Since 1972, Landsat satellites have continuously gathered data about our planet for the benefit of the U.S. and the world. The Landsat data archive is the longest continuous, nearly complete global record of Earth’s surface, with all of the data free and available to the public. Land cover and land use are changing globally at rates unprecedented in human history. These changes bring profound consequences for weather, ecosystems, resource management, the economy, carbon storage and emission.

**Landsat Since 1972**

The Landsat program offers the longest continuous global record of the Earth’s surface. Landsat missions have been in operation since 1972. Each new satellite in the Landsat series is named for the year in which it was launched. Landsat 9 is the newest satellite in the program, and will add more than 750 scenes to the ever-increasing archive. As Earth-probes, replacing to Expedition, Landsat 9 will enable our ability to detect and characterize land surface changes, and will offer critical new information to researchers that can differentiate between natural and human-induced change.

**The Andes Sea** has been shrinking since the 1960s when two massive mudslides dammed a large lake that was stored by agriculture. A dam built in 2005 has conserved the northern extent of the lake, but what was once a large freshwater lake is now just a fraction of its original size. The lake and fishing industries have collapsed. Without the moderating influence of water, the local climate has changed, and we see a spread of dry-land vegetation from the exposed lakebed.

**Mount St. Helens erupted with a catastrophic collapse, avalanche, and explosion in 1980.** As the first eruption in the continental United States in the era of modern scientific observation, it has given scientists an unprecedented opportunity to witness the intricate steps through which life reclaim a devastated landscape. The scale of the eruption and the beginning of reclamation in the Mount St. Helens blast zone are documented in this series of images captured by the Landsat series of satellites between 1974 and 2006.

**Landsat’s Thermal Infrared Sensor observed the calving of a massive iceberg from the Larsen C Ice Shelf of Antarctica in 2017.** Thermal imaging is able to show where colder ice ends and “warm” water of the Weddell Sea begins — even in the Antarctic winter. In a few weeks of observation, the passage widened between the main ice berg and the front of the shelf. This slow widening occurred after an initial back-and-forth movement in July 2017. In August 2017, the main berg into two large, iceberg, later named A-68A and A-68B. Landsat continued to track the movement of these bergs in 2018.

**The city of Dubai, in the United Arab Emirates, has transformed from a small fishing and pearl-digging village into a modern metropolis.** The population has increased from 23,000 to an estimated 2.9 million residents in 2022. The image shows an area in Dubai Workers’ City where apartments are occupied by red roof housing. A dramatic change can be observed from the image of the first image in 1973 (very little vegetation and urbanization) to 2022 with many areas of red from the water.

**The Columbia Glacier descends from an 18-km (11-mi) thick ice sheet calving from the Chugach Mountains, and into a narrow inlet that leads into Prince William Sound in Southeastern Alaska.** It is one of the most rapidly changing glaciers in the world. The glacier has been retreating to the north since the 1980s and has contributed to global sea level rise, mostly through melting in summer. Because of the rapid loss in the Columbia satellite series, scientists have been able to observe the rate of change of the Columbia Glacier for the last 50 years.

In a swampy area in Southern Louisiana, new land has formed in the past few decades along the Wax Lake Outlet and the Atchafalaya River. This land formation process is being captured through time by multiple Landsat satellite missions. Both deltas have been built by sediment carried by the Atchafalaya River. Geologists first noticed the process building up in Atchafalaya Bay in the 1970s. In 2017, new land first rose above the water line after a severe flood and scientists from Louisiana State University calculated that the delta has grown by 2.0 km2 per year.

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The conversion of tropical rainforests to pasture and cropland is having dramatic effects on the environment. Particularly, deforestation and accelerated land degradation is taking place in the state of Rondônia, Brazil, part of which is shown in the series of Landsat images. The deforestation starts along roads and then fans out to create the "battered" pattern, which begins to show in the eastern half of the 1994 image. About 50% of the world’s tropical forests are in Brazil. The estimated average deforestation rate from 1978 to 1988 was 15,000 km² per year.

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