

# Planck's Law illustrated on lava using Sentinel-2

Sentinel-2 MSI acquired on 23 May 2018 at 20:59:39 UTC

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[2D Layerstack](#)

Fig. 1 - Sentinel-2 (23.05.2018) - 4,3,2 natural colour - Fissures show in band 4 (red), not in bands 3 & 2; smoke marks non visible fissures. [2D view](#)



Fig. 2 - 5,4,3 colour composite - Fissures dots are wider and more intense in band 5 (now in red channel) than in band 4 (now in green). [2D view](#)

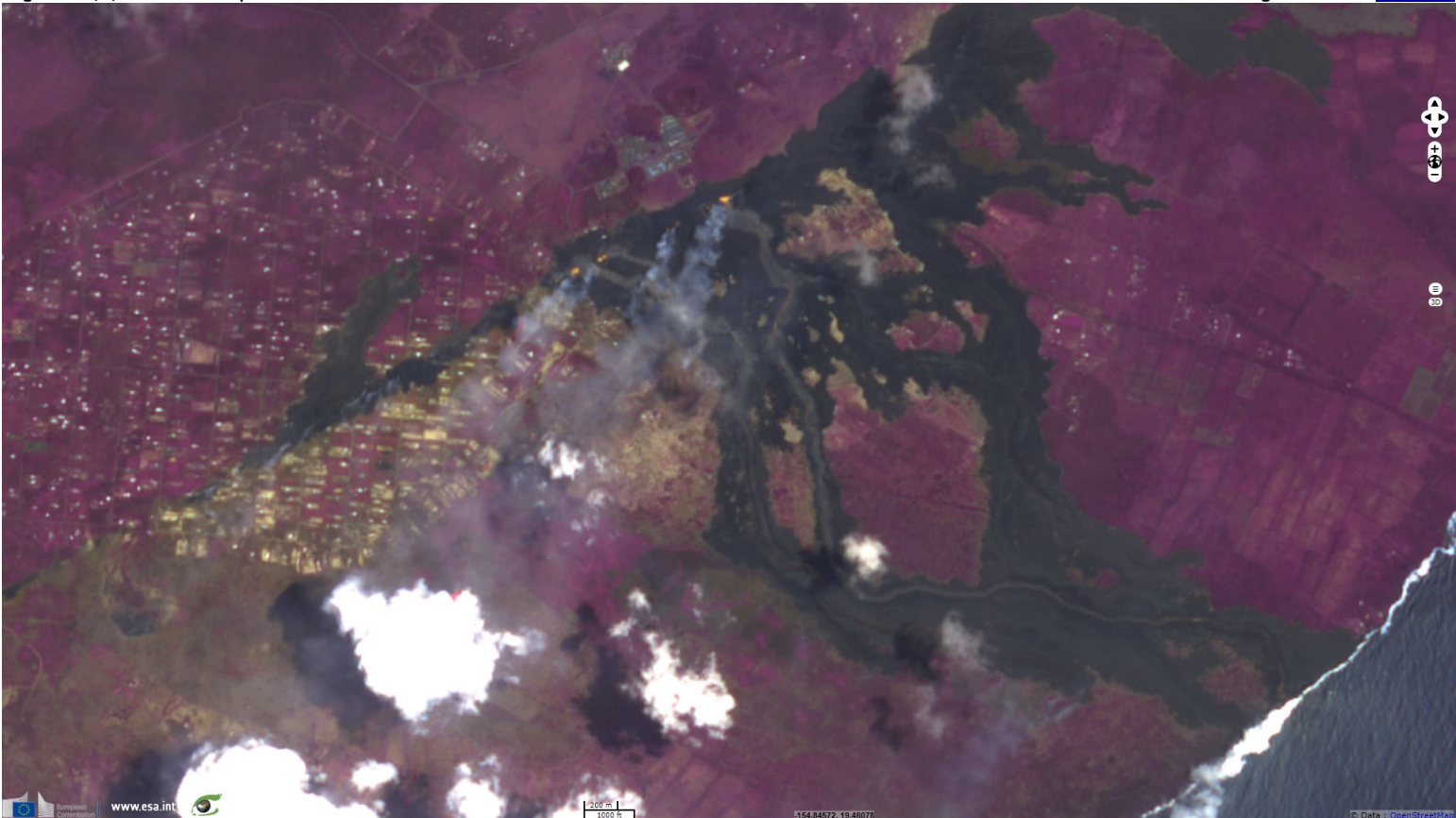




Fig. 3 - 8,7,6 colour composite - While they looked light grey in natural colour, lava flows emit faint light in band 7, stronger in band 8.

