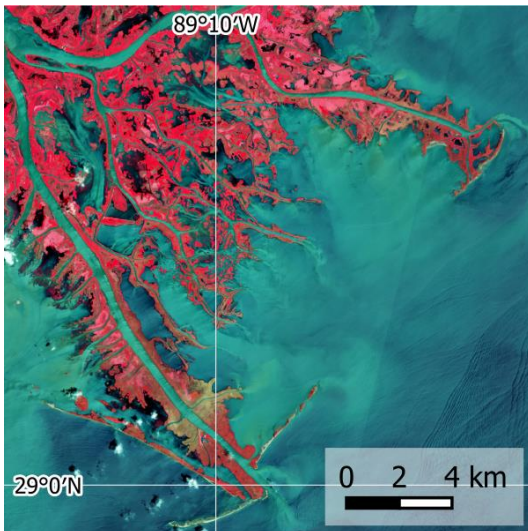
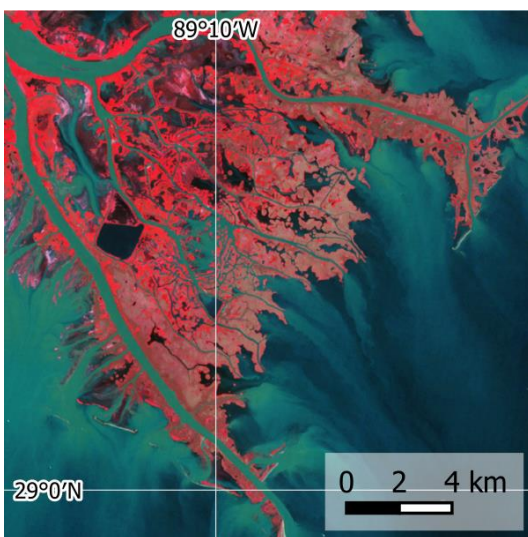


2023-05-12, Sentinel-2



2017-05-08, Sentinel-2



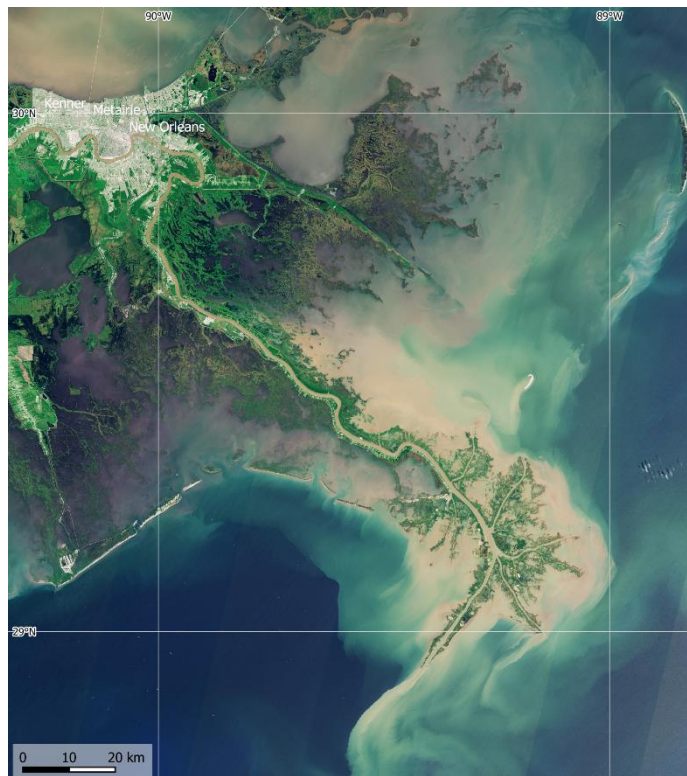
1995-07-19, Landsat 5

### A dynamic coastal region

Land use changes in the Mississippi catchment and its delta have altered both landscape and hydrology, with implications for the environment and the human population. About 80% of the original wetlands in the Mississippi River Delta have been lost due to land conversion for agriculture, urbanisation, and infrastructure development.

Around 60% of the sediment load carried by the Mississippi River is now trapped behind dams, reducing sediment delivery to the delta and exacerbating land subsidence. Urbanisation along the river has fragmented natural habitats and increased impervious surfaces, leading to higher runoff volumes and flood risks in downstream areas. The city of New Orleans, located in the Mississippi delta, is particularly vulnerable to flooding, with over 40% of its land below sea level.

