

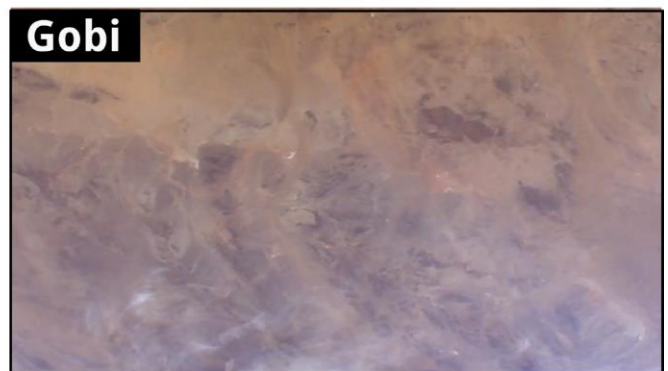
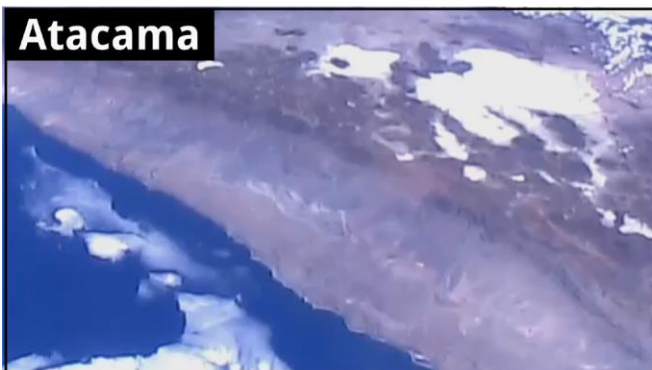
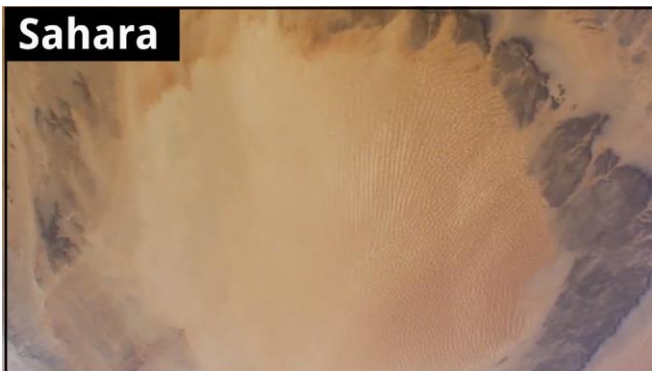
Educational material on the subject of

