

# Visit to Comoros archipelago - Grande Comores

Sentinel-1 CSAR IW acquired on **18 August 2017** at 02:41:09 UTC

Sentinel-1 CSAR SM acquired on **29 August 2017** at 02:50:05 UTC

Sentinel-1 CSAR SM acquired on **01 September 2017** at 15:28:38 UTC

Sentinel-2 MSI acquired on **08 August 2018** at 07:32:29 UTC

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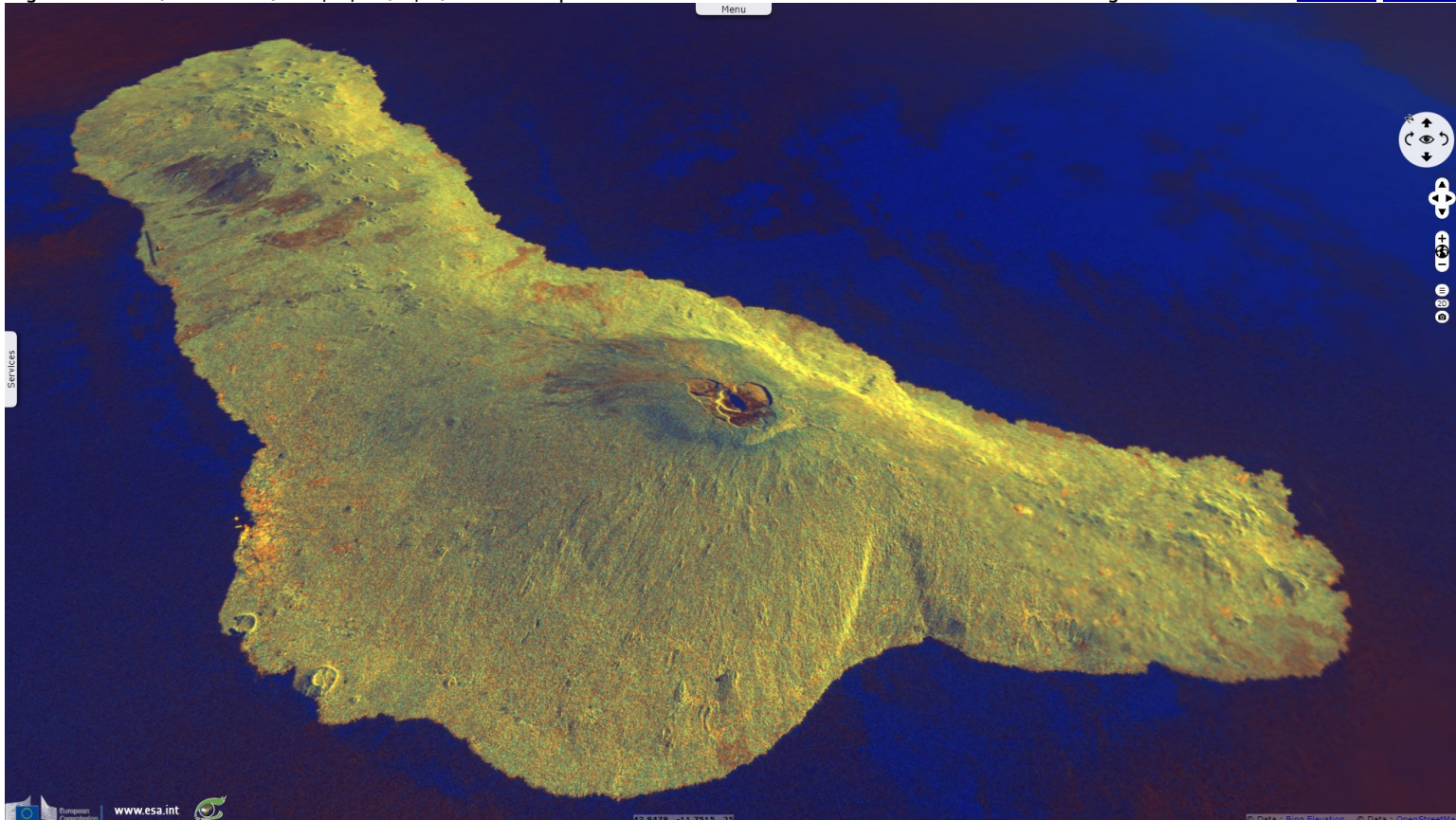
Keyword(s): Coastal, island, archipelago, volcano, geohazard, lava flow, urban planning, coral reef, slash and burn agriculture, erosion, Ramsar, Comoros, Madagascar, Mozambique Channel, Indian Ocean



[2D Layerstack](#)

Fig. 1 - S1 IW (18.08.2017) - vv,vh,ndi(vh,vv) colour composite - Sentinel-1 view of Grande Comores in descending orbit.