The oil industry is an important economic driver in the region, with offshore drilling platforms, refineries, and petrochemical plants dotting the coastline. This industry poses environmental risks, including habitat destruction, pollution, and the potential for oil spills. The 2010 Deepwater Horizon oil spill, for example, released an estimated 4.9 million barrels of oil into the Gulf of Mexico. Hurricanes are a recurring threat to the Mississippi delta. Hurricane Katrina in 2005 and Hurricane Harvey in 2017 caused billions of dollars in damages and loss of life. Wetland loss and coastal erosion have reduced natural barriers protecting the coast, leaving communities increasingly vulnerable to storm surges and flooding.



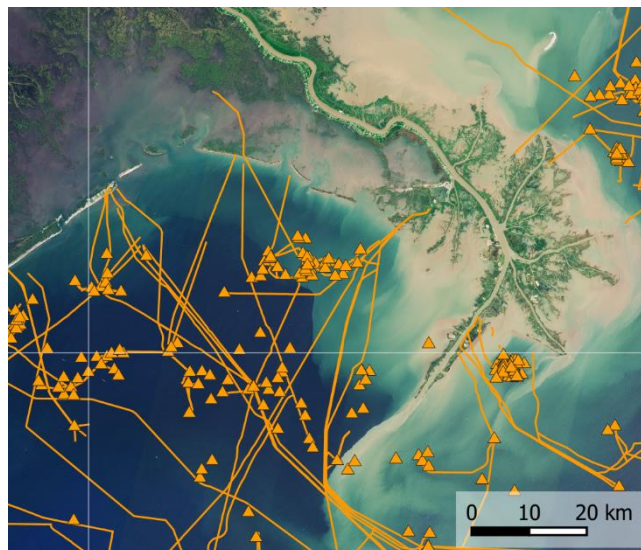
2023-04-22, Sentinel-2 overview satellite image of the Mississippi Delta



### Exercises

- Look at the overview Sentinel-2 satellite image and try to identify areas with different land cover and landuse. Can you see built-up areas, coastal vegetation, and water bodies?
- In this satellite image, water shows up in quite different colours. What reasons can you imagine? Think about material transported by the river. What happens with it once it reaches the sea?
- Look at the false colour infrared images and compare them. What has happened to the coastline? What has happened to the vegetation in the delta?
- Which reasons do you think are responsible for the retreat of the coastline? Think about possible changes in the supply of sediments and changes in the sea level and in the frequency or intensity of hurricanes.
- Look at the map below showing the installations around the Mississippi Delta made by the oil industry. Which potential risks can you identify that could be related to these activities?

### Additional Material



*Satellite map of the oil production installations around the Mississippi Delta  
(Data: Sentinel-2; U.S. Department of the Interior, BOEM, Bureau of Ocean Energy Management)*

### Links and Sources

- [https://www.esa.int/Applications/Observing\\_the\\_Earth/Earth\\_from\\_Space\\_Mississippi\\_River\\_Delta](https://www.esa.int/Applications/Observing_the_Earth/Earth_from_Space_Mississippi_River_Delta) - Landsat satellite image of the delta.
- [https://www.esa.int/ESA\\_Multimedia/Videos/2012/05/Earth\\_from\\_Space\\_Mississippi\\_River\\_Delta](https://www.esa.int/ESA_Multimedia/Videos/2012/05/Earth_from_Space_Mississippi_River_Delta) - ESA video about the Mississippi River Delta in satellite image data.
- [https://earth.esa.int/web/earth-watching/natural-disasters/cyclones/cyclone-events/-/asset\\_publisher/4Lfz/content/hurricane-katrina-florida-august-2005/index.html](https://earth.esa.int/web/earth-watching/natural-disasters/cyclones/cyclone-events/-/asset_publisher/4Lfz/content/hurricane-katrina-florida-august-2005/index.html) - ESA Earth Watching page on the 2005 Hurricane Katrina and its impact on the Mississippi Delta and New Orleans.
- <https://climate.esa.int/en/projects/sea-level/> - ESA Climate Change Initiative project with a large amount of in-depth information on sea level rise and its consequences.

