

Glacial atmospheric phosphorus deposition

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Phosphorus in the atmosphere is poorly studied and thus not much is known about atmospheric phosphorus and phosphate transport and deposition changes over time, though it is well known that phosphorus can be a source of long-range nutrient transport, e.g. Saharan dust transported to the tropical forests of Brazil.

In glacial times it has been speculated that transport of phosphorus from exposed shelves would increase the ocean productivity by wash out. However whether the exposed shelf would also increase the atmospheric load to more remote places has not been investigated.

Polar ice cores offer a unique opportunity to study the atmospheric transport of aerosols on various timescales, from glacial-interglacial periods to recent anthropogenic influences.

We have for the first time determined the atmospheric transport of phosphorus to the Arctic by means of ice core analysis. Both total and dissolved reactive phosphorus were measured to investigate current and past atmospheric transport of phosphorus to the Arctic.

Results show that glacial cold stadials had increased atmospheric total phosphorus mass loads of 70 times higher than in the past century, while DRP was only increased by a factor of 14. In the recent period we find evidence of a phosphorus increase over the past 50 yrs in ice cores close to human occupation likely correlated to forest fires.

References:

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