

Unit: Cloud Formation and Climate Change

Module: Atmosphere

Transcript – Earth's Water Cycle Video (NASA)

Transcript: Video – Earth's Water Cycle – Slide 47

Video: The 5.52min. video is in the *Cloud and Climate Power Point* (Slide Section: *One of Two Primary Cloud Function* – Slide #46)

Source: NASA Precipitation Education

Link: <https://pmm.nasa.gov/education/videos/earths-water-cycle>

Water is the fundamental ingredient for life on Earth. Looking at our Earth from space, with its vast and deep ocean, it appears as though there is an abundance of water for our use. However, only a small portion of Earth's water is accessible for our needs. How much fresh water exists and where it is stored affects us all. Nearly two-thirds of this fresh water is stored in the polar ice caps, snow packs, and glaciers, making it inaccessible for long periods of time.

The water cycle is dynamic; it describes the continuous movement of water on, above and below the surface of the Earth and the transitions from one state to another. Sea surface temperature, surface winds, and air temperature influence the rate of evaporation at the ocean surface. In the tropics, warm ocean surface temperatures support high rates of evaporation. Wind also increases evaporation. When the air's temperature is warmer, it can hold more water. While the atmosphere does not store a large quantity of water compared to the ocean, rivers and lakes, it can transport water quickly from one place to another. Low-lying regions of the atmosphere with high moisture and strong winds, can form "atmospheric rivers" to transport water horizontally.

Clouds are formed as water vapor cools and condenses into droplets and ice crystals. Clouds and water vapor act as insulators in the atmosphere. Clouds help shield the Earth from the Sun and trap heat from below. When cloud particles grow large enough, they may fall out as rain or snow. Under the right conditions, areas of precipitation can grow into large storms. As storms grow, they transfer heat vertically into the upper atmosphere. The migration of storms helps to distribute heat between the equator and poles - shaping wind patterns globally. How storms grow and intensify depends upon atmospheric moisture, surface temperatures and wind patterns. Precipitation is concentrated in some parts of the world and scarce in others. It can vary substantially from season-to-season and from year-to-year. Water that falls on the land surface as

precipitation is stored within snow packs, lakes, reservoirs, soils and underground aquifers.

Water availability varies from place-to-place and over time. The availability of water affects the type and abundance of vegetation, the primary source of food for animals and people. Extreme water cycle variability, unusually dry or wet conditions, impacts humans worldwide. Each year, hazards such as floods exact a costly economic and human toll. Most of the water that falls on to land remains stored there for weeks or more. Snowfall is stored as snow pack or ice. Melt water and rainfall are stored in lakes and soils. Some of the water is absorbed by plant roots or drains into the water table. Eventually, the water will evaporate to the atmosphere or return to the ocean in streams and rivers, providing a source of nutrient rich water that supports ocean life.

Sensors on a suite of NASA satellites observe and measure water on land, in the ocean and in the atmosphere. These measurements are important to understanding the availability and distribution of Earth's water, which is both vital to life and vulnerable to the impacts of climate change and a growing world population.

NASA Earth Observing System Data and Information Systems (EOSDIS)

EOSDIS is a distributed system of twelve data centers and science investigator processing systems. EOSDIS processes, archives, and distributes data from Earth observing satellites, field campaigns, airborne sensors, and related Earth science programs. These data enable the study of Earth from space to advance scientific understanding.

Source:

<http://svs.gsfc.nasa.gov/vis/a010000/a011000/a011054/>

Credits:

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