Climate change is having an impact on the character and global distribution of clouds.

Picture / AP

Cloud study offers no silver lining on climate change

Clouds, which act as thermal regulators for Earth, have altered in character and global distribution due to climate change, and could in turn make warming worse, a study says.

A trawl of satellite images has revealed reduced cloudiness in Earth's temperate mid-latitude zones, which lie between the poles and subtropics in both hemispheres, accompanied by a poleward expansion of the subtropical dry zones.

The tops of clouds everywhere rose higher, according to data that stretched over more than two decades from the early 1980s.

"These cloud changes enhance absorption of solar radiation by the Earth and reduce emission of thermal radiation to space," said a statement from the Scripps Institution of Oceanography at the University of California San Diego, which took part in the study.

"This exacerbates global warming caused by increasing greenhouse gas concentration."

Clouds regulate Earth's temperature by reflecting some solar radiation back into space before it can hit the ground, while also acting as a blanket to limit heat loss from the planet at night.

How they are affected by climate change, and how they influence global warming in return, "has been one of the biggest areas of uncertainty for scientists attempting to understand current climate and forecast future trends", said Scripps.

Satellites originally designed to monitor Earth's weather are not stable enough to reliably track cloud changes over decades.

But the team figured out a way to "correct" the data by removing confounding factors such as satellite orbit, instrument calibration and the degradation of sensors.

The record revealed clear changes in cloud distribution, which the team then compared to a history of Earth-warming greenhouse gas concentrations in the atmosphere.

"They concluded that the behaviour of clouds they observed is consistent with a human-caused increase in greenhouse gas concentrations," said the statement. There was no similar correlation with other potential influences such as ozone levels, human-created aerosols, or natural changes in solar radiation.

Another factor on clouds was two major volcanic eruptions – the 1982 El Chichon eruption in Mexico and the 1991 eruption of Mount Pinatubo in the Philippines, which would have had a net cooling effect on the planet for a few years at a time. Volcanoes spew out sunlight-reflecting ash and dust which have a short-term cooling effect on the planet.

"Barring another volcanic event of this sort, the scientists expect the cloud trends to continue in the future as the planet continues to warm due to increasing greenhouse gas concentrations," said the statement.

– AFP