[2D view](#) [3D view](#)

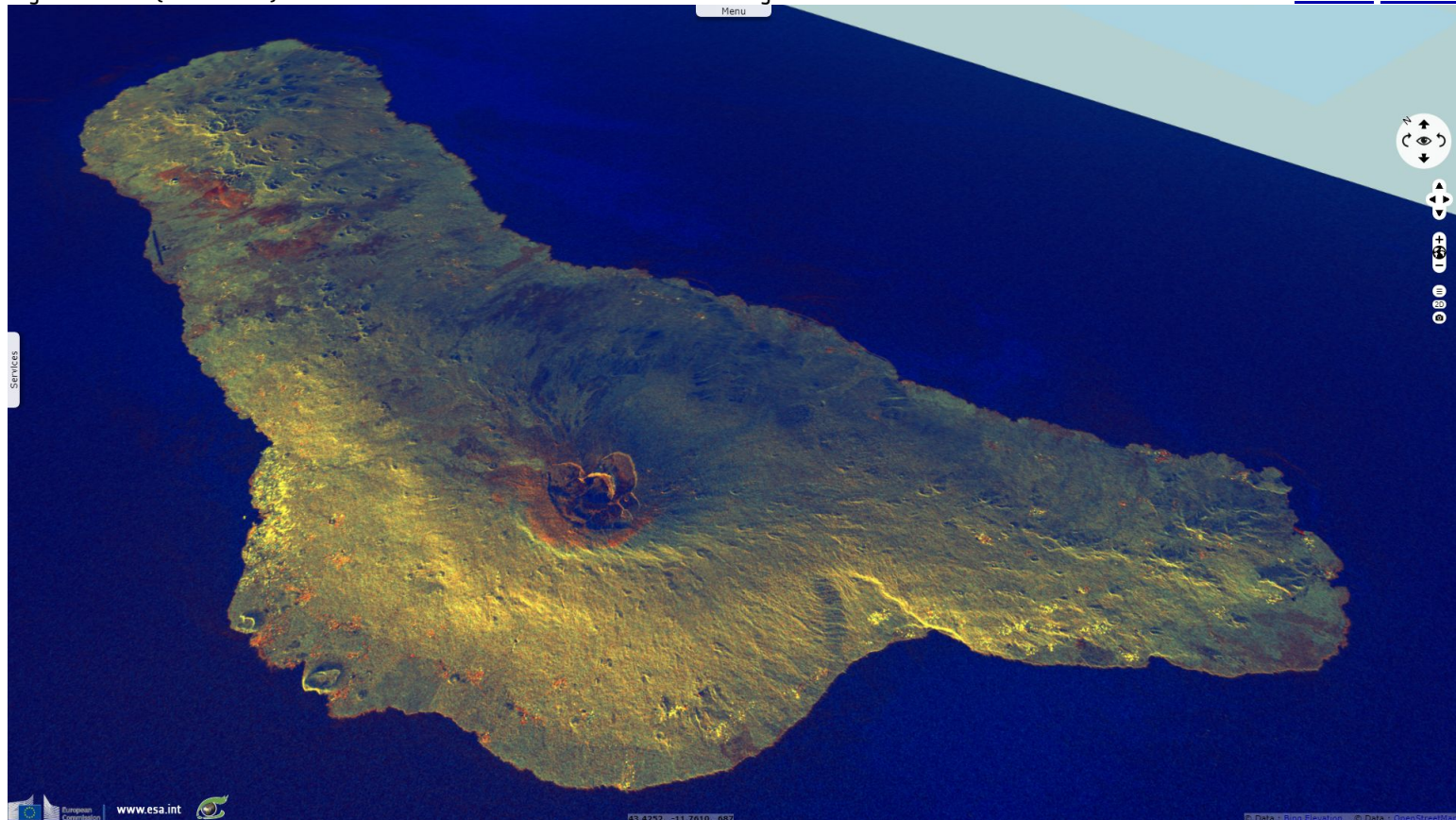


Jean-Paul RUDANT, emeritus professor at University Paris-Est and speaker during ESA radar training commented : *"The 2360m-high summit of Mount Karthala lies in the southern half of Grande Comore Island. It is approximately halfway between the eastern and western shoreline, each being 10km away. The Sentinel-1 image has been acquired during a descending orbit, its antenna looking West, North-West."*



