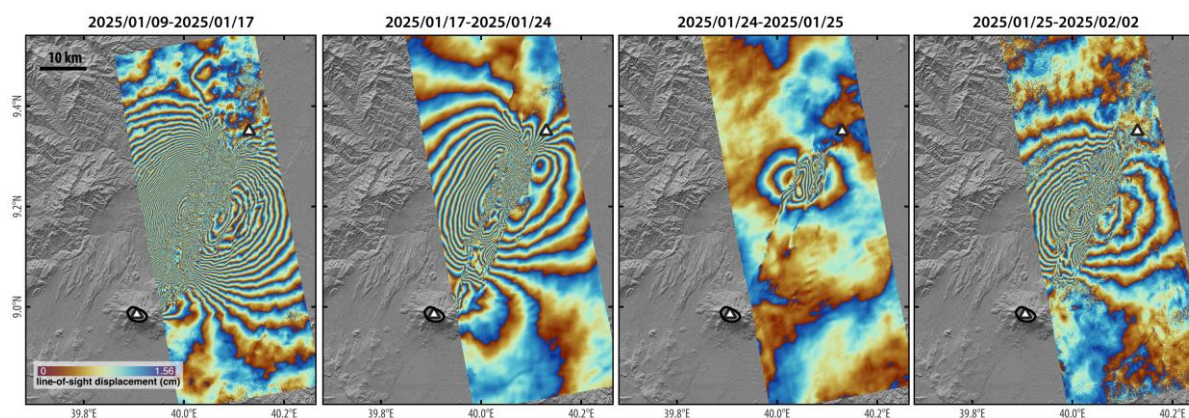


Fig 3. Consecutive ascending CSK interferograms of the same track. In our previous event report, we wrote that the 1-day interferogram (24-25 Jan) shows the dyke opening being localised to the northern segment. However, the subsequent interferogram spanning 25 Jan to 2 Feb shows continued opening along a ~ 33 km dyke, suggesting that the rate of opening is variable along the length of the dyke.