Deserts and their Formation

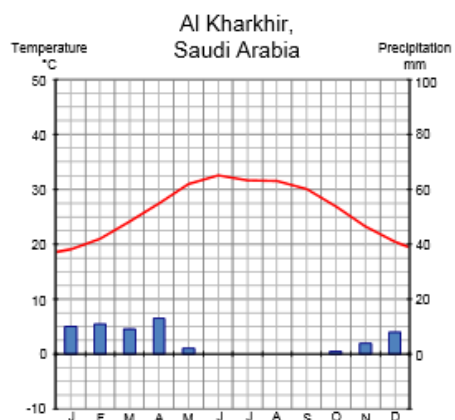
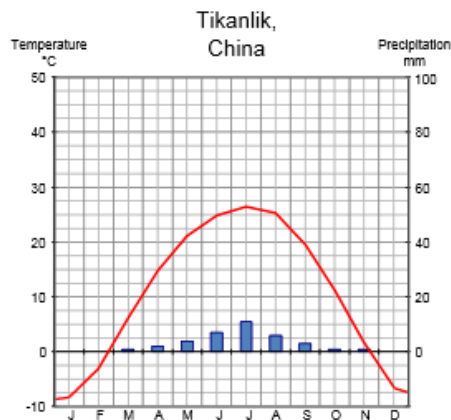
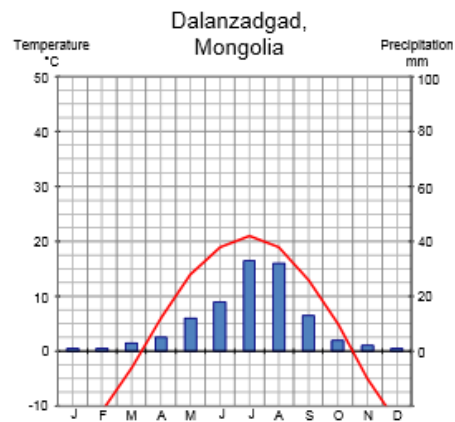
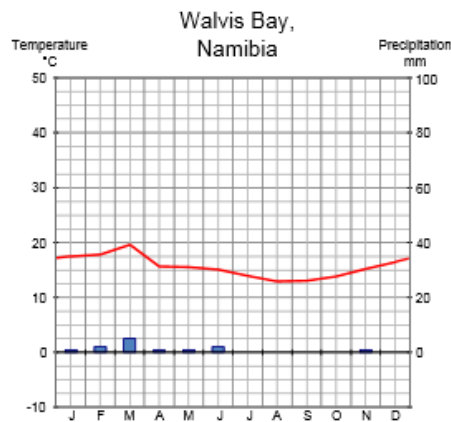
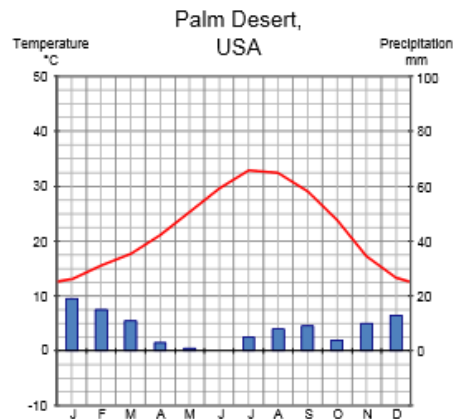
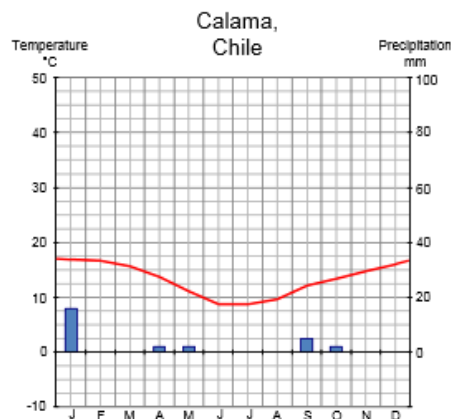
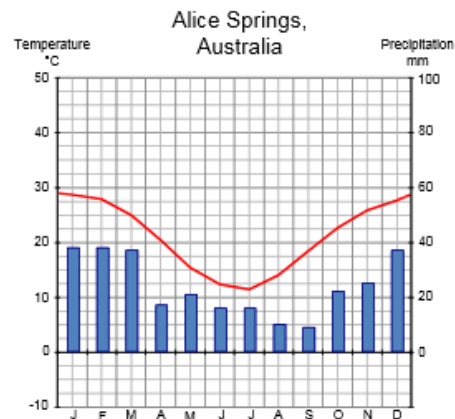
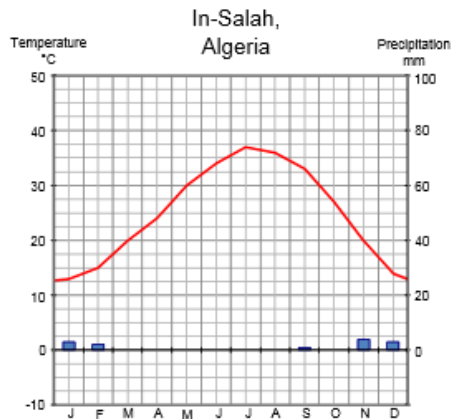
Grades 7-9