Fig. 2 - S1 SM (01.09.2017) – Sentinel-1 view of Grande Comores in ascending orbit.

[3D view](#) [2D view](#)



*"The resulting view is different with this image acquired during an ascending orbit looking East, South-East."*

Fig. 3 - S2 (08.08.2018) - 4,3,2 natural colour - A rare cloudless view of Grande Comore.

[3D view](#) [2D view](#)



The coral reef and nuances in lava flow colour show using Sentinel-2 natural colour. The degree of weathering of lava flows is indicative of their age.



Fig. 4 - 8,4,3 colour composite - The NIR band provides additional information about the vegetation cover.

[3D view](#) [2D view](#)

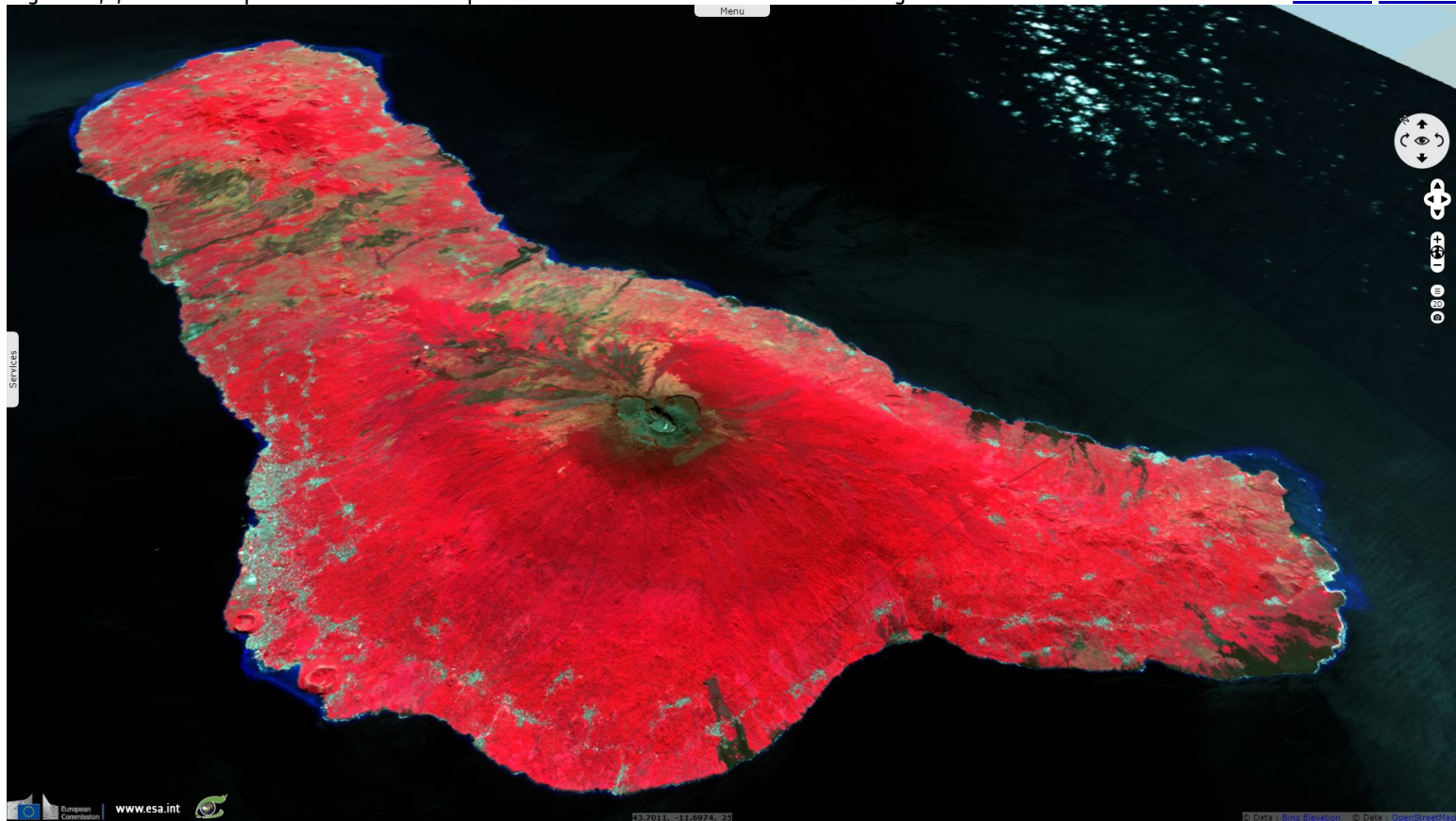
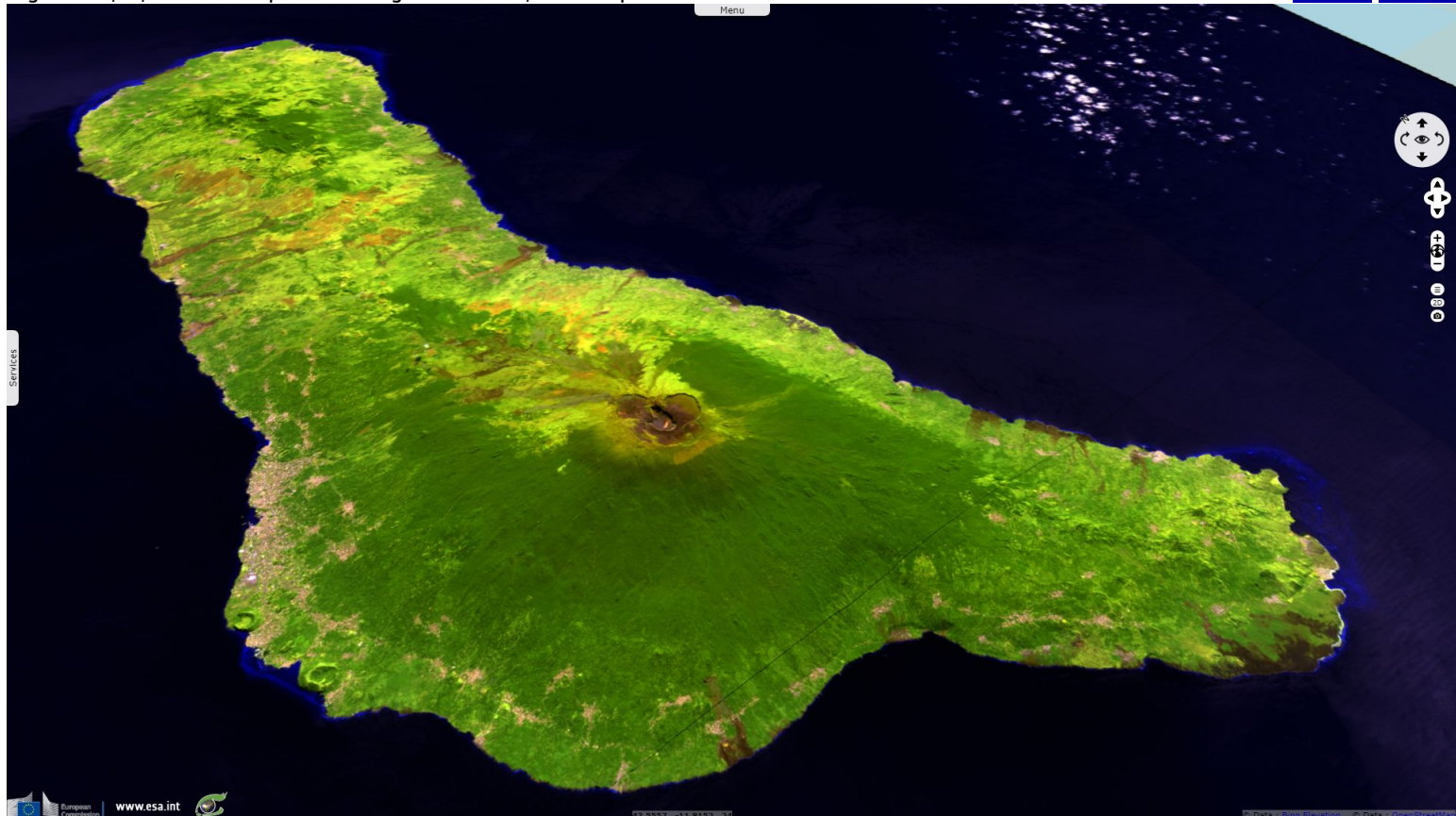


