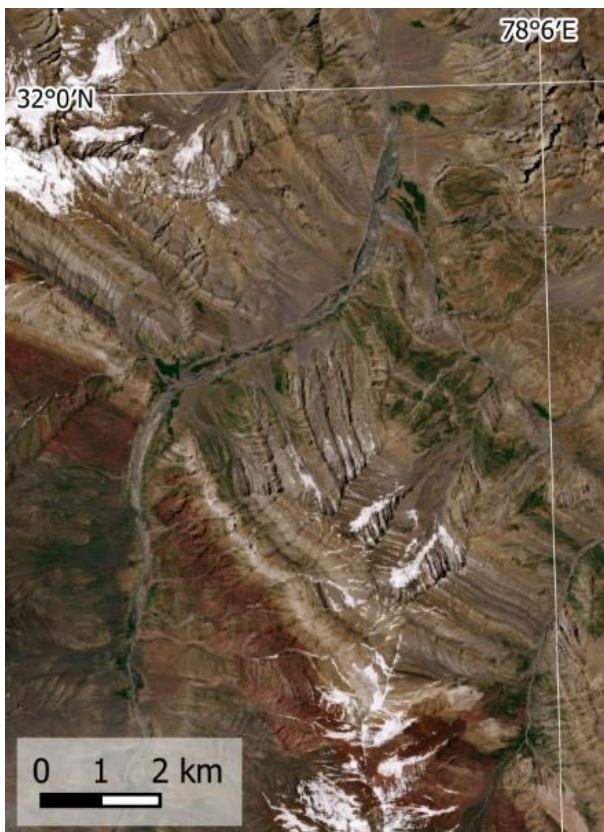


Global satellite map with the most important tectonic plate boundaries. Arrows indicate the moving direction.



Section of the Himalayas.  
Data: Sentinel-2, 2023-08-02.

### Tectonic Activities shape the Earth

The crustal movements and deformations driven by the movement of tectonic plates are powerful processes, shaping the surface of the Earth over millions of years. The Earth's lithosphere, comprising the crust and upper mantle, sees immense forces related to the movement and interaction of these plates, leading to the formation of mountains, rift valleys, earthquakes, and other geological phenomena. Examples illustrating tectonic processes are the Himalayas, where tectonic plates collide, and the East African Rift Valley, where they are pulled apart.

### Folding Mountains – the Himalayas

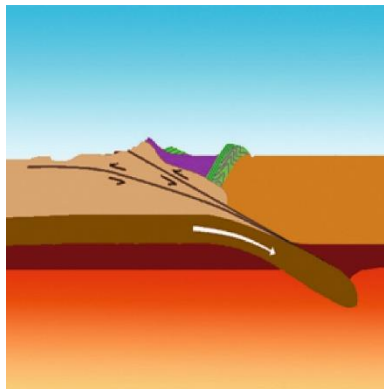
The Himalayas, stretching across South Asia, are the result of the collision between the Indian and Eurasian tectonic plates. This ongoing collision began around 50 million years ago and continues to shape the landscape of the region. The converging plates have caused the uplift of mountain ranges, including Mount Everest, the world's highest peak with an elevation of 8,849 meters above sea level. The Himalayas exhibit a wealth of geologic processes, including folding and erosion, exposing rock layers of different age.



### Exercises

- Look at the satellite image and try to identify important landuse and land cover classes (focus on bare land, sparse vegetation, dense vegetation, and snow/ice).
- Look at the satellite image and try to identify different landscape features. Can you separate valleys from mountain ridges? Which role do shadows/illumination play for your considerations? Think about the role of the sun position, which is more or less south-southeast of the image.
- Which of the features would you attribute to the folding (uprising) process, which to erosion?
- Identify the location of the Himalayas in the global map above.
- Can you see differences in the vegetation south and north of the Himalayas? What could be the reason why the vegetation in the region north of the Himalayas is scarcer than in the south? Think about the role of mountain ridges as barriers for wind currents.

### Additional Material



*Schematic cross section of the Himalayas, showing the formation of the mountain chain by the collision of the Indian and the Eurasian Plates.*

### Links and Sources

- [https://www.esa.int/ESA\\_Multimedia/Images/2018/06/Mount\\_Makalu\\_Himalayas](https://www.esa.int/ESA_Multimedia/Images/2018/06/Mount_Makalu_Himalayas) - ESA image of one of the fifth highest mountains in the world, showing (retreating) ice and snow at the “roof of the world”.
- [https://www.esa.int/ESA\\_Multimedia/Images/2024/02/Earth\\_from\\_Space\\_A\\_veil\\_of\\_haze\\_and\\_smoke](https://www.esa.int/ESA_Multimedia/Images/2024/02/Earth_from_Space_A_veil_of_haze_and_smoke) - Sentinel-3 image of the Himalayas, a high-reaching barrier for atmospheric currents.
- [https://www.esa.int/ESA\\_Multimedia/Images/2016/12/Proba-V\\_images\\_Mount\\_Everest](https://www.esa.int/ESA_Multimedia/Images/2016/12/Proba-V_images_Mount_Everest) - large area satellite image (Proba-V) showing the Himalayas separating the arid north from the lush vegetation in the south.
- <https://earthobservatory.nasa.gov/images/147980/himalayas-near-and-far> - Astronaut photo of the Himalayas viewed over Mt. Everest towards east.

