

Storage of greenhouse gasses in Siberian peat moor

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Wet peat moorlands form a sustainable storage place for the greenhouse gas carbon dioxide but are also a source of the much stronger greenhouse gas methane. According to Dutch researcher Wiebe Borren, peat moorlands will counteract the greenhouse effect under the present climatic conditions. If the climate becomes warmer, the greenhouse effect can temporarily be enhanced. Borren investigated the carbon exchange between West-Siberian peat moorlands and the atmosphere.

The West-Siberian peatlands have been formed over the past 10,000 years during the Holocene period and cover some one million square kilometres. Carbon is formed during the development of the peatland. Plants initially take this up in the form of carbon dioxide. Subsequently part of the dead plant material is stored under water-saturated, acid-free conditions. As the peat slowly breaks down, carbon is released again in the form of methane (CH₄), which just like carbon dioxide is a greenhouse gas. Up until now it was not clear how peat moorland areas influenced the greenhouse effect.

Borren calculated the changes in the atmospheric supplies of carbon dioxide and methane using a 3D-model based on exchange fluxes due to peat formation over the past 9000 years. With this model he also simulated the effects of draining peatlands