Student Material

Material 1: Images from the ISS



Material 2: Climate graphs



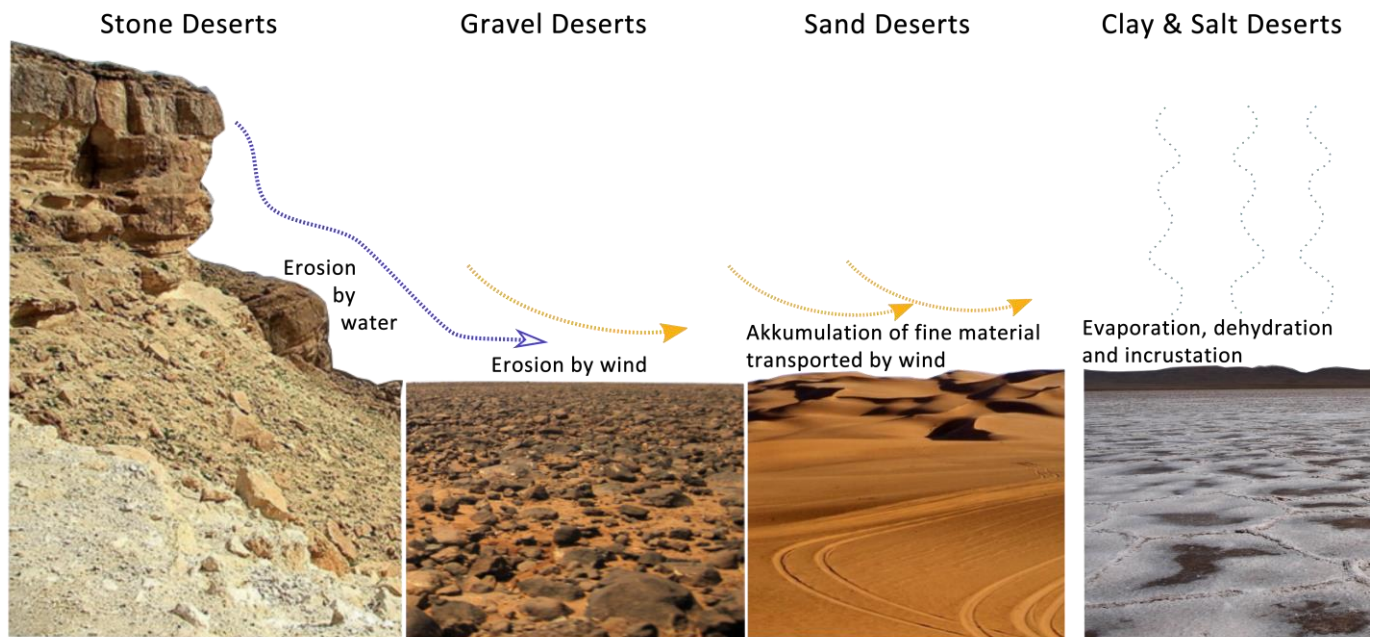
Material 3: Deserts and their Formation/ Genetic Types of Deserts

-**Mid-latitude deserts** are situated deep inside the inland of the continents, remote from the shore. They are usually surrounded by mountain ranges. Moist air masses coming from the ocean ascend at the mountains on their windward side (Luv-side). Clouds are formed due to the condensing process, leading to rainfall only on that side of the mountains. By the time the air reaches the downwind side (Lee-side) of the mountain range, there is no rain left and the area stays dry.

-**Trade wind deserts** are usually located around 23° latitude north and south of the equator. Warm, moist air masses soar over the equatorial rainforests and shed their rain over the forests. The less moist air flows north- and southwards towards the Tropics of Capricorn and Cancer and descends there as dry-hot air masses.

-**Coastal deserts** are located (as the name already suggests) at the shores of the continents, especially at the west coasts. This is where cold seawater causes a cooling of the overlying air. Fog is generated during the condensation process of the hydrated air. In case this air is moving towards the continent, the warm land surface heats it up and dissolves the fog with the result that rain cannot develop.

Material 4: Morphological types of Deserts



Deserts can be differentiated by their material and their surface structure:

- **Stone deserts** are made of bare rocks and blocky, edgy debris, which has partly been eroded by water.
- **Gravel deserts** consist of rough debris, which has been eroded in stone deserts. Finer material as sand will be swept away by the wind.
- Conversely, **sand deserts** are only composed of sand. The typical landscapes of dunes can often be located here.
- **Clay deserts** have a high salinity, which withdraws water of the soil and causes crust formations on the soil surface.
- **Salt deserts** develop during the dehydration of very salty lakes.

Material 5: Desertification

*“ We are talking about **desertification** as soon as the natural Resources (soil, vegetation, water) in an area with a dry climate are affected or destroyed as a result of excessive land use by humans.*

This kind of destruction has dramatic consequences: vegetation cover declines or disappears entirely; water becomes a scarce commodity; soils erode, become saline or get sand-covered; wind-borne sand destroys the infrastructure. Briefly: the land becomes infertile and deserted. This is often also called land degradation.”