[2D view](#)

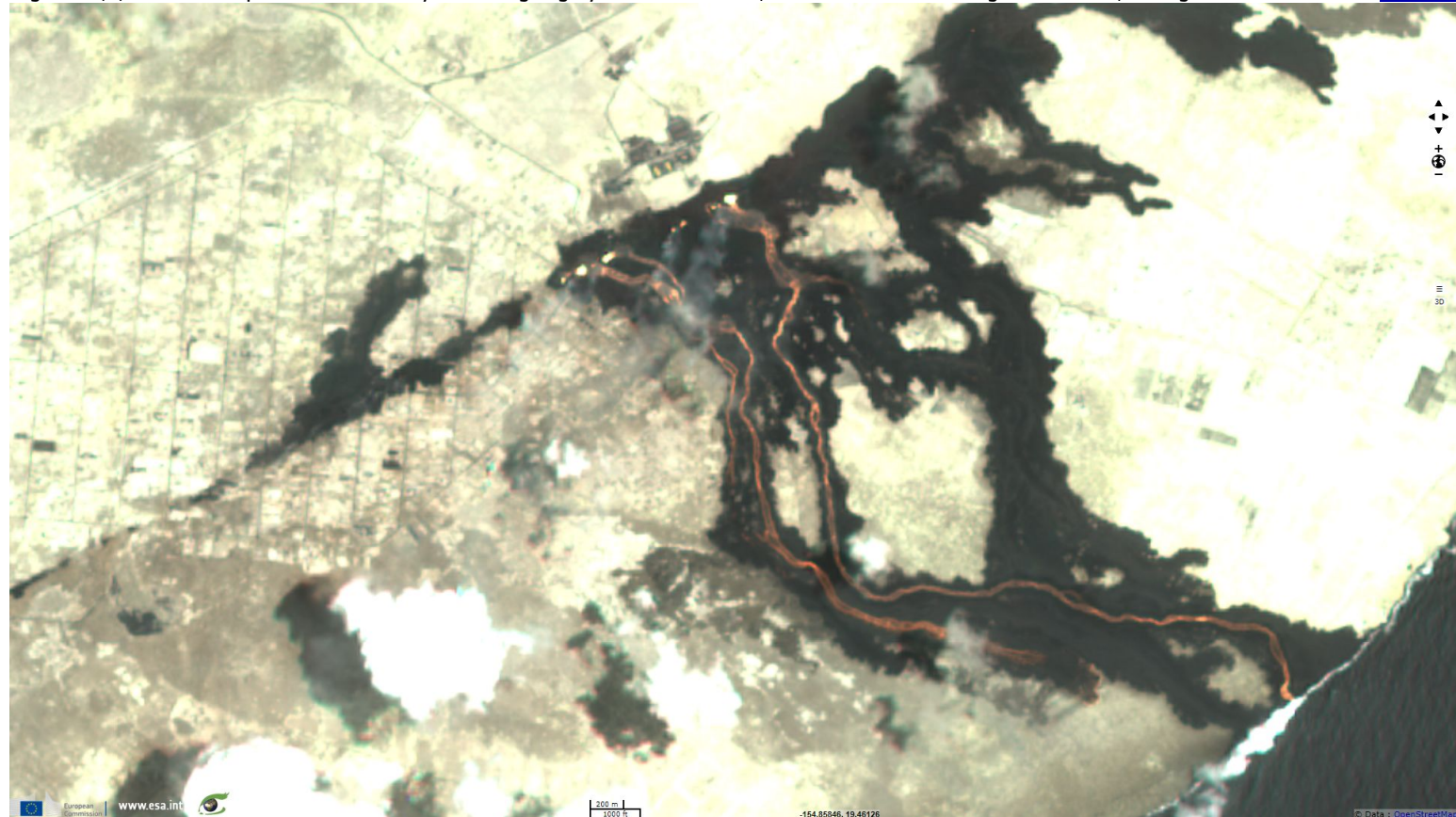
