



The Tiamat Hypothesis explanation of abrupt climate change

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The Tiamat Hypothesis postulates that climate is a non-linear dynamical system, which on Earth is dominated by a positive feedback loop caused by the greenhouse effect of water vapour on sea surface temperatures. When sea surface temperatures exceed a threshold due to solar energy, the result is a runaway situation which is stabilized when the water vapour reaches an altitude where it condenses and forms cloud.

The greenhouse effect of water vapour over sea-ice is relatively small and stable due to the low vapour pressure of ice. However, if the ice melts and exposes the ocean beneath a runaway situation can develop. This is especially true in polar regions where there can be continuous solar flux during summer..

At the end of the Younger Dryas stadial, northern polar sea ice stretched as far south as Ireland. Its sudden disappearance due to the ice albedo effect would have decreased the global albedo leading to an abrupt warming which would have been amplified by positive feedback from water vapour. This could account for the rapid warming recorded in the northern hemisphere when temperatures rose by about 5 K within three years.

The positive feedback from the greenhouse effect of water vapour could also account for the rapid cooling at the start of the Younger Dryas, if low salinity water from from a pro-glacial lake caused sea ice to form in northern polar waters.

The rapid melting of the Arctic sea ice in 2007 could be start of another event similar to that which ended the Younger Dryas.