

VtWeb provides access to 4 global Digital Elevation Models (DEM) at a ground sampling distance of 1" arc, or 30 metres at the equator. These 4 DEMs are defined in the geographic coordinates reference system on the WGS84 datum. The first 3 are free to access, but Copernicus GDEM-30 is not yet free:

- [SRTM](#) - C-band interferometry - *Shuttle Radar Topographic Mission* acquired by Endeavor shuttle from 11 to 22 February 2000.
- [ASTER-GDEM](#) - Photogrammetry - Stereo views of the ASTER instrument on-board Terra satellite from December 1999 to February 2011.
- [ALOS World 3D](#) - Photogrammetry - Tri-stereo views of the PRISM instrument on-board ALOS satellite from 2006 to 2011.
- [Copernicus GDEM-30](#) - X-band interferometry.

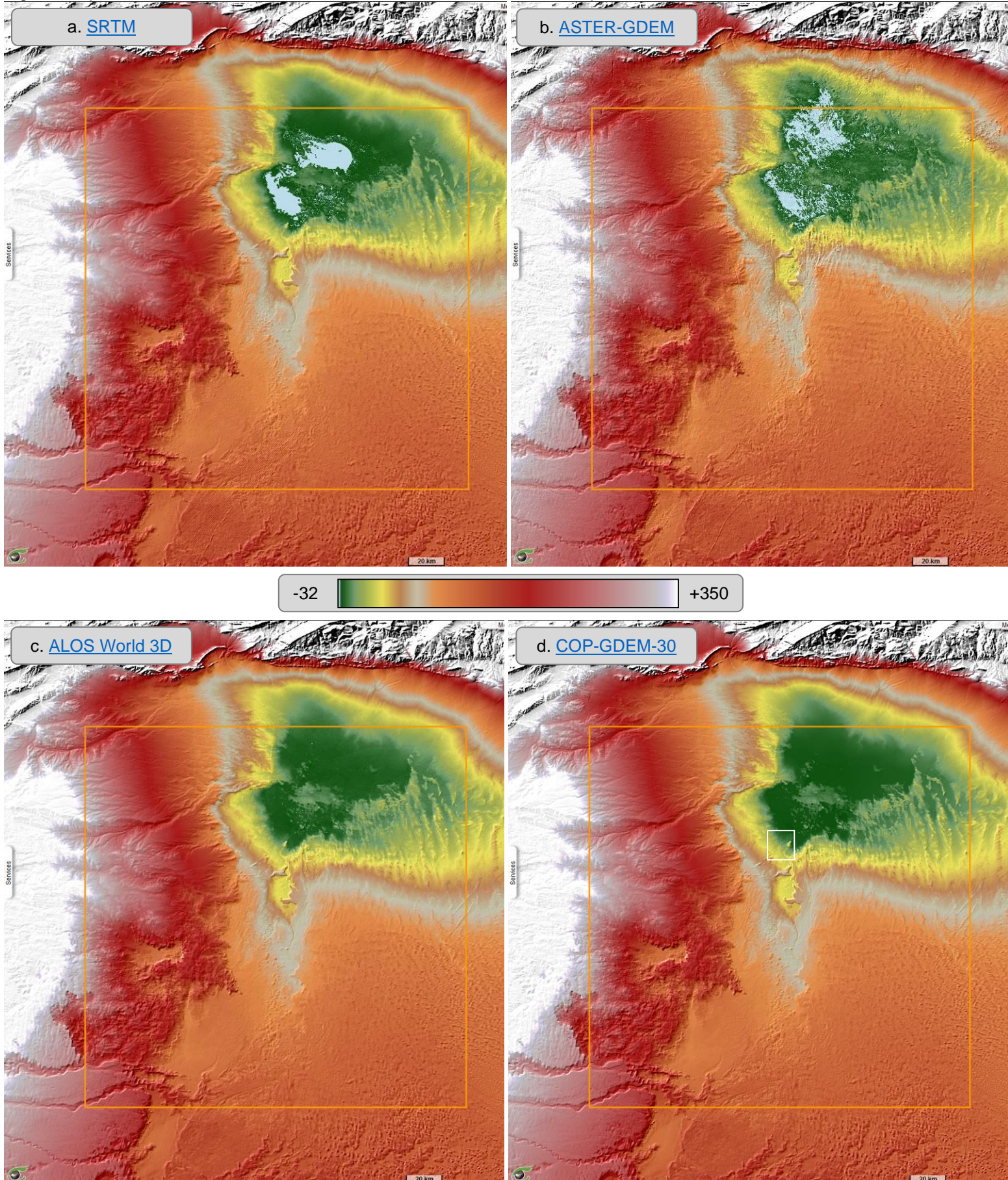
Chott Melghir (Algeria)

