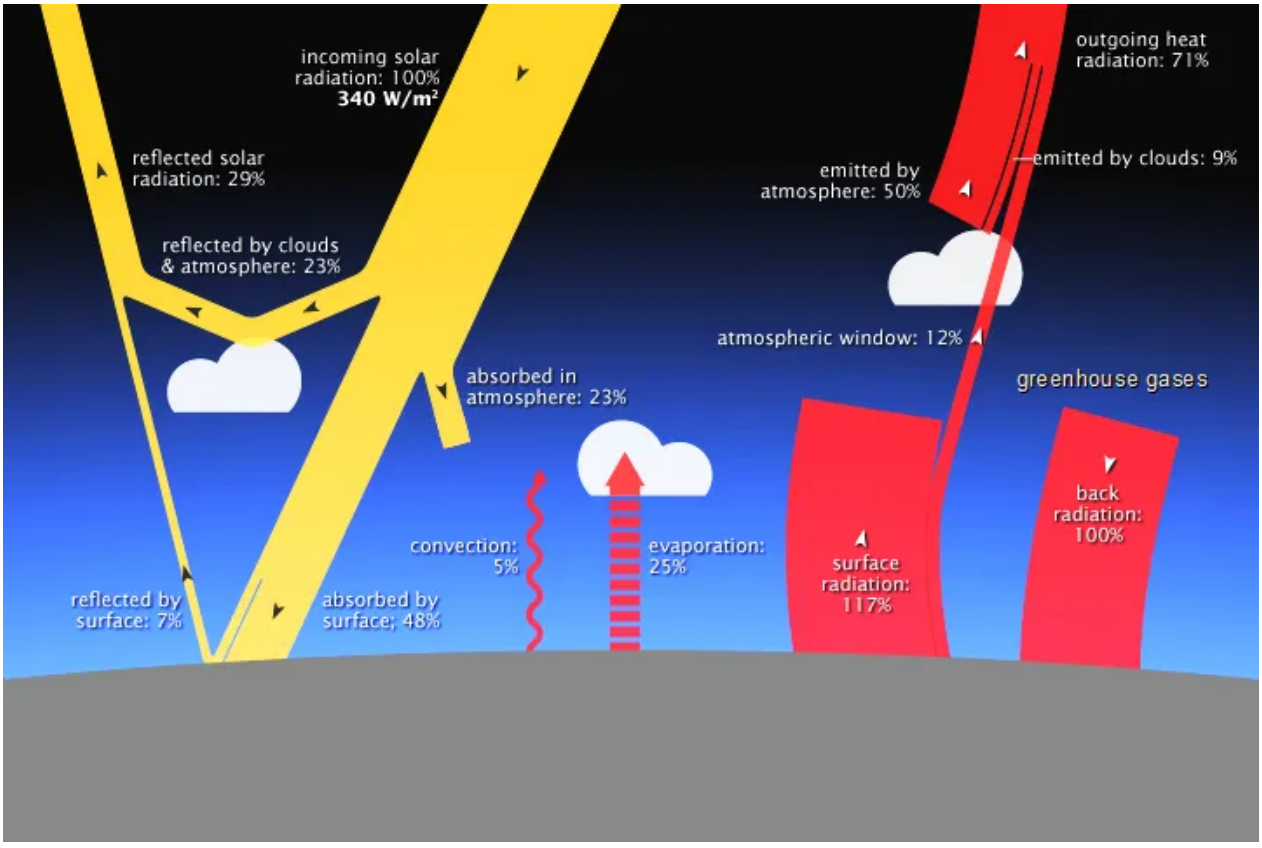
Absorption

By Lennart Kiil



The Earth's energy budget. Of the sunlight reaching the Earth, 48 per cent is absorbed at the surface and 23 per cent in the atmosphere. The rest, 29 per cent, is reflected back into space.

Robert Simmon, NASA Earth Observatory. Public domain. Wikimedia Commons.

When Solar radiation is transformed into heat in the lower atmosphere and on the surface.

Absorption at the Earth's surface is important for the climate and temperature. Incoming radiation from the Sun passes through the atmosphere and is changed from a short wavelength into longer wavelengths, i.e. heat, when it is absorbed at the surface of the planet. This then heats the atmosphere from below.

Absorption at the surface is also important because more than half of the incoming solar radiation is absorbed there. Less than 20 percent of incoming radiation is absorbed directly by the atmosphere. The remaining part is reflected back into space

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through the albedo effect.

Apart from regulating the temperature in the lower atmosphere, absorption at the Earth's surface also controls the temperature of the crust and the oceans' surface waters.

Changes in the composition of the Earth's surface such as glaciation and deforestation have an impact on absorption at the Earth's surface. These changes also affect the Earth's albedo - the opposite of absorption.

Because global warming and human activities change the relation between albedo (diffuse reflection) and absorption there is a potential for positive feedback and further warming.

Most of the direct absorption in the atmosphere of incoming sunlight is by water vapor. It is estimated that about 70 percent of atmospheric absorption is by water vapor.

In the atmosphere water vapor also absorbs 60 percent of the thermal radiation that is re-emmitted from the surface of the planet. The absorption of thermal radiation is also known as the greenhouse effect.

Absorption, furthermore, takes place during photosynthesis in plants and algae, but here some of the energy from the sunlight is converted into chemical energy instead of heat.

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