

ETHIOPIA - AFAR & OROMIA REGIONS

Observed seismic and volcanic activity - Sept 2024 - Jan 2025

For humanitarian purposes only  
Production date : 15 January 2025

The Fentale Volcanic Complex, located in the Ethiopian Rift Valley, has experienced increased seismic activity since Oct 2024. In late Dec 2024 and early Jan 2025, several earthquakes exceeding M5 hit the area, including a M5.7 to the north of Dofan volcano on Jan 4th. The increased seismic activity appears to be associated with movement of magma along dikes several km beneath the surface. So far, a hydrothermal explosion has been observed to the southwest of Dofan volcano in Seganto Kebele, along with mud volcanism along fissures to the south of this vent. Several settlements are located in this area (inset A). There is a possibility of further activity occurring with limited warning.

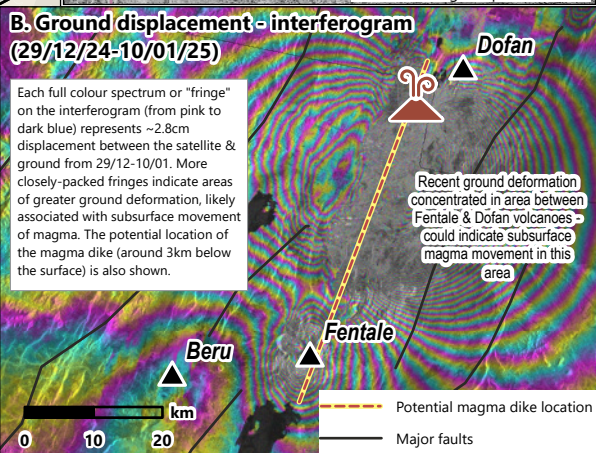
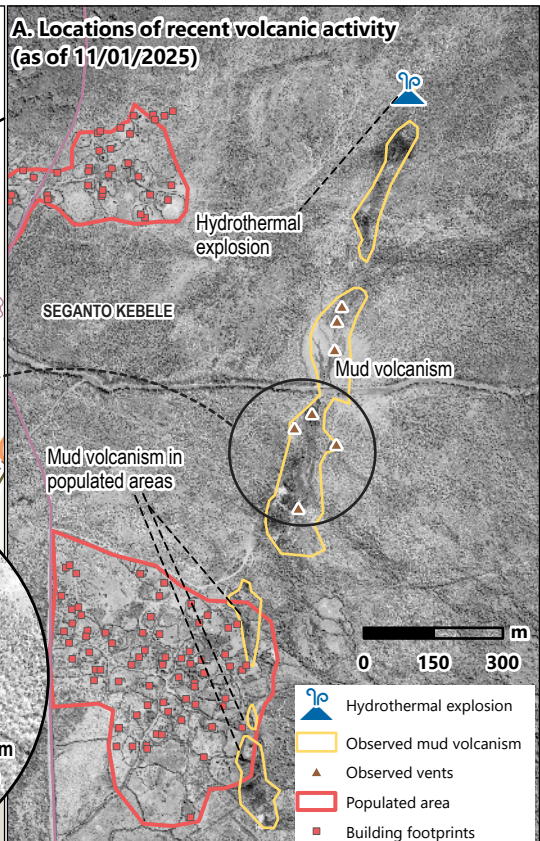
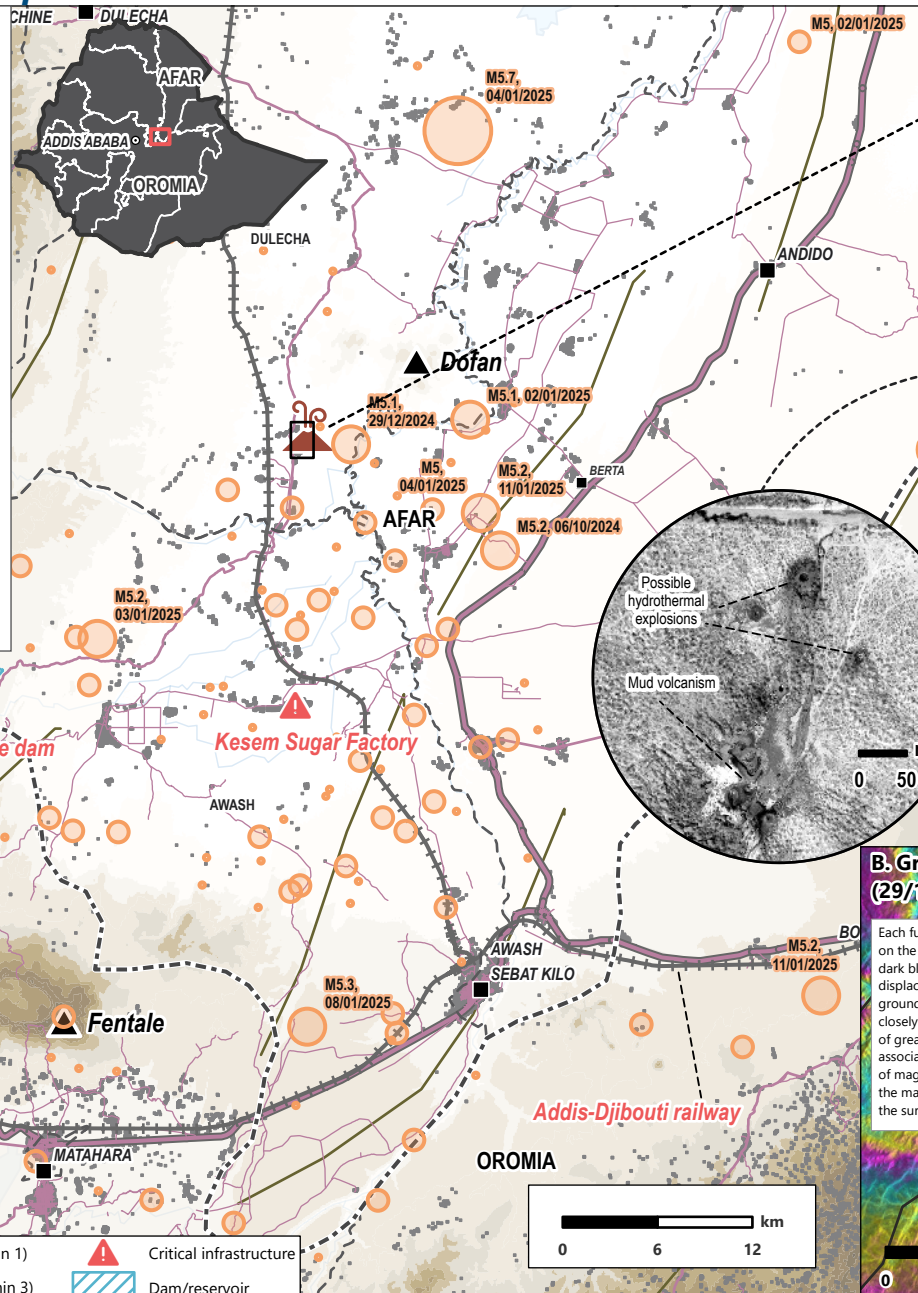
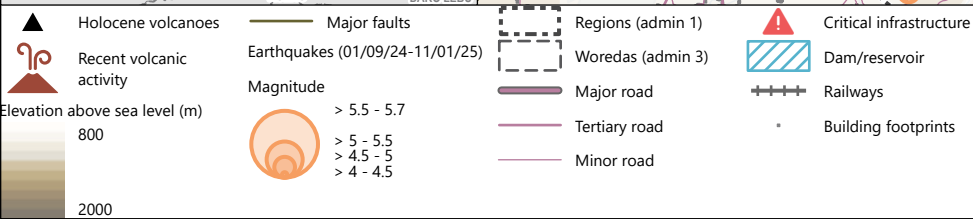
In total around 35cm of inflation has occurred in the area since 2021. The interferogram (inset B) highlights areas of recent displacement between 29/12 and 10/01, with more tightly packed "fringes" indicating zones of greater deformation associated with subsurface magma movement. The potential location of the most recent dike is also shown on the map. It is not yet known if a magmatic eruption will occur and whether it will occur at Dofan, Fentale or a new vent entirely.

