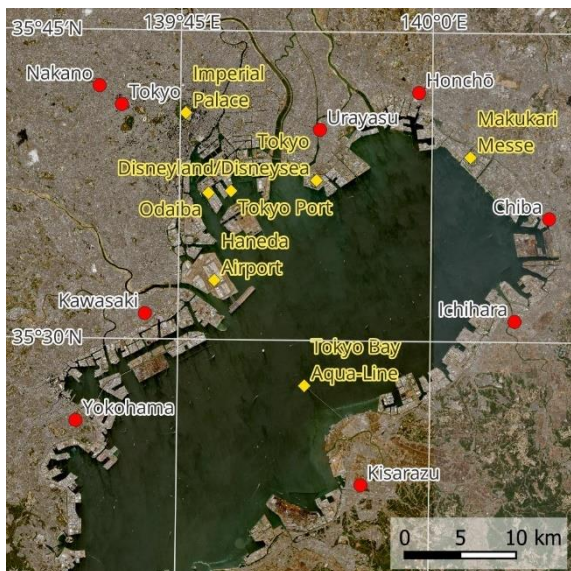
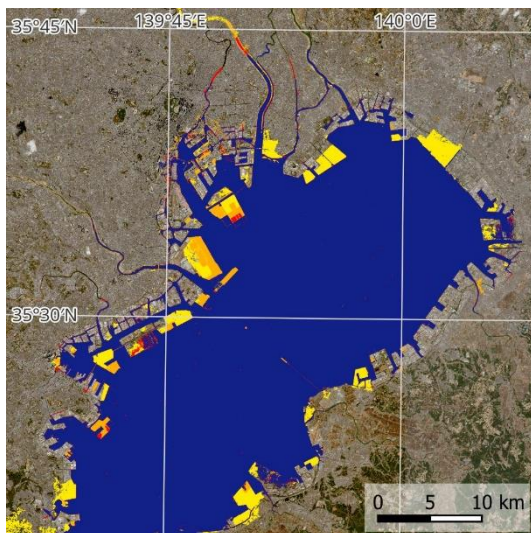


Landsat 1, 1973-10-16



Sentinel-2, 2025-03-07



Land reclamation 1973-84 (yellow), 1984-2017 (orange), 2017-2025 (red)

Tokyo Bay has undergone significant development in the past five decades, driven by economic growth and urban expansion. Since the 1970s, Tokyo Bay has lost much of its original coastline due to land reclamation. Large sections of the bay were filled in to create space for industrial zones, ports, airports, and residential areas. Some of the most important reclaimed areas include **Odaiba**, a futuristic waterfront district, and **Makuhari**, a business and entertainment hub. By 2020, nearly 250 square kilometres of land had been reclaimed.

The Tokyo metropolitan area includes the Chiba Prefecture in the east and Kanagawa Prefecture with the cities of Kawasaki and Yokohama in the south. It surrounds the bay and has seen a population growth from around 26 million in 1970 to over 37 million today, making it one of the largest urban areas in the world. This rapid expansion has been fuelled by Japan's economic boom, during which Tokyo's GDP (gross domestic product) increased from about € 280 billion in the 1970s to over € 1,800 billion today.

One of the most famous projects in Tokyo Bay is **Tokyo Disneyland**, which opened in 1983 on reclaimed land in Urayasu. Another major project is **Tokyo Bay Aqua-Line**, a 15-kilometer tunnel-bridge highway, completed in 1997, connecting Kanagawa and Chiba prefectures to reduce congestion around the city.

Additionally, **Haneda Airport** expanded significantly with a new international terminal, built on reclaimed land, to accommodate rising air traffic. The 2020 Tokyo Olympics also led to the construction of new stadiums and transportation networks around the bay.

Tokyo Bay's rapid development has contributed significantly to Japan's economy, with its port handling over 100 million tons of cargo annually. However, industrialization and urban expansion have led to pollution and habitat loss, too. Recent efforts focus on environmental restoration, such as seawater purification systems and artificial tidal flats to improve water quality and protect marine life.

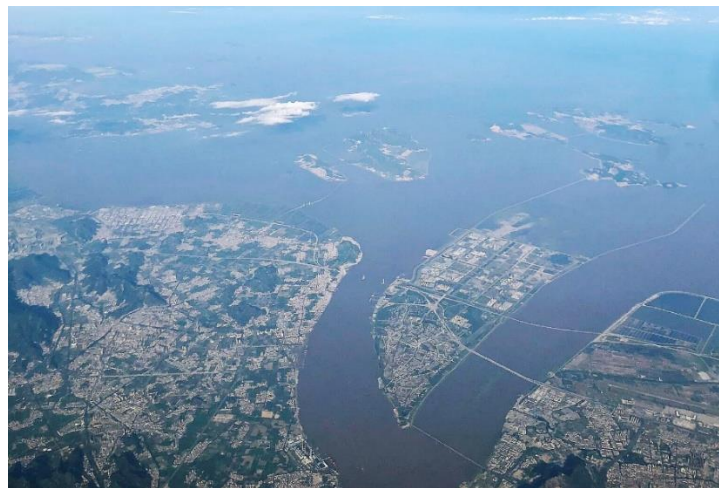


## Exercises

### • *Satellite Maps:*

- Look at the satellite image maps and discuss the changes that occurred in the region between **1973** and **2025**.
- Which factors have originally limited the growth of the city area?
- Try to identify areas in which these limitations have been overcome and describe how this was done.
- Try to identify the places mentioned in the text in the satellite map and focus on the development in these areas by comparing the satellite images.
- Compare the quality of the satellite data – in which respect has it improved? Think e.g. about the level of detail and the spectral quality of the data. (Note: in older datasets there are sometimes errors due to transmission problems, see e.g. the 1973 image).
- Look at the map showing the **land reclamation areas** and try to identify when the largest development projects were performed. Use the scale bar to estimate the areas involved in some of these projects.

## Additional Material



*Haneda Airport, built on artificial islands in the Tokyo Bay (photograph: Bruno Plas).*

## Links and Sources:

- [https://www.esa.int/ESA\\_Multimedia/Images/2014/11/Tokyo\\_Bay\\_Japan](https://www.esa.int/ESA_Multimedia/Images/2014/11/Tokyo_Bay_Japan) - a Sentinel-1 radar image highlighting the different land cover classes in the Tokyo Bay area
- [https://www.esa.int/ESA\\_Multimedia/Images/2025/02/Earth\\_from\\_Space\\_Tokyo\\_Japan](https://www.esa.int/ESA_Multimedia/Images/2025/02/Earth_from_Space_Tokyo_Japan) - large area multitemporal Sentinel-1 radar image from August/September 2024
- [https://www.esa.int/ESA\\_Multimedia/Images/2018/03/Tokyo](https://www.esa.int/ESA_Multimedia/Images/2018/03/Tokyo) - true colour Sentinel-2 image of the Tokyo area from 2018
- <https://research.hktdc.com/en/article/NDaWMDc1MjU2> - a 2018 background article about lessons to be learned from the Tokyo Bay Area Development
- <https://storymaps.arcgis.com/stories/fdc02295fe7c4dce87a4b0926ecd6d95> - excellent in-depth presentation of the development of the Tokyo Bay Area from the 16<sup>th</sup> century to now