Fig. 5 - 12,11,2 colour composite - Using mid infrared, this composite reveals small scale fires around Moroni.

[3D view](#) [2D view](#)

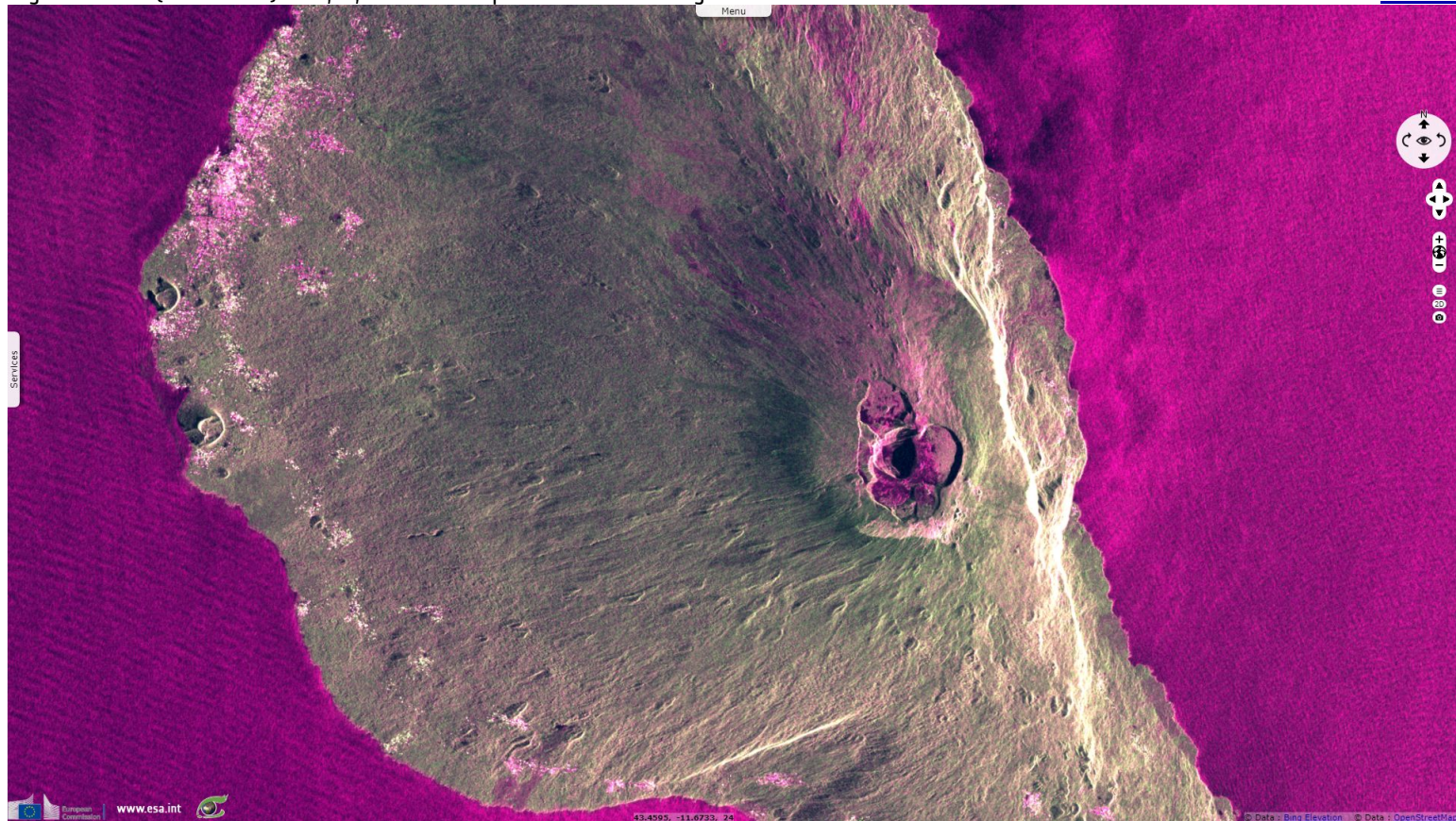


The traditional slash and burn agricultural methods cause erosion of the steep sloped soils. This environmental issue also lessens the yield of the crops in the same way it does in its seriously [deforested](#) bigger neighbour, Madagascar. It