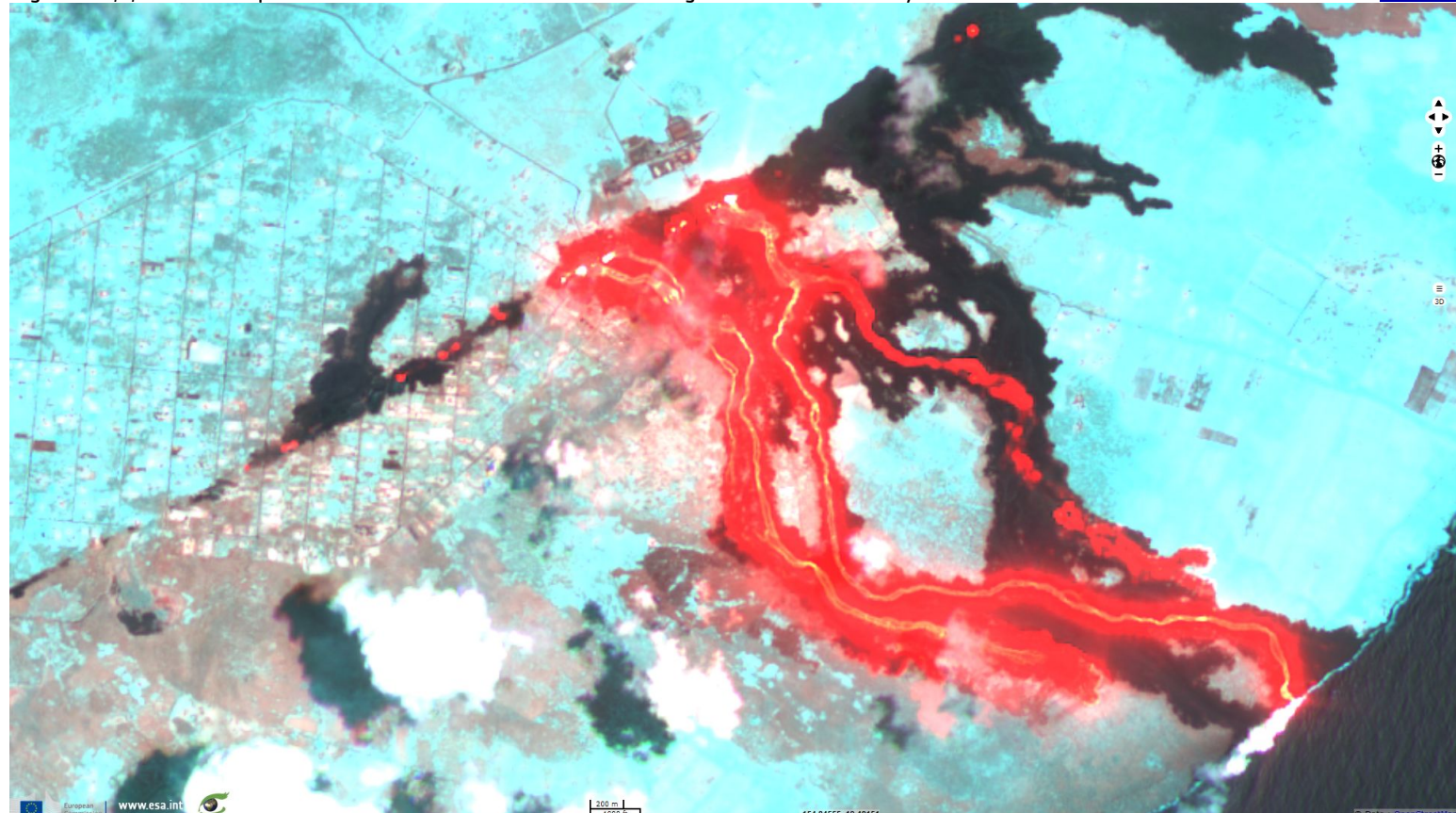


