Climate change–related definitions

Climate—The mean state of the atmosphere over a long period of time. This period is generally at least 30 years, to produce a statistically significant sample and to avoid shorter term variability. The principal elements of climate are the same as the principal elements of weather (IPCC 2007a).

Climate change—Alteration in the mean state of the atmosphere over a long period of time that can be detected statistically. Climate change consists of trends in the mean and the variability of climate that persist for an extended period, typically decades or longer. Climate change may be due to natural internal processes, natural external forcings, or persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC 2007a).

Climate variability—Variations in the mean state of the atmosphere on all spatial and temporal scales beyond the scales of individual weather events. Climate variability may be due to natural internal processes within the climate system (internal variability) or to variations in natural or anthropogenic external forcing (external variability). Major forms of interdecadal variability, which are often cyclical, include the El Niño–Southern Oscillation and the Pacific Decadal Oscillation (IPCC 2007a).

Global warming—A long-term increase in the average surface temperature of the world that constitutes the major form of climate change.

Radiative forcing—Change in the net radiation flow at the top of the troposphere (about 6–10 km [4–6 mi] altitude), with positive values indicating increased heat toward the surface of Earth (IPCC 2007a). Changes in greenhouse gases, ozone, other atmospheric constituents, airplane contrails, the reflectivity of the earth, and the output of the sun contribute to radiative forcing. Radiative forcing from 1750 to 2005 was +1.6 watts per square meter [+0.8, –1.0 watts per square meter], causing the warming detected around the world (IPCC 2007a). Greenhouse gas emissions from power plants, motor vehicles, deforestation, and other human activities have caused 93% of the radiative forcing (IPCC 2007a).

Weather—The state of the atmosphere at a point in time. Principal elements of weather include temperature, precipitation, wind, air pressure, and humidity (U.S. National Weather Service, http://www.weather.gov/glossary).