[2D_layer_stack](#)

Comparison of Digital Elevation Models (DEMs) Global view

[2D_animation](#)

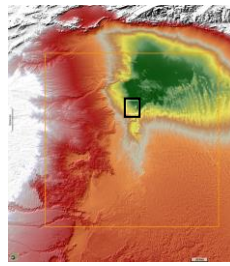
Fig.1: Comparison of DEMs SRTM, ASTER-GDEM, ALOS World 3D and Copernicus GDEM-30. Global view.



Views in fig. 2 are almost at full resolution (one pixel image corresponds to approximately 30 meters on ground). The hypsometric color table reproduces the altitudes compared to the EGM-96 (Earth Gravity Model) for SRTM, ASTER-GDEM and ALOS World 3D, or to the EGM-2008 for the Copernicus GDEM-30. The color table is stretched between -32m and +45m in fig.2 against -32m to +350m in fig.1.

In fig. 1 as in fig. 2, shadowing is performed in the usual NW-SE direction. The shading effect has been increased by a factor of 100 in fig.1 but only by a factor of 50 in fig.2.

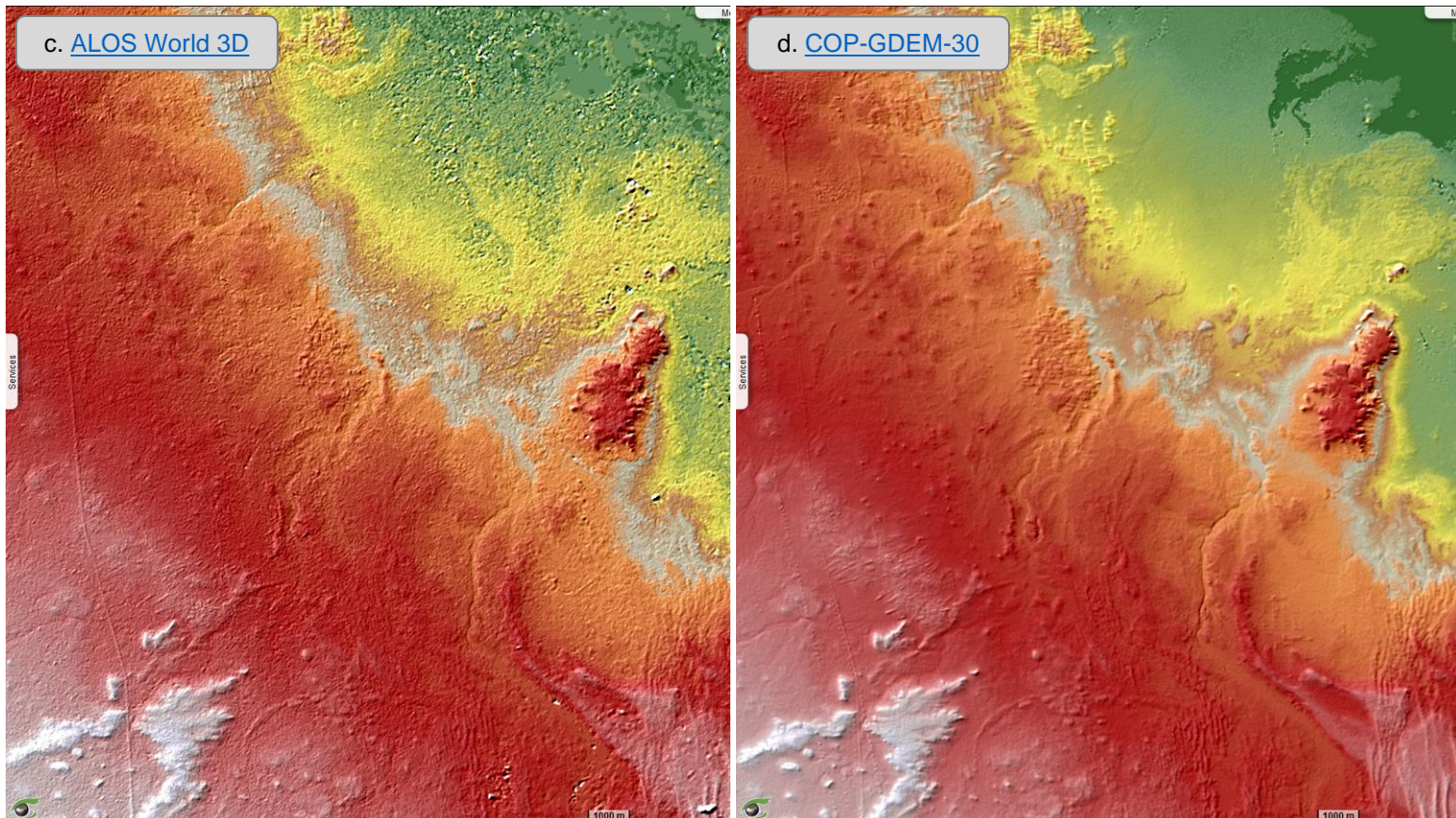
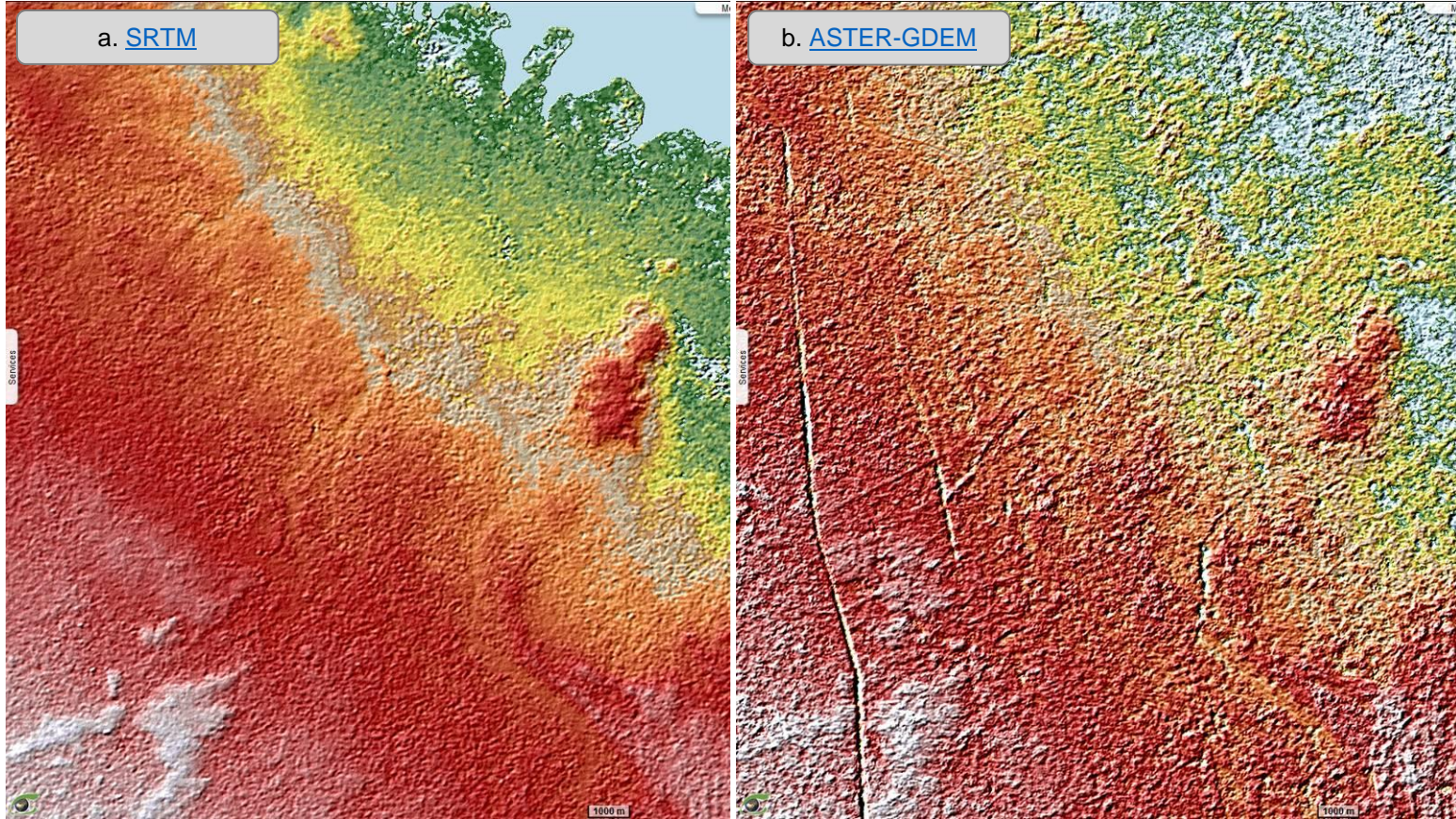
We note the clearly improved restitution of Copernicus DEM (fig.1d and fig.2d). One of the reasons is the better definition of the altimetric values: real on 4 bytes for Copernicus GDEM-30 against integer on 2 bytes for the other 3.



