

HIGH CLOUDS

The high, thin cirrus clouds in the Earth's atmosphere act in a way similar to clear air because they are highly transparent to shortwave radiation (their cloud albedo forcing is small), but they readily absorb the outgoing longwave radiation. Like clear air, cirrus clouds absorb the Earth's radiation and then emit longwave, infrared radiation both out to space and back to the Earth's surface. Because cirrus clouds are high, and therefore cold, the energy radiated to outer space is lower than it would be without the cloud (the cloud greenhouse forcing is large). The portion of the radiation thus trapped and sent back to the Earth's surface adds to the shortwave energy from the sun and the longwave energy from the air already reaching the surface. The additional energy causes a warming of the surface and atmosphere. The overall effect of the high thin cirrus clouds then is to enhance atmospheric greenhouse warming.

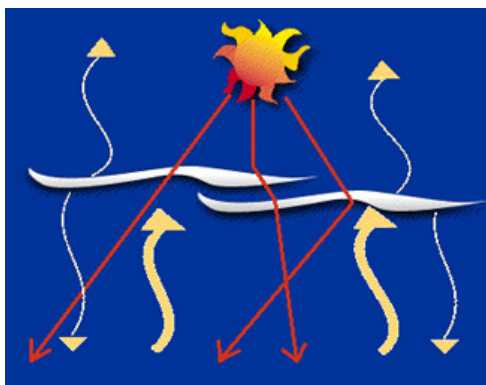


Image from the Space Shuttle Endeavour on July 1, 1993 (STS-57) showing wispy cirrus clouds.

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