

Climate sensitivity

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The increase in [temperature](#) following a doubling of CO_2 in the [atmosphere](#).

More generally, climate sensitivity refers to the change in surface air temperature that arises some time after a significant change in [radiative forcing](#).

The evaluation of climate sensitivity from models requires very long simulations with [global climate models](#), or it may be deduced from observations.

Climate sensitivity measures the response of global average temperature to increased concentrations of greenhouse gases. The [IPCC](#) has estimated that a doubling of CO₂ from the level of 280 ppm (parts per million) from before [industrialization](#) to 560 ppm at around year 2100 will raise the temperature about 3°C.

Most of the expected change is not due to the direct radiative forcing of CO₂. At least half of the rise in temperature is due to [positive feedbacks](#). Indeed, without any feedbacks, a doubling of CO₂ would result only in a 1°C global temperature rise.

The uncertainty in climate sensitivity estimates is due entirely to feedbacks in the system, namely, the [water vapor feedback \(see last paragraph\)](#), the [ice-albedo feedback](#) and the [cloud feedback](#).

Climate sensitivity can also be estimated for doublings in other greenhouse gases. Then the [carbon dioxide equivalent](#) for that particular gas is used.

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