(<http://www.desertifikation.de/desertifikation.html>)

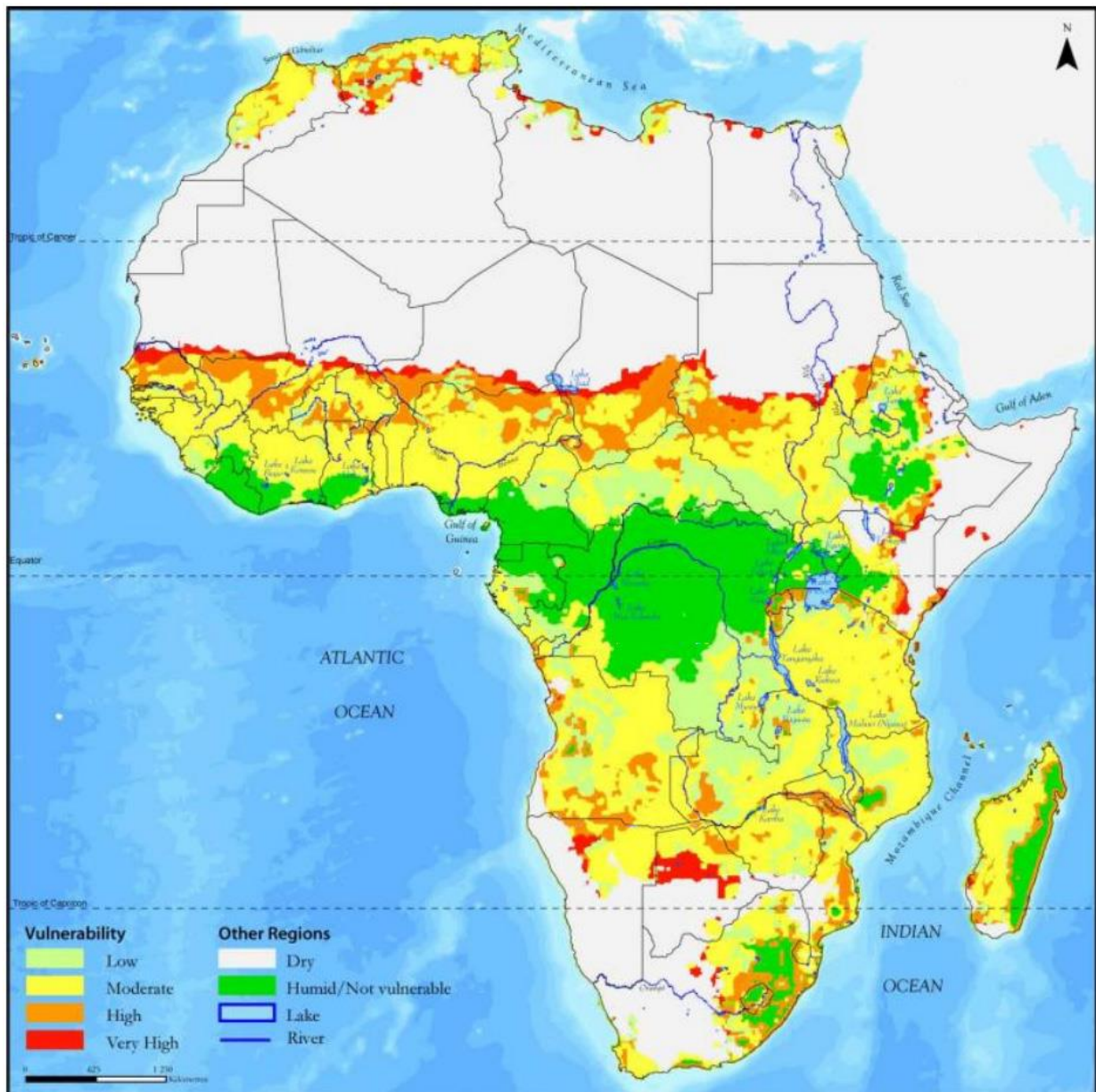
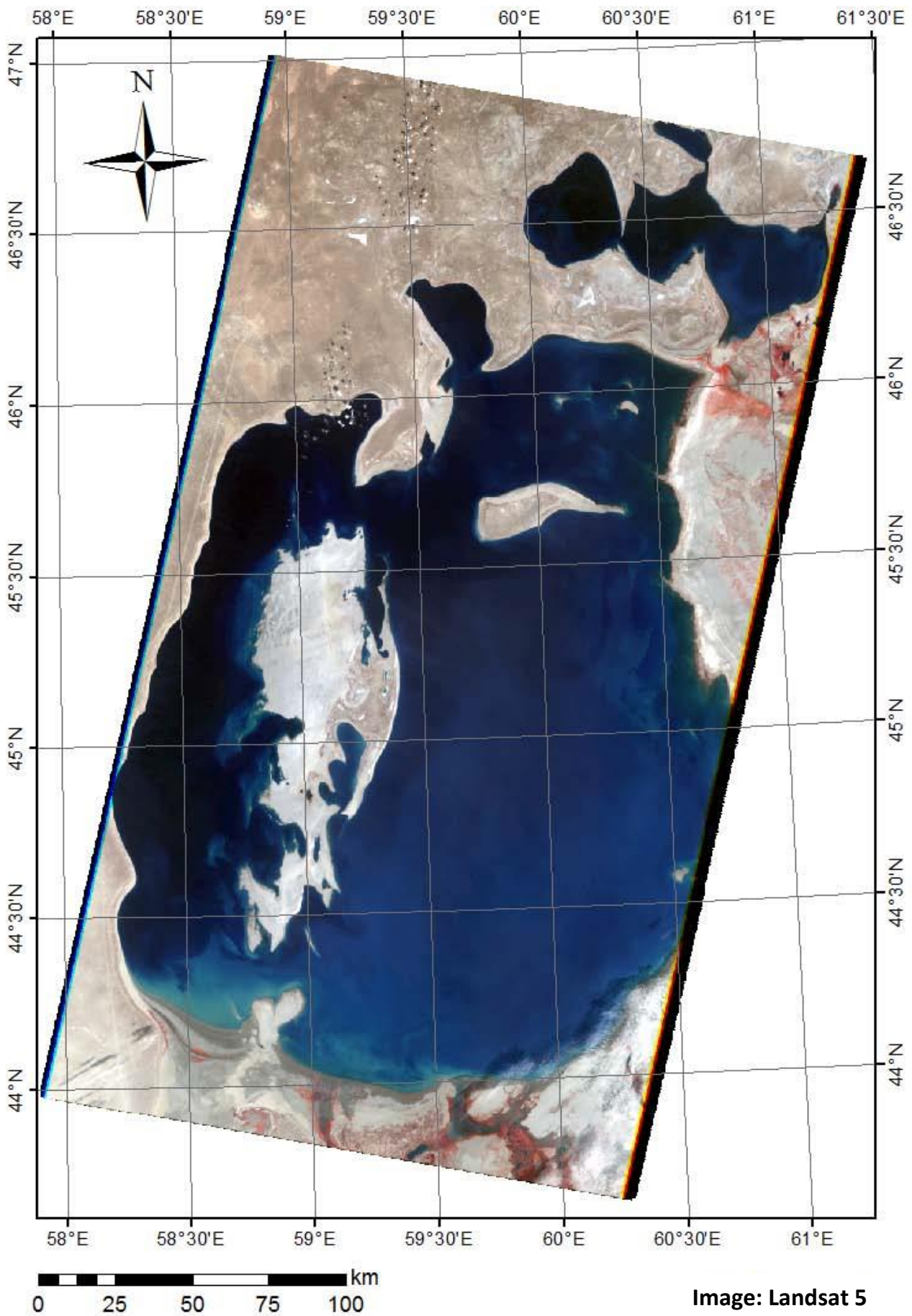
