

Keeping an Eye on Climate Change



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

The 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 the quality of life around the world that it does today. For instance, small particles added to the air can change the way clouds are formed and how heat is distributed in the atmosphere. This can affect the monsoons by either making them more intense or by drying them up.

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



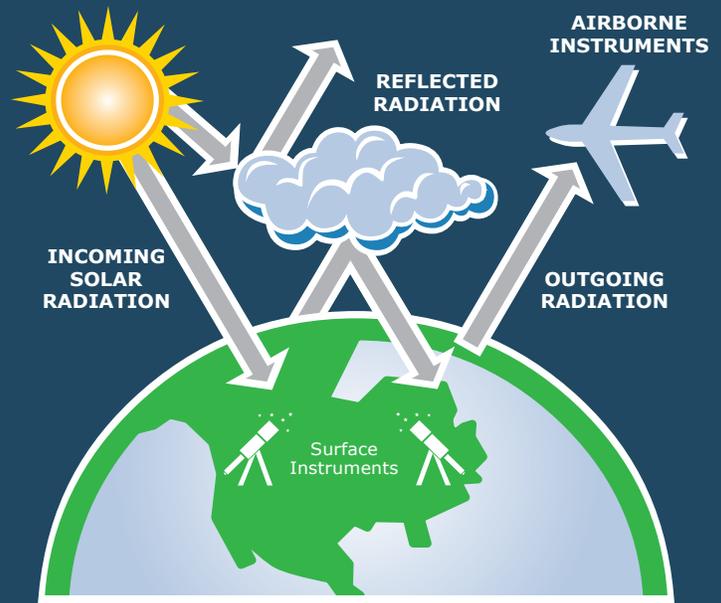
Photo courtesy of Shubhrajit Chatterjee

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 two portable laboratories—the Atmospheric Radiation Measurement (ARM) Mobile Facilities—that can be moved around to obtain data from other places.



Between June 2011 and March 2012, one ARM Mobile Facility is operating at the observatory in Nainital, India, for the **Ganges Valley Aerosol Experiment**, or **GVAX**.

During GVAX, scientists from India and the United States are using instruments in the Ganges Valley to measure aerosol particles—what they're made of, how big they are, and how they change over time. Scientists will use the data to study how aerosols absorb or reflect sunlight and how they might affect clouds and the seasonal monsoons in the region.

To learn more about GVAX and the ARM Mobile Facility, visit the ARM website at www.arm.gov.



Photo courtesy of Raja



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