Evacuations of around 80K people have been proposed by the Ethiopian government from high risk areas in Afar & Oromia so far (inset C). Seismic activity has damaged homes, health centres, schools and roads, as well as key infrastructure such as the Kesem sugar factory. Further activity poses a significant risk to other buildings in the area, many of which are poorly constructed, and other critical infrastructure such as major roads, the Addis-Djibouti railway and the Kesem/Sabure dam. Collapse of the dam, which is designed to withstand earthquakes up to M5.6, could lead to catastrophic flooding downstream.

Sources: OCHA Flash Update (Jan 6th 2025), UNDAC (Jan 2025); Geology Hub (Jan 2025) & "The 2024 Fentale Diking Episode in a Slow Extending Continental Rift" by Kier et al. (2024).

C. Evacuations proposed by Ethiopian Govt.

Source: OCHA as of 06/Jan/2025



Data sources - Satellite imagery: Worldview-1 from 11 January 2025. Copyright: ©2024 DigitalGlobe. Source: US Department of State; earthquakes: USGS (01/09/24-11/01/25); sites of possible mud volcanism and hydrothermal activity digitised from WV-1 imagery, potential magma dike location (Geology Hub); roads & railways (HotOSM); buildings (Google); holocene volcanoes (Smithsonian); contours (SRTM); interferogram developed from Sentinel 1 data through Alaska Satellite Facility; Note: interferogram indicates areas of ground deformation relative to satellite between the two image dates. Areas of inflation may be related to magma movement towards the ground surface. The magma dike is the potential location but is indicative only and subject to change once more data is available.

Note: Data, designations and boundaries contained on this map are not warranted to be error-free and do not imply acceptance by REACH partners, associates or donors mentioned on this map.