



SPACE

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WHO IS AN EARTH OBSERVATION SCIENTIST?

Field Earth observations, geography, ecology
Type Research, industry
Level of study Masters



What is the field about?

Earth observation essentially gives a bird's eye view of the Earth. It is also called "remote sensing", because it gathers images and data from the Earth's surface and atmosphere using cameras and instruments that can be on a satellite orbiting the Earth, or on an aircraft flying over a particular region, or even on a drone flying over your backyard. The information collected is then processed in a computer to tell us more about the weather, the damage caused to a forest in a storm, the area flooded after a strong rainfall event, the area of a country planted with different crops, the temperature of the water in the sea and lots more. Remote sensing is also used to observe areas that are very difficult to access because of their remoteness, dangers or inaccessibility after an earthquake or flood.

One great thing about Earth observation is that we can "see" in ways that our eyes can't. For instance, with sensors we can detect heat, therefore we can know the temperature of the clouds, the ocean, or land. With microwave sensors we can "see" through clouds and at night, which allows us to collect vital information at any time. We can also measure the height of a wave in the ocean using a sensor called an altimeter.

What would I do every day?

The main job of an Earth observation scientist is to analyze the data that is collected from the sensor systems. For that reason, you need to be very comfortable working with a computer in order to process the data and make sense of it. You would generate maps showing different features and produce graphs showing how temperature and other properties change over time. Some remote sensing scientists also make measurements on the ground or in the sea to compare them to the measurements made by instruments on the air to ensure that they are all consistent.

How much and what do I need to study?

It is good to be interested in how our Earth works, so geography is useful. However, Earth observation also involves a lot of computer processing so being good at mathematics, physics and computer science is definitely an advantage. You will need a degree in one of these areas and usually a master's degree with a specialization in Earth Observation. Some scientists working in the field also have PhDs but it is not vital.

Where can I work?

There are more and more opportunities for Earth observation scientists. You can work in private companies and consultancies involved in environmental monitoring, in non-governmental organizations, or shortly NGO's, that follow global development or disaster response, research labs and universities and even in space agencies. This is still a somewhat specialized field, so at the beginning it may be necessary to move around, work on short term contracts, and it is still an area that relies on government funding to a great extent.

This is the job for me, if...

...you are curious about how our Earth works and love the idea of discovering parts of it you may never see with your own eyes.

...you also enjoy working with computers and if you like the challenge of writing computer programs that helps.

...you are methodical and patient, as often you have to process your images and data in a number of ways in order for them to reveal their secrets.

An Earth observation scientist should be:

A logical thinker: the results you get from processing the data need to make sense

Detail oriented: when working with the data, there are lots of steps to follow, so you need to pay attention to details and be thorough

Persistent: often you have to try a number of different approaches in order to reach the answer to your question. Sometimes you can go down blind alleys and have to retrace your steps and start again.

Learn more about Earth observations:

- Introduction to ESA's Earth Observations video
- How does Earth observation work?
- "Monitoring the oceans from space" EUMETSAT online course

The text is kindly provided by Dr. Ned Dwyer, Executive Director of the European Centre for information on Marine Science and Technology (Eurocean).

Image: Sharp eyes on Earth

Credit: ESA/ATG medialab



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