also competes with the Ramsar status acquired by a 130km<sup>2</sup> area around Mount Karthala. The increase of the demographic pressure and the change in eating habits have made the country becomes more dependant on food importation.



Fig. 6 - S1 SM (29.08.2017) – vv,vh,vv colour composite – West looking view zoomed in on Mount Karthala.

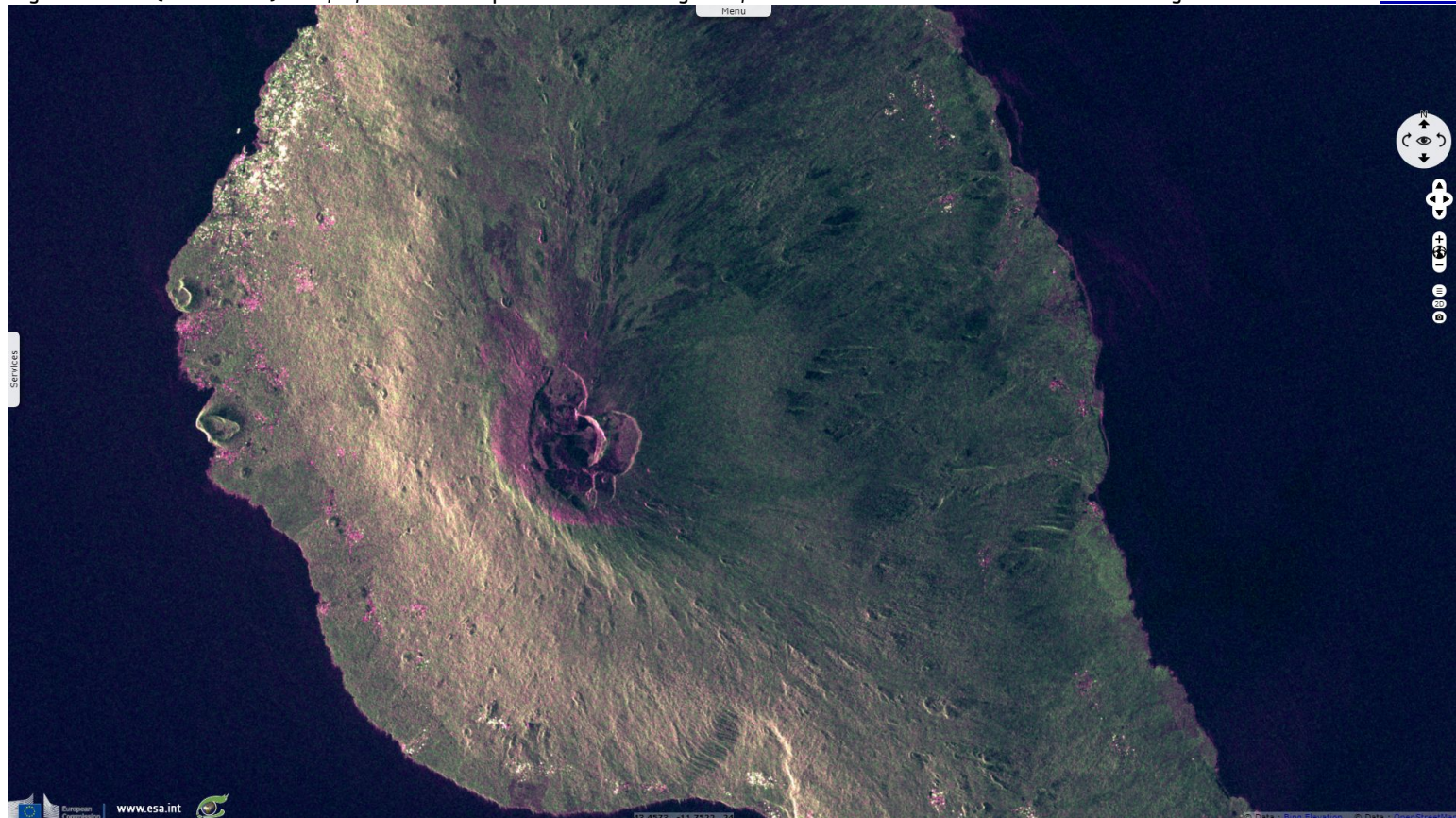
[3D view](#)