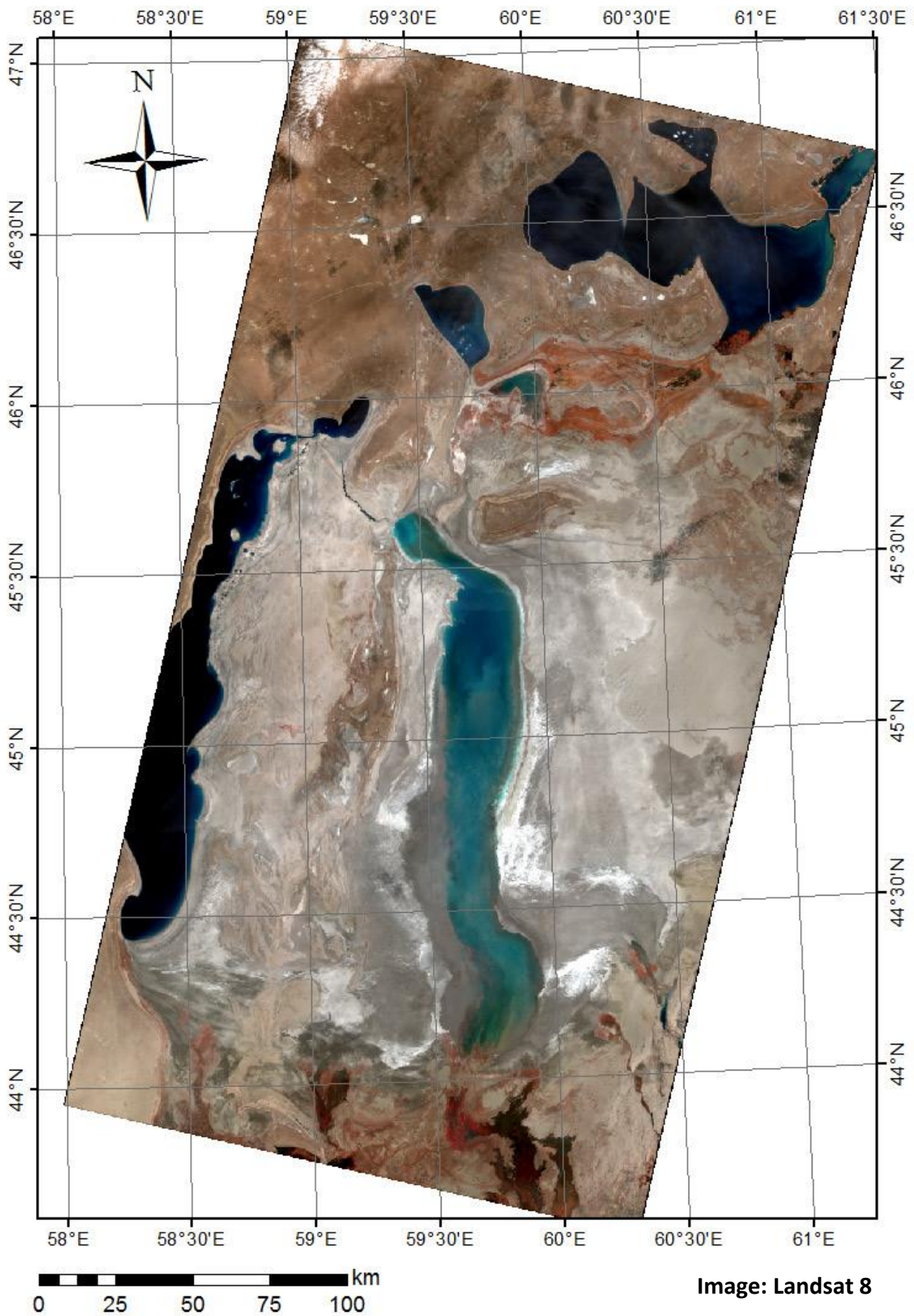


