

EARTH OBSERVATION

Earth Observation (EO) can help us to answer questions and make sense of the world.

EO combines information from remote-sensing technologies such as satellites, with measurements taken from the ground or at sea. It is at its best when local knowledge and observations give context to satellite imagery.

EO is used by many different types of organisations to map and monitor changing environment and human activity. It is particularly useful for locations which are otherwise expensive and challenging to monitor, such as our coasts and oceans.

Satellites orbit the Earth gathering data.

There are more than two thousand satellites constantly orbiting the Earth. Different satellites have different jobs. The data which some of these gather provide ways to tell us about the physical, chemical and biological systems of our planet.

People take measurements of our coasts and oceans. These can be made from ships, buoys, drifting floats or from the shore.

These data are transmitted to data centres, and information is extracted.

Land-use change

We can keep track of activities on land, such as farming, mining and urban growth, which affect our oceans.

Coastline mapping

We can monitor the position of the coastline and the height of the sea surface – mapping our dynamic coasts, helping us understand where changes are taking place, and how fast these changes are happening.

Ocean physics

Measurements of sea surface temperature, wind speed, wave height, sea level and ocean currents tell us how the state of the ocean changes with time. The data are used for weather forecasts, climate prediction, and ocean models to deliver vital information for shipping and port operations, offshore industries, and the planning of coastal developments.

Ocean colour and water productivity

From the colour of the sea we can calculate the amount of chlorophyll-a, an indicator of phytoplankton growth. This can tell us about potentially harmful algal blooms and about the nutrient content and biological productivity of waters, helping protect aquaculture, fisheries and the biodiversity of sensitive coastal and marine habitats.

Shallow water habitat and depth mapping

Through processing optical images, we can measure the depth of the seafloor, and map and monitor seabed habitats. This information can help us decide which areas require special protection and more effective management. It provides a way to protect marine habitats such as coral reefs and seagrass meadows.

Water quality and pollution

We can detect and track pollution such as oil spills, untreated waste-water or illegal dumping. This can help to identify sources of the pollutants and take action to combat the environmental threat.

Be an Earth Observer

The quality and quantity of Earth observations are increasing rapidly. Many of the satellite data sets and tools to process and interpret these are available for free.

Collecting, analysing and presenting EO information is something everyone can get involved in, and wide use of the data brings benefit to us all.

There are many opportunities online to submit your own measurements, access free data and processing tools or learn more about satellite applications. For example:

- You can use information, tools and free data made available by the European Space Agency <https://earth.esa.int/web/guest/home>
- You could help scientists track changes in clouds, water, plants and other life in support of climate research <https://observer.globe.gov>
- You can LearnEO! Free image processing capability is available for educational use <https://learn-eo.org>

Southampton (UK) and surrounding area