Fig. 4 - 11,8,7 colour composite - Band 11 reveals lesser fissures along the rift and secondary lava flows not visible in band 8.

[2D view](#)

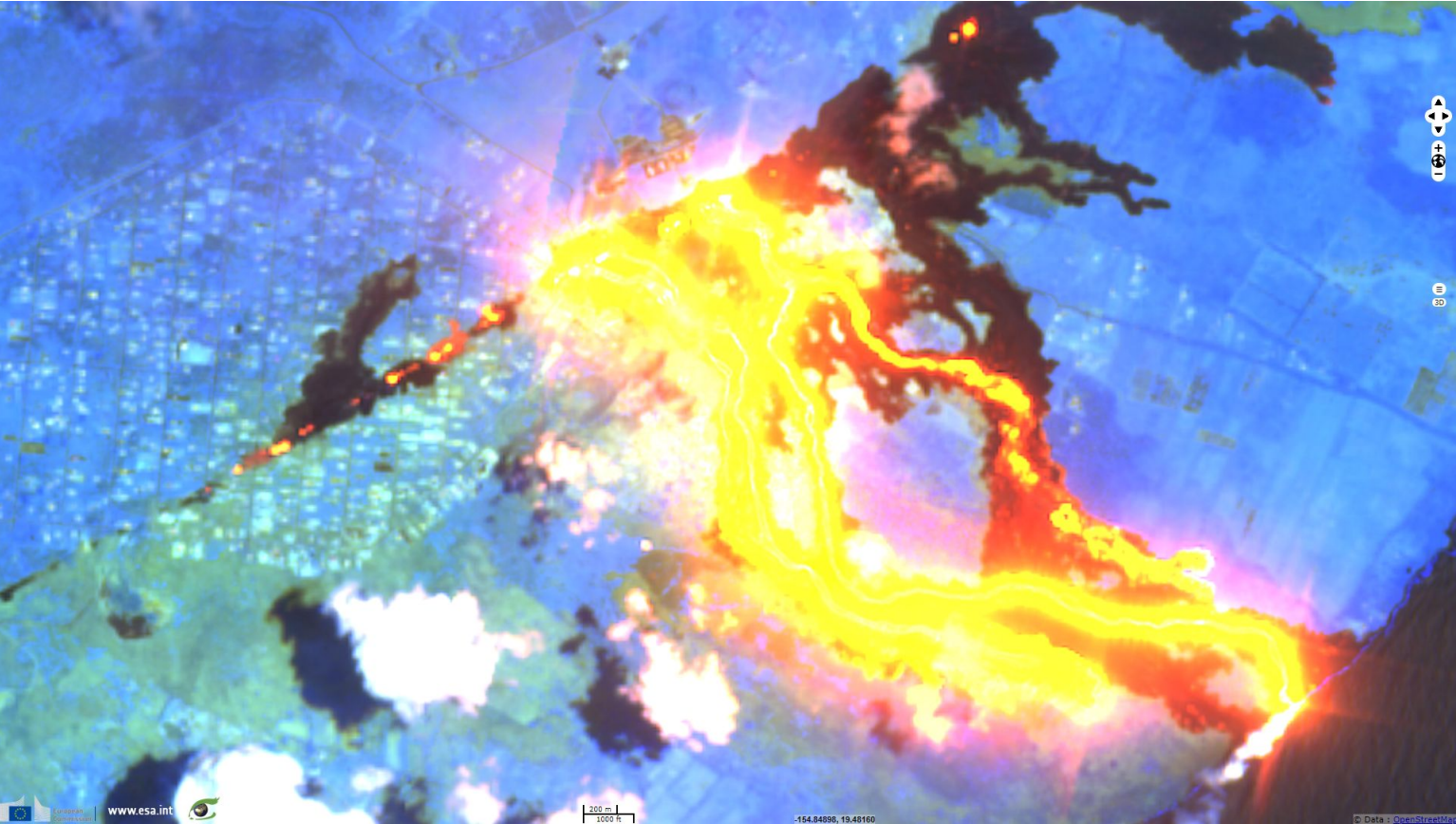


This story revisits the lava flows highlighted in the story [EVT-279 - Lower Puna eruption has expanded Hawaii by 3km<sup>2</sup> since May](#).













Transitioning from 4,3,2 to 12,11,8 colour composite, one can see how lava colour changes from red to yellow to white according to the wavelength used and the temperature of the heat source. It shows how lava emittance progressively increases from visible bandwidth to middle infrared, dominating lava's low reflectance at some point, as expected by Planck's Law describing black body radiation. Using Planck's Law, knowing the solar spectral irradiance top of atmosphere, it would be possible to estimate the spectrum of the energy radiated by the lava and thus value its temperature.



Fig. 5 - 12,11,8 colour composite - Keeping identical gamma processing parameters on all bands, flows saturate more on SWIR [2D animation](#) [2D view](#)



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