Sentinel Vision
SED-390
30 January 2019

2D Layerstack

# Ol Doinyo Lengaï, the white volcano

**Sentinel-1 CSAR IW** acquired on **30 August 2016** at 03:20:36 UTC
**Sentinel-1 CSAR IW** acquired on **09 September 2016** at 15:55:25 UTC
**Sentinel-2 MSI** acquired on **20 December 2016** at 07:52:12 UTC
**Sentinel-1 CSAR IW** acquired on **24 December 2018** at 03:19:53 UTC
**Sentinel-1 CSAR IW** acquired on **28 December 2018** at 15:55:36 UTC

Author(s): Sentinel Vision team, VisioTerra, France - svp@visioterra.fr

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Fig. 1 - S2 (20.12.2016) - 4,3,2 natural colour - Ol Doinyo Lengaï is a volcano located in Tanzania. 2D view 3D view

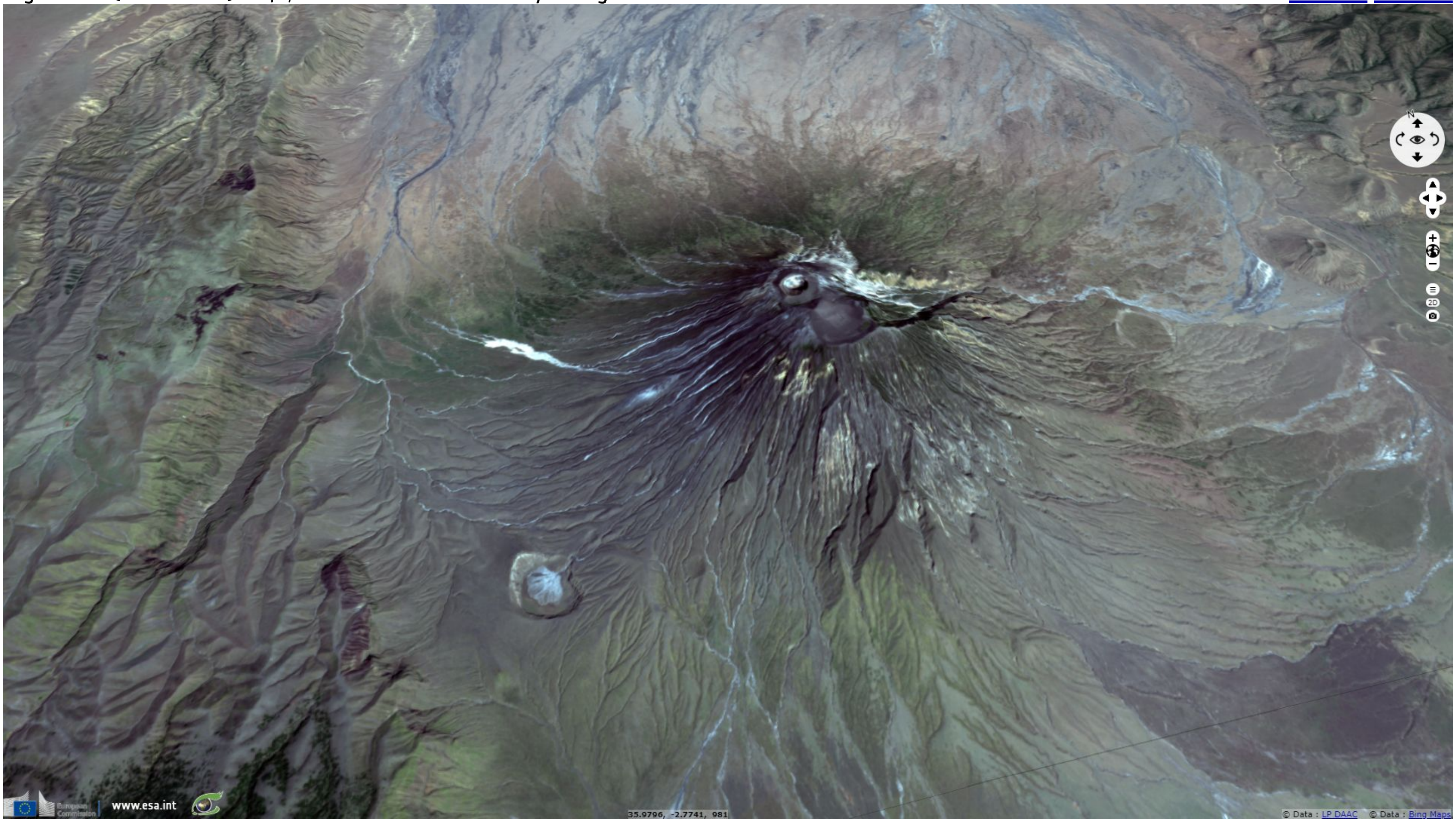



Fig. 2 - S1 (28.12.2018) - vv,vh,ndi(vh,vv) colour composite - It lies on the Eastern branch of the Great Rift Valley or Gregory rift. 3D view 2D view