Professor Jean-Paul Rudant added: *"Being several kilometres large, the central crater of Mount Karthala shows clearly. Radar shadows appear wherever abrupt relief drops hide part of the ground surface from the the radar beam. Depending on the radar view direction, the 2360m-high crater appears with a 4-km across track offset either toward East (descending orbit) or West (ascending orbit)."*

Fig. 7 - S1 SM (01.09.2017) – vv,vh,vv colour composite - East-looking view, Moroni shows in the north-west of the image.

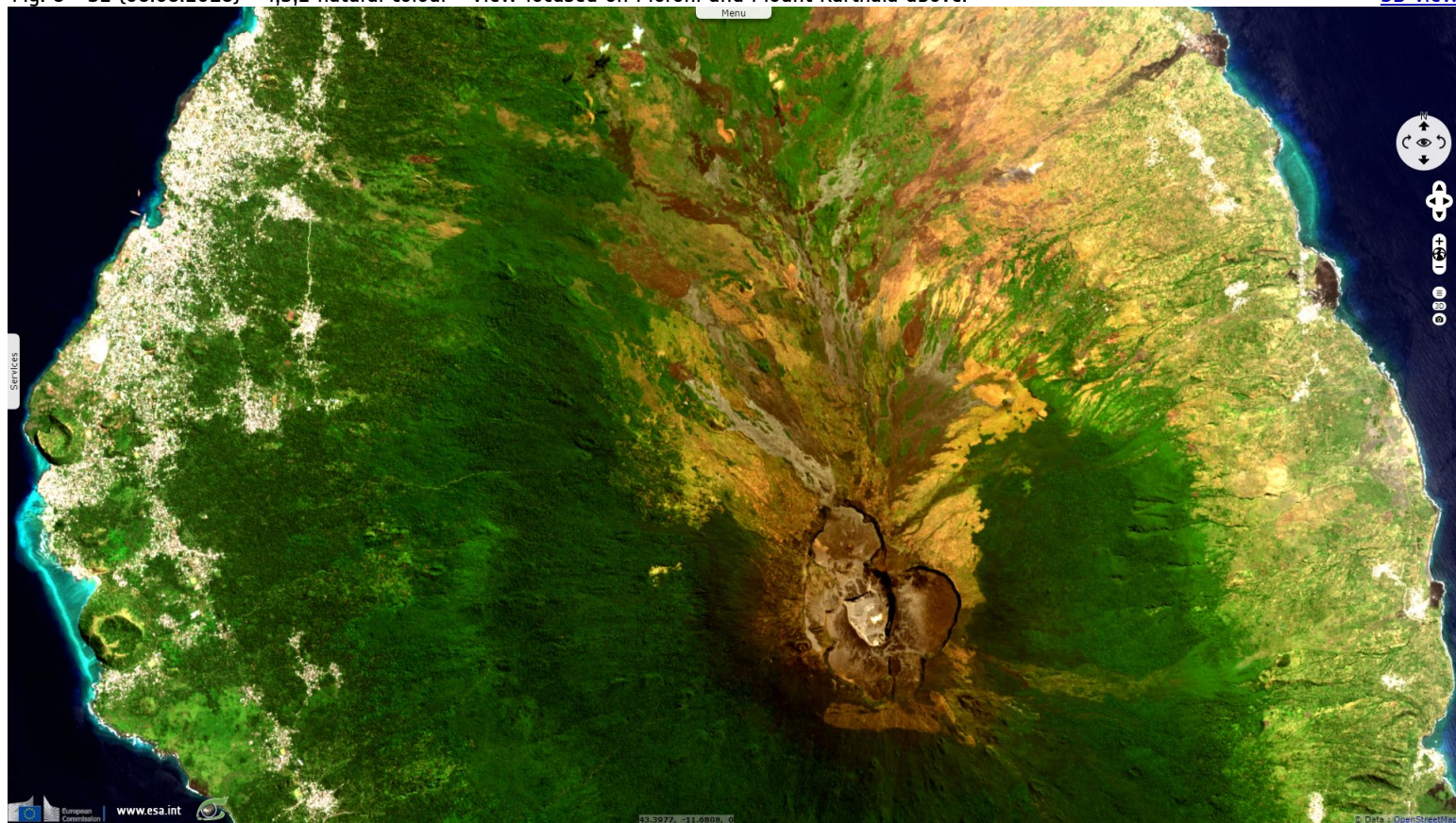
[3D view](#)