Illustration: Desertification vulnerability in Africa. Source: UNEP 2008



Material 6a: Aral Sea in 1991

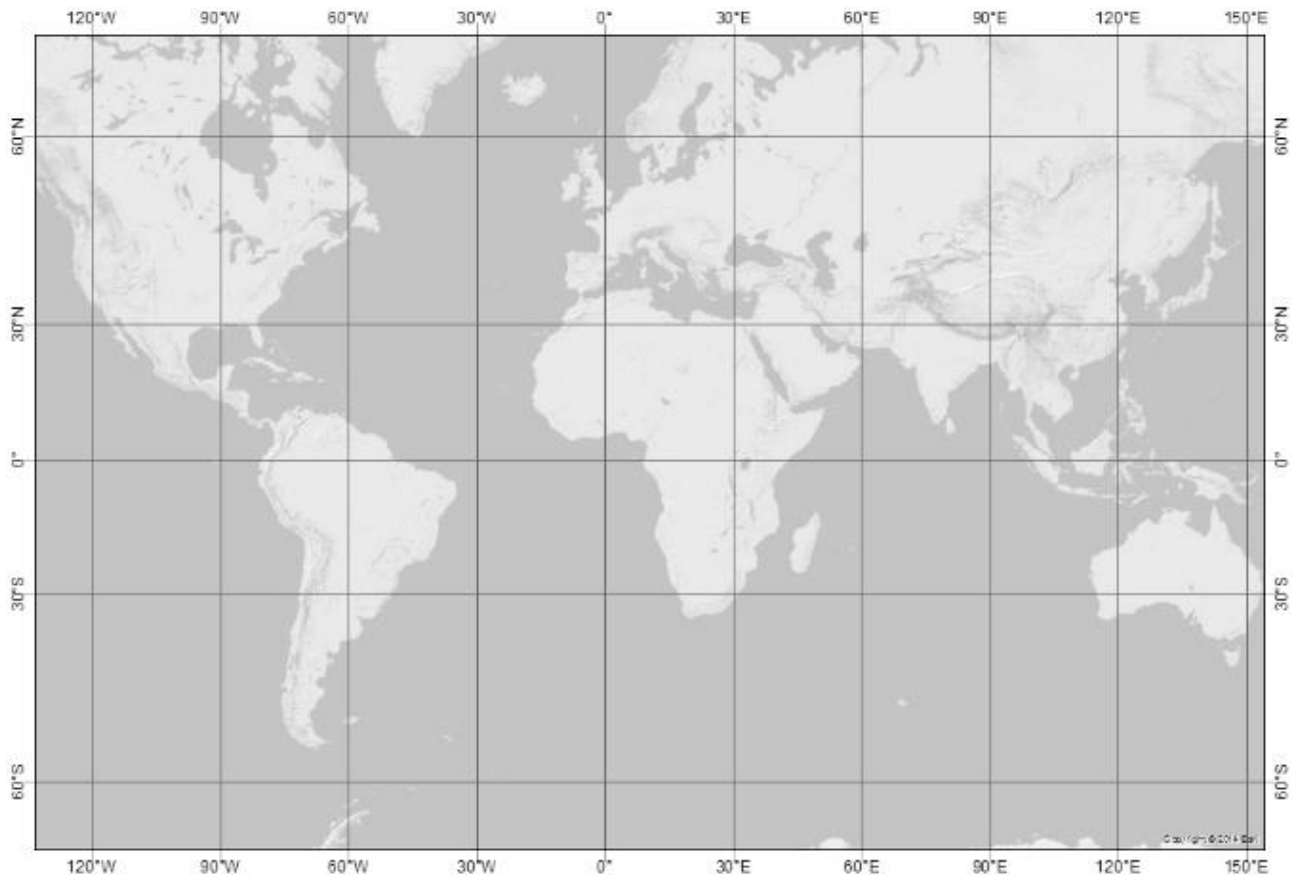


Material 6b: Aral Sea in 2015

Tasks:

1.) In Material 2, you can find climate diagrams of places located in the listed desert regions (material 1). The diagrams illustrate the temperature and precipitation during the course of the year. Compare, describe and explain the course of the curves. Which similarities do they share? How do the diagrams differ from each other?

2.) A section of an empty world map only with mountains as well as longitude and latitude specifications is shown below. Highlight those regions on the map where the deserts of material 1 can be located (if necessary with the help of an atlas). What do you recognise?



3.) Classify the deserts according to their formation regarding their geographical location. Fill in the following table. Material 3 will help you with this.

	genetic type of desert		genetic type of desert
Sahara		Namib	
Australian Desert		Gobi	
Atacama Desert		Taklamakan	
Sonora		Rub' al Khali	



4.) Which morphological types of deserts can be seen in material 1? Enter the desert’s names in the following table. Material 4 will help you with this.

Stone Desert	Gravel Desert	Sand Desert	Clay Desert

5.) In material 6, you can find images of the Aral Sea in Kazakhstan and Uzbekistan of 1991 and 2015. Compare these two satellite images. How did the landscape change? Guess the ratio between now and the past. How many times bigger was it in 1991 compared to today?

- ☐ twice as big
- ☐ ten times as big
- ☐ twenty times as big

6.) Look for settlements close to the Aral Sea with the help of an atlas. Locate towns or settlements which are threatened by desertification and a decreasing water surface level. Name the biggest towns in that region.