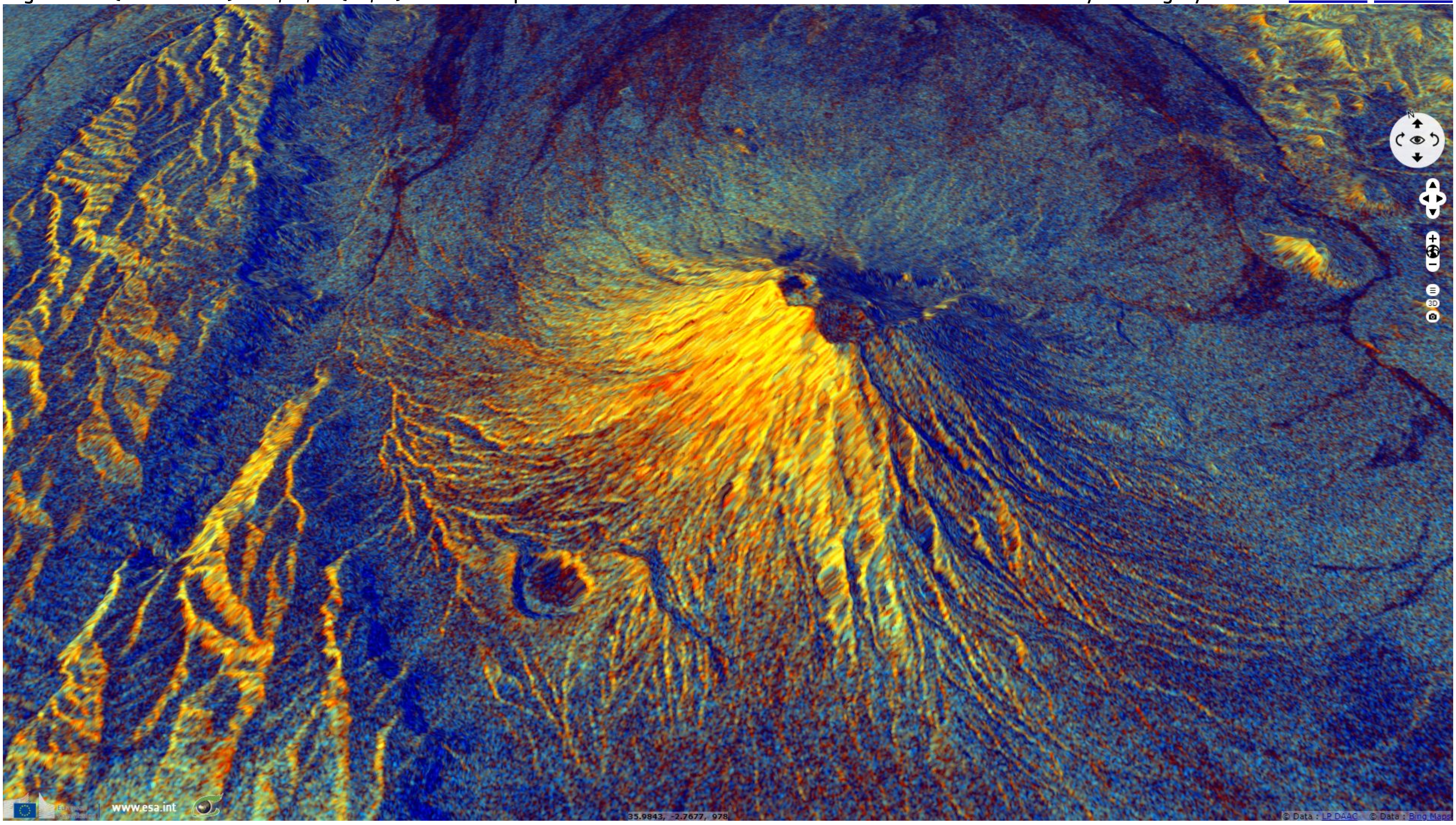
