Ages: 10 and 11 years old

Topography

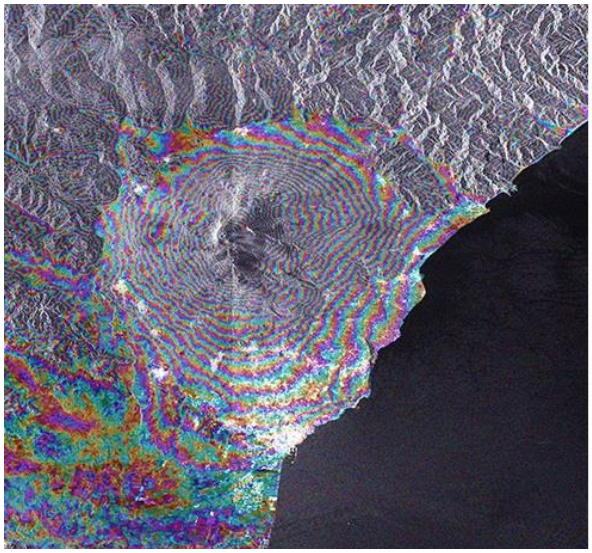
Context

The European Space Agency (ESA) is developing a new family of satellites called *Sentinel* to observe the Earth and to study the environment. The *Sentinel* satellites have instruments that take special pictures of the ground, which are called **topographic maps**.

Sentinel 1A satellite representation. Source: esa.int

Topographic maps represent the ground by showing the relief of the Earth and they allow us to know the height of the terrain. How does it work?

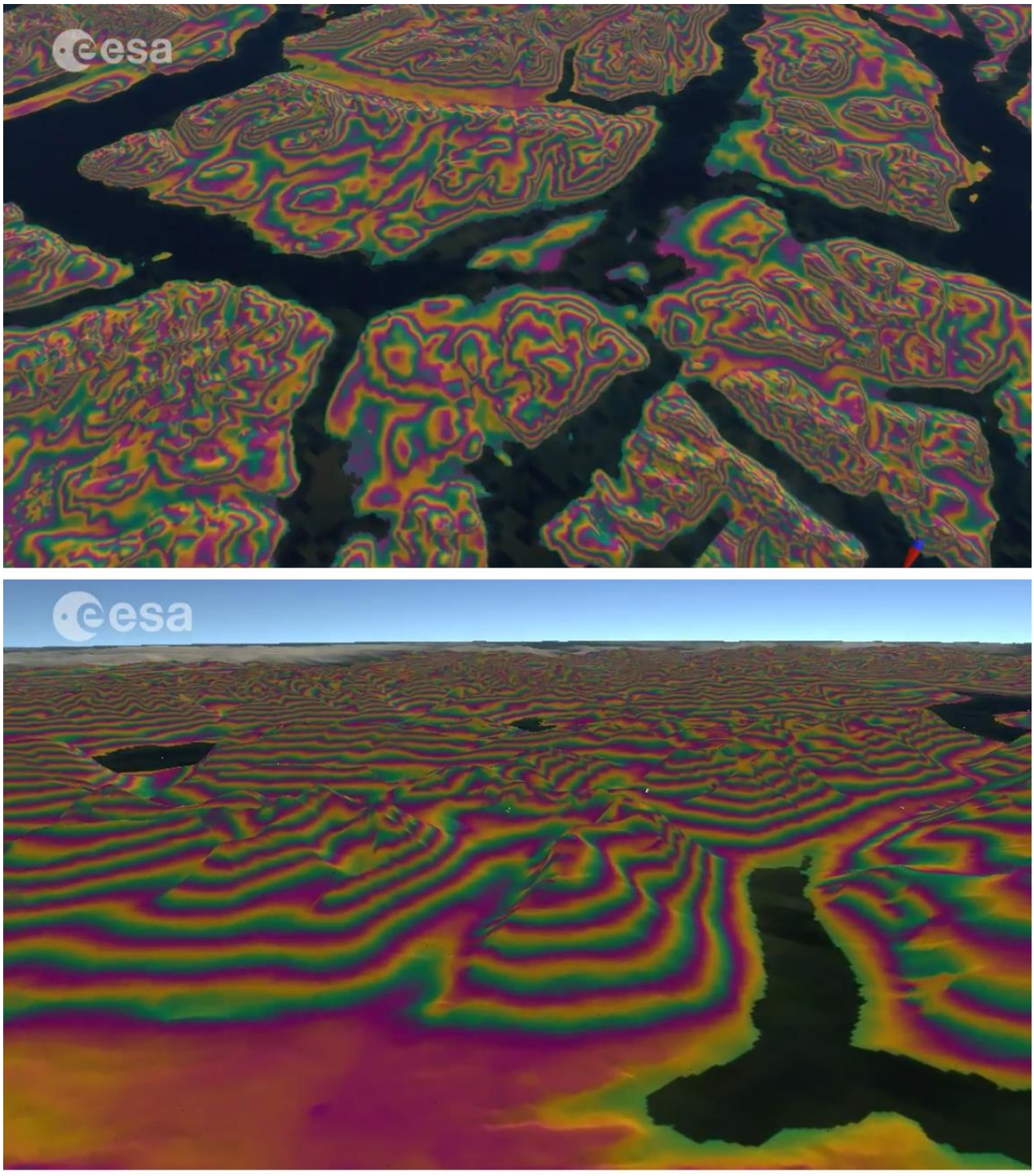
Horizontal imaginary cuts are performed and drawn as lines to develop **topographic maps**. These lines are called **contour lines**: you can picture them as if you were to cut a mountain into slices, paint each slice with a different colour and then stick them all together again. Thus, every line will show a different height. For instance, look at the drawn contours on top of the image of the volcano: each **contour line** represents how high it is that part of the terrain. In this way, we can easily observe how the mountain rises from sea level up to the top of the volcano.



View of the Etna volcano from above with contour lines www.esa.int/spaceinimages/Images/2014/08/Etna_slopes

Satellite view of the Etna volcano. www.maps.google.com

Sentinel satellites allow us to create **3D topographic maps**, too. Observe the following two images, taken by *Sentinel 1A*, and watch the contour lines for a group of Norwegian islands in different colours:



Source: www.esa.int/spaceinvideos/Videos/2014/08/Norwegian_fringes
Watch the complete animation here: http://m.esa.int/spaceinvideos/Videos/2014/08/Norwegian_fringes

More educational resources

Useful information about Sentinel:
http://www.esa.int/esaKIDSes/SEM1TJB2GKH_Earth_0.html
http://www.esa.int/esaKIDSes/SEMHG22AKAI_Earth_0.html

Observe the launch of Sentinel 2A:
http://www.esa.int/esaKIDSes/SEMX6X7A4BI_Earth_0.html

Educational resources from ESA about the Earth and the environment:
http://www.esa.int/Education/Teachers_Corner/Earth_and_Environment

Official webpages of Sentinel:
https://sentinel.esa.int/web/sentinel/home
http://copernicus.eu/main/services

Project CESAR:
http://www.cosmos.esa.int/web/cesar

ESA Kids:
http://www.esa.int/esaKIDSes