



This is the print version of the [Skeptical Science](#) article '[Positive feedback means runaway warming](#)', which can be found at <http://sks.to/runaway>.

Does positive feedback necessarily mean runaway warming?

What The Science Says:

Positive feedback won't lead to runaway warming; diminishing returns on feedback cycles limit the amplification.

Climate Myth: Positive feedback means runaway warming

"One of the oft-cited predictions of potential warming is that a doubling of atmospheric carbon dioxide levels from pre-industrial levels — from 280 to 560 parts per million — would alone cause average global temperature to increase by about 1.2 °C. Recognizing the ho-hum nature of such a temperature change, the alarmist camp moved on to hypothesize that even this slight warming will cause irreversible changes in the atmosphere that, in turn, will cause more warming. These alleged "positive feedback" cycles supposedly will build upon each other to cause runaway global warming, according to the alarmists." ([Junk Science](#))

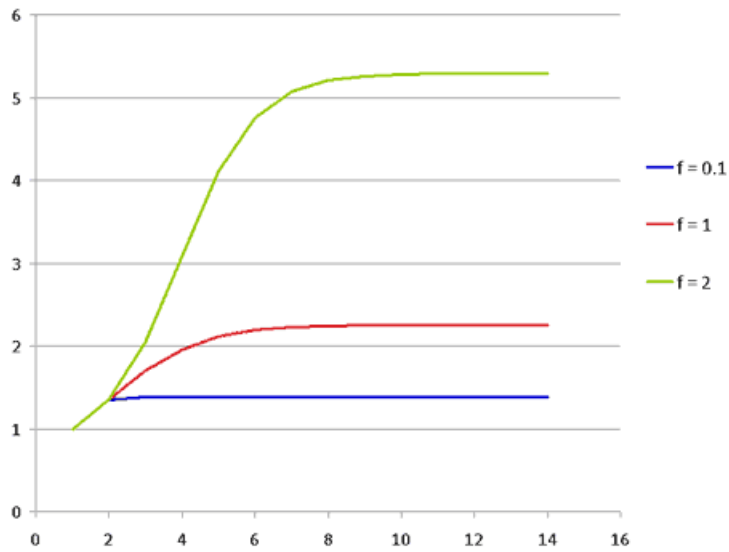
Some skeptics ask, "If global warming has a positive feedback effect, then why don't we have runaway warming? The Earth has had high CO₂ levels before: Why didn't it turn into an oven at that time?"

Positive feedback happens when the response to some change amplifies that change. For example: The Earth heats up, and some of the sea ice near the poles melts. Now bare water is exposed to the sun's rays, and absorbs more light than did the previous ice cover; so the planet heats up a little more.

Another mechanism for positive feedback: Atmospheric CO₂ increases (due to burning of fossil fuels), so the enhanced greenhouse effect heats up the planet. The heating "bakes out" CO₂ from the oceans and arctic tundras, so more CO₂ is released.

In both of these cases, the "effect" reinforces the "cause", which will increase the "effect", which will reinforce the "cause"... So won't this spin out of control? The answer is, No, it will not, because each subsequent stage of reinforcement & increase will be weaker and weaker. The feedback cycles will go on and on, but there will be a diminishing of returns, so that after just a few cycles, it won't matter anymore.

The plot below shows how the temperature increases, when started off by an initial dollop of CO₂, followed by many cycles of feedback. We've plotted this with three values of the strength of the feedback, and you can see that in each case, the temperature levels off after several rounds.



So the climatologists are not crazy to say that the positive feedback in the global-warming dynamic can lead to a factor of 3 in the final increase of temperature: That can be true, even though this feedback wasn't able to cook the Earth during previous periods of high CO₂.

Note: [A more detailed explanation is provided here.](#)



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Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a [college textbook on climate change](#) and the book [Climate Change Denial: Heads in the Sand](#). Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.



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