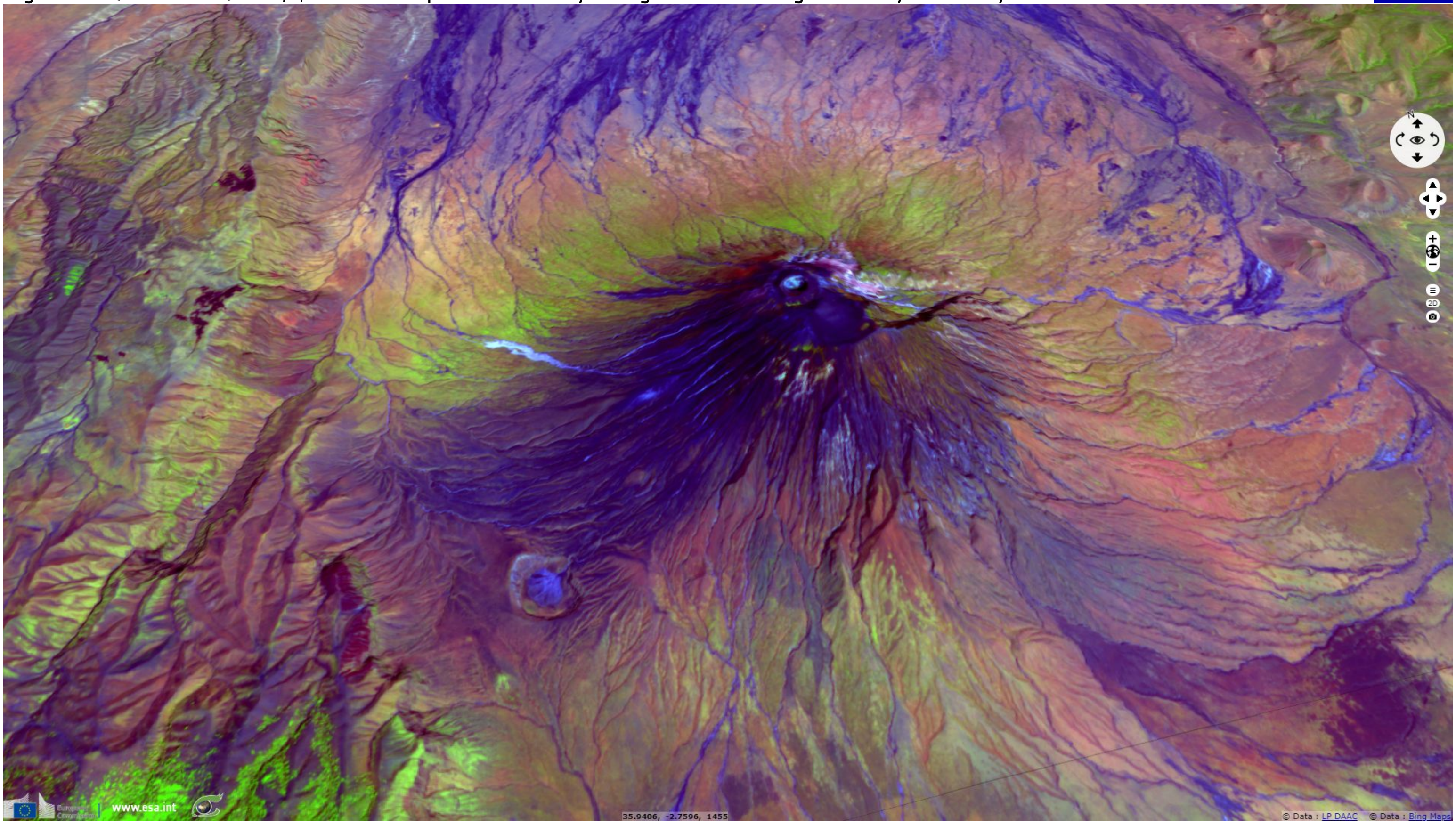


