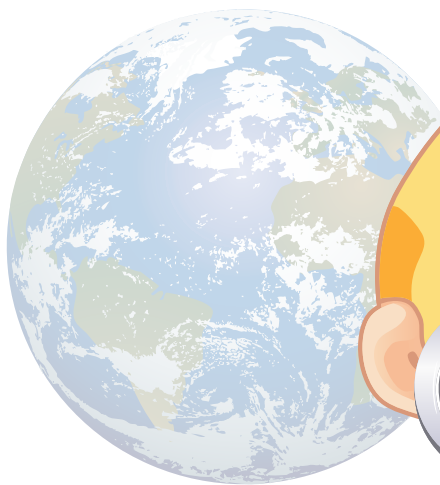


Keeping an Eye on Climate Change



Do you know the difference between “climate” and “weather”?

Weather is what you see outside right now—maybe cloudy and breezy or calm and sunny. Climate is like weather, except it covers a longer period of time—months, years, or even decades. It’s the type of weather you “expect” at a certain place at a certain time of the year.

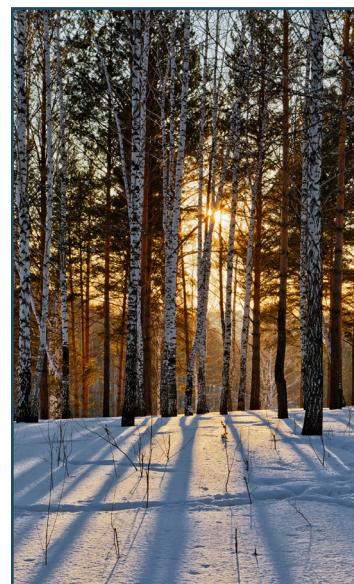
Climate is what you expect, but weather is what you get.

Does climate matter? Yes!

Earth is the only planet—that we know of—that can sustain life. This is because its overall climate is flexible enough to support moderate changes in temperature.

If Earth’s climate changes beyond a certain point, it may no longer be able to support all the different kinds of life that it does today. For instance, small particles added to the air can change the way clouds form and how much rain or snow they produce. Less snow and more rain in the winter creates a higher chance of flooding.

Researchers from around the world use data gathered from the sky, sea, and Earth’s surface to study its climate and predict how it could change in the future.

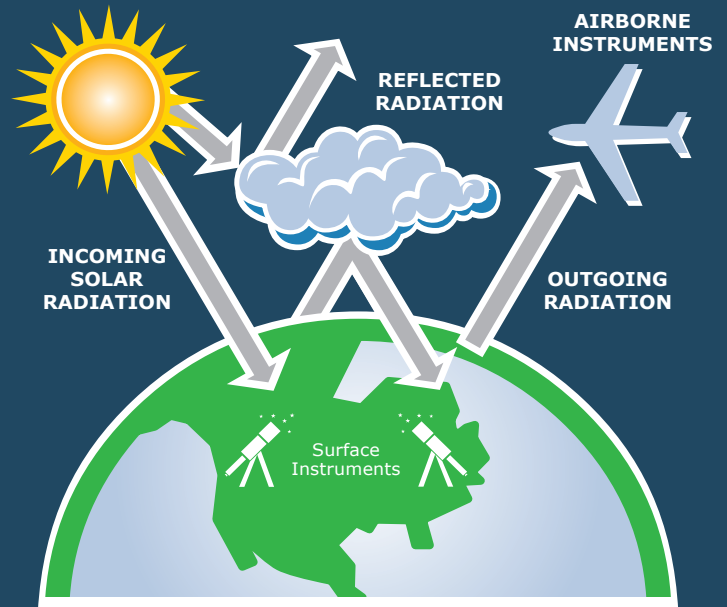


How do they get the data?

The U.S. Department of Energy (DOE) operates a handful of “outdoor laboratories” around the world that use lots of different instruments to monitor various elements of the climate, such as:

- **Clouds** – how big and thick and bright they are
- **Aerosols** – small particles in the air, such as soot, dust, and sea salt, that can grow into clouds
- **Solar and thermal radiation** – energy coming down from the sun and up from the Earth
- **Basic weather components** – temperature, pressure, humidity, and winds.

They also have three portable laboratories—the ARM Mobile Facilities—that can be moved around to obtain data from other places.



From January through December 2014, one ARM Mobile Facility is operating in Hyytiälä, Finland, for the **Biogenic Aerosols – Effects on Clouds and Climate, or BAECC**, field study.

BAECC is a collaboration with Finnish scientists to study biogenic—or natural—aerosols emitted from forests. They're using dozens of ground-based instruments to measure tiny particles and gases emitted from Scots pine trees. Scientists will use the data they collect and combine it with observations already done in Hyytiälä during the last 18 years to better understand the links between biogenic aerosols, cloud formation, and Earth's climate.

To learn more about this study, look for “BAECC” on the ARM website.

www.arm.gov.



What are biogenic aerosols?

Trees, shrubs, fungi, animals, and even humans release microscopic particles and gases into the air. The natural airborne particles are known as biogenic aerosols.

Aerosols in the sky are important to Earth's climate because they can reflect light back into space, cooling the atmosphere. They can also combine with other particles, such as dust or tiny water droplets, to create clouds. Clouds can act as a blanket and warm Earth's atmosphere, or cool it by reflecting the sunlight away.



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