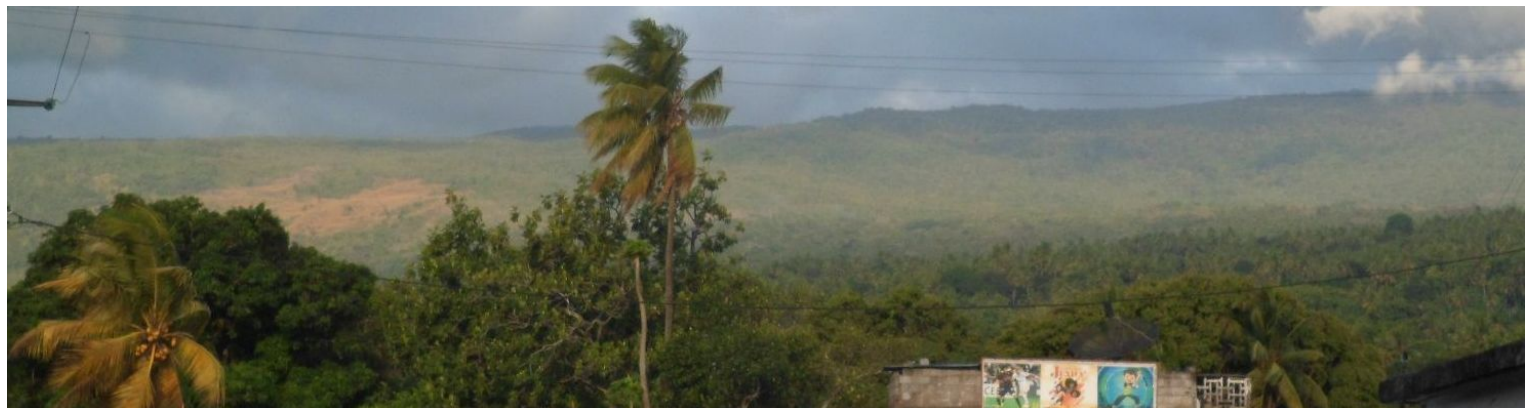
*"This animation of images using nearly opposite view vectors bring a new perception. On the west-looking image, the eastern side of the mount is compressed and overbright while on the east-looking image the overbright areas are on the western side. This overbrightness is stronger on the eastern side, which shows its slope is steeper, up to 30°, while it only reaches 15° on the western side.*

*The overbrightness is caused by the compression of the image where the slope is tilted toward the radar beam. A larger ground surface is located at the same range of the sensor and thus mapped on the same pixel. As a result, the energy backscattered toward the radar sensor is significantly higher for these areas. The overbrightness effect increases as the difference between the beam incidence and the slop decreases. In the case of Karthala, the radar beam has an incidence close to 33°."*

















"The volcano regularly erupts (four times between 2005 & 2007) which can be deadly. In particular since the capital of Comores, Moroni, lies on previous lava flows located in the south-west of Grand Comores Island. The energy backscattered by urban areas toward the antenna is in general higher than for the surrounding landscape. Urban areas thus appear brighter on the radar images."



Mount Karthala viewed from Moroni. On the left, a remnant of lava flow shows in yellow. Source : Jen-Paul Rudant

*The views expressed herein can in no way be taken to reflect the official opinion of the European Space Agency or the European Union.*

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