Fig. 3 - S2 (20.12.2016) - 11,8,2 colour composite - Ol Doinyo Lengaï is 2960 m high and only 370 000 years old. 3D view




What makes it unique on Earth is its lava flows, made of natrocarbonatite. This lava melts at 500-600 ºC, a temperature too low to emit the usual red glow, so that it appears black to the eye when it erupts.

Furthermore, the anhydrous sodium and potassium carbonate minerals of the lavas erupted at Ol Doinyo Lengai are unstable at the Earth's surface and susceptible to rapid weathering as they come into contact with the moisture of the atmosphere. The black or dark brown lava and ash erupted begins to turn white within a few hours. The resulting volcanic landscape is different from any other in the world.

Fig. 4 - S1 - VV polarisation in raw reprojection, 09.09.2016 (ascending) in red & blue channels, 30.08.2016 (descending) in green channel. 2D view

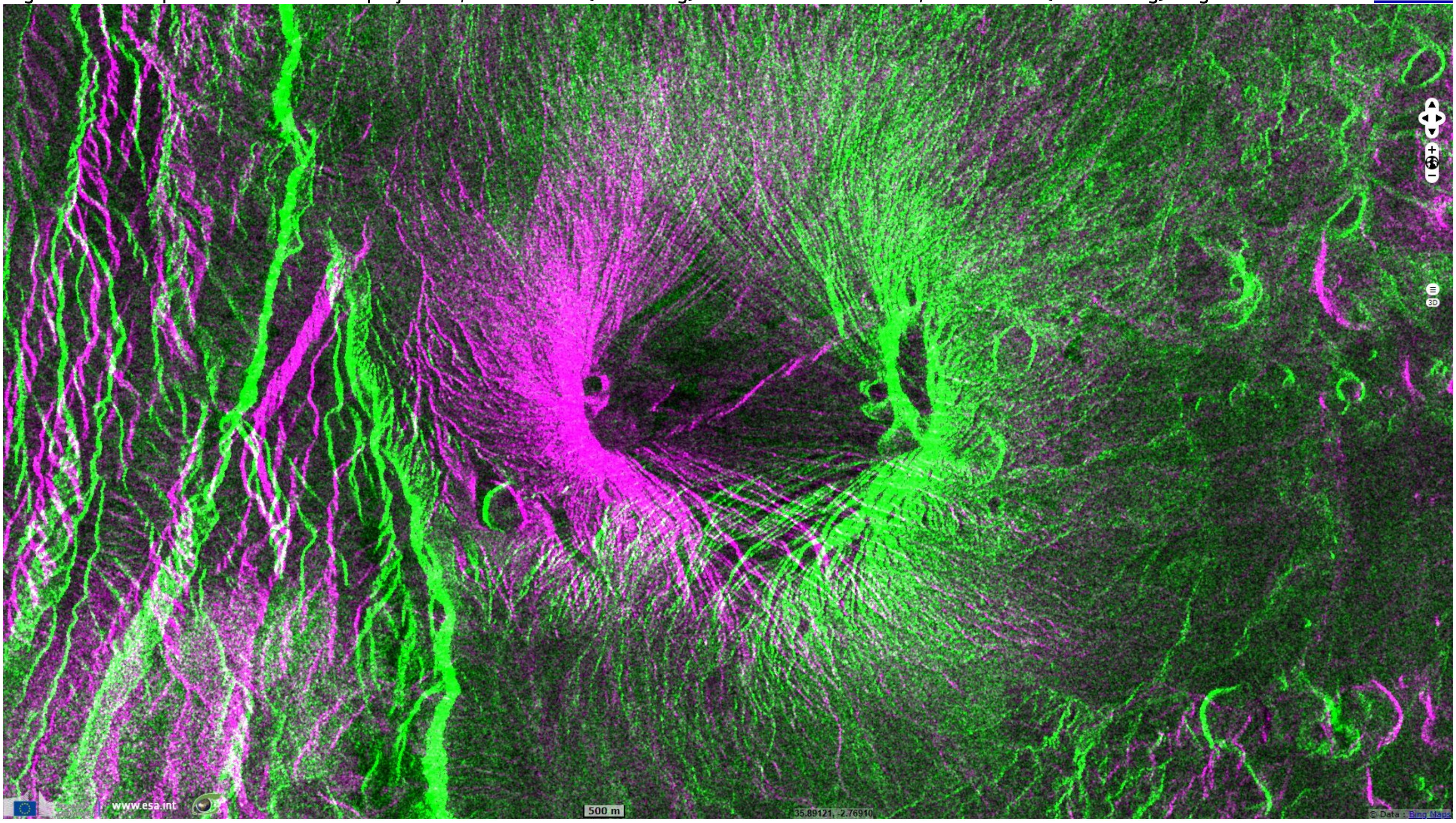
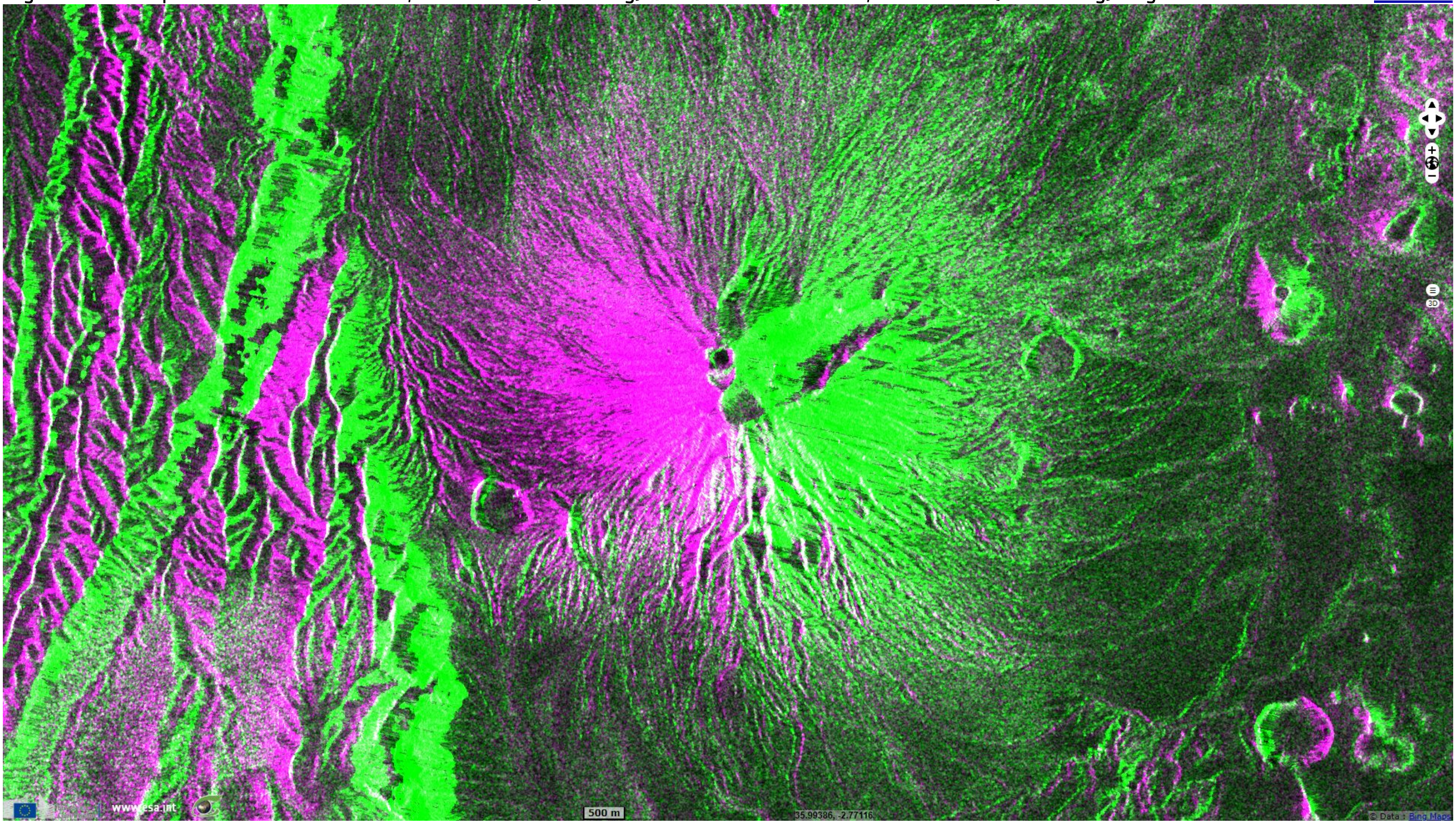


Fig. 5 - S1 - VV polarisation orthorectified, 09.09.2016 (ascending) in red & blue channels, 30.08.2016 (descending) in green channel. 2D view




As shown on the multi-date composite above, the pixel-scale on-the-fly orthorectification reprojects each pixel correctly. Ridges and talwegs show at the same location on both ascending and descending images.

East facing slopes appear in bright on the descending orbit (west looking) image due to radar compression and in dark on the ascending orbit (east looking) image because they are in the shadow of the beam. They thus show in green on the above colour composite. For the same reasons, the west-facing slopes appear in magenta.

On this image, slopes are the dominant factor for single-bound radar backscattering. Note how bright magenta and bright green parts of the image complement each other since a location cannot be sloped toward east and west at the same time.





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