

Much of the early methane rise can be attributed to the spreading of northern peatlands

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(PhysOrg.com) -- The surprising increase in methane concentrations millennia ago, identified in continental glacier studies, has puzzled researchers for a long time. According to a strong theory, this would have resulted from the commencement of rice cultivation in East Asia. However, a study conducted at the University of Helsinki's Department of Environmental Sciences and the Department of Geosciences and Geography shows that the massive expanse of the northern peatlands occurred around 5000 years ago, coincident with rising atmospheric methane levels.

After [water vapour](#) and carbon dioxide, [methane](#) is the most significant [greenhouse gas](#), resulting in about one fifth of atmospheric warming caused by humans. Methane emissions are mainly created by peatlands, animal husbandry, rice cultivation, landfill sites, fossil fuel production and biomass combustion.

Northern peatlands are immense sources of methane, but previous studies have argued them to have been established almost immediately after the Ice Age ended. Consequently, they could not explain the increase of methane, dated to have commenced thousands of years later, since the [methane emissions](#) of peatlands decrease as they age.

William Ruddiman, Professor Emeritus in environmental sciences at the University of Virginia, has presented a widely published theory

according to which humanity started to affect the climate thousands of years ago, not just since the start of the industrial revolution. According to the theory, rice cultivation, commenced in East Asia already over 5,000 years ago, caused the declining methane amounts to again increase, which contributed to preventing the next ice age.

The timeframe of the spread of peatlands matches the increase in methane levels

The new study, conducted under the supervision of Professor Atte Korhola, explains the emergence of the peatlands in the [northern hemisphere](#), and their development history, in a new way. The researchers compiled an extensive [radiocarbon](#) dating database concerning the bottom peat in peatlands. Based on over 3,000 dates, their statistical and location information-based analysis, it was identified that the expansion of northern peatlands significantly accelerated about 5,000 years ago. At the same time, the methane content in the atmosphere started to increase.

Peatland expansion resulted in the emergence of millions of square kilometres of young peatlands of the mineretrophic fen type, and they puffed large amounts of methane gas in to the air as the organic matter rotted. According to the study, the early increase in methane levels was mainly caused by natural reasons, and human operations are not necessarily required to explain it.

The expansion of peatlands was triggered by the climate turning moister and cooler, which caused the groundwater levels to rise, while accelerating peat build-up and growth. A similar methane peak may also emerge in the future if precipitation in the arctic areas increases as forecasted.

The study was published last week in the *Quaternary Science Reviews* series.

More information: Korhola, A., et al., The importance of northern peatland expansion to the late-Holocene rise of atmospheric methane, *Quaternary Science Reviews* (2010), [doi:10.1016/j.quascirev.2009.12.010](https://doi.org/10.1016/j.quascirev.2009.12.010)

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