Comparison of Digital Elevation Models Close up view (2D)

Fig.2: Comparison of DEMs SRTM, ASTER-GDEM, ALOS World 3D and Copernicus GDEM-30. Close up view.

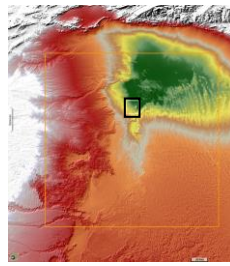
[2D animation](#)



The 3D views also render the roughness of the relief relief. In each of the views in fig.3, the DEM was used both to calculate the texture as in fig.2 but also to build the 3D perspective.

These 3D views are used to locate noise peaks (see fig. 3c ALOS World 3D). We also note the descending swath limits (see fig. 2c and fig. 3c) of satellites with an optical instrument such as ASTER-GEM or ALOS World 3D. The restitution of the latter by optical photogrammetry produces variations of the model at higher frequency than the radar interferometry technique of SRTM (a) and Copernicus GDEM-30 (d).

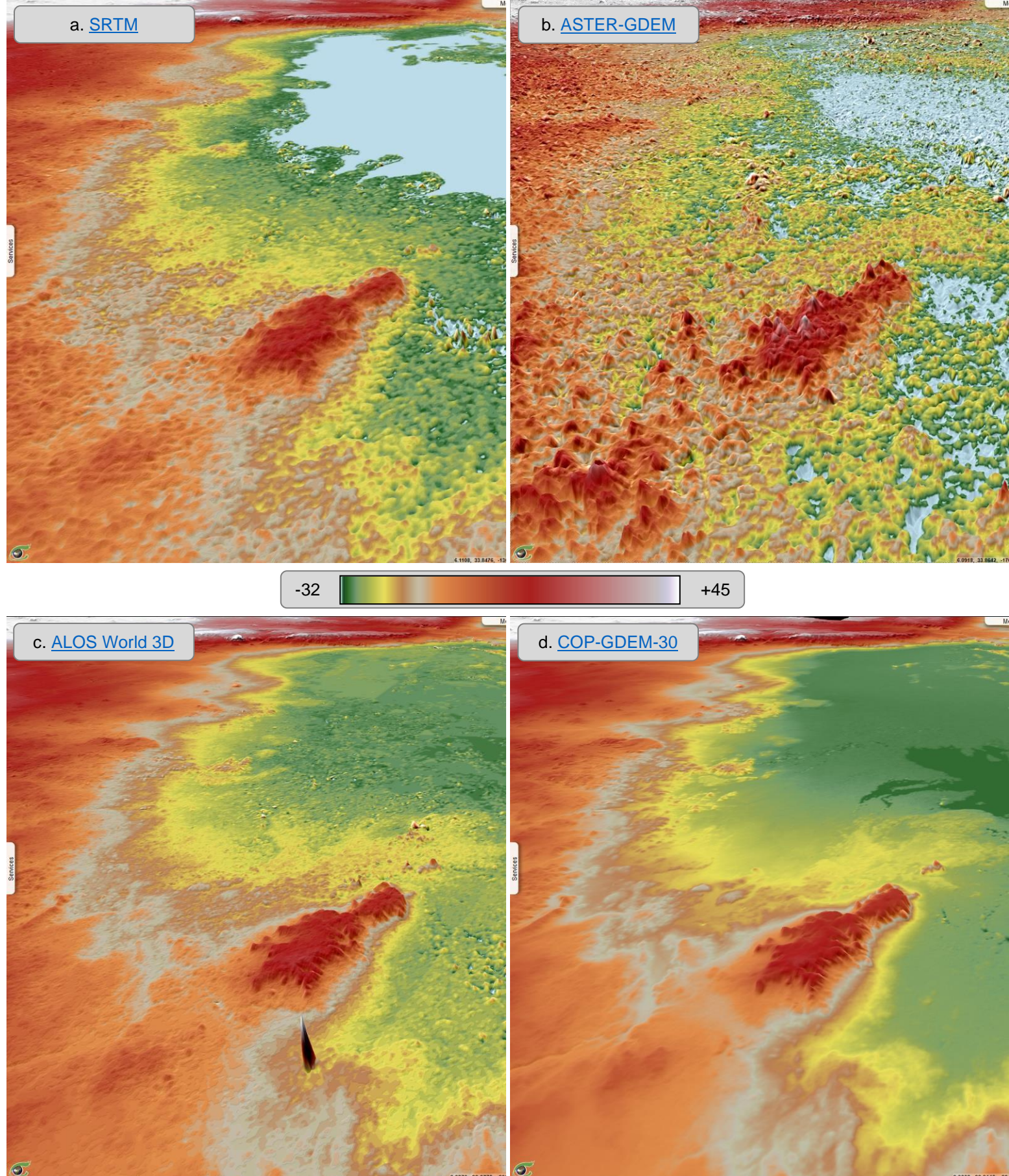
As the rendering technology does not allow the altimetric reference frame to be changed between 2 views, 3D animation uses the same Copernicus GDEM-30 elevation values and only the texture takes account of each of the 4 DEMs.



Comparison of Digital Elevation Models Close up view (3D)

Fig.3: Comparison of DEMs SRTM, ASTER-GDEM, ALOS World 3D and Copernicus GDEM-30. Close up view.

[3D animation](#)



a. [SRTM](#)

b. [ASTER-GDEM](#)

c. [ALOS World 3D](#)

d. [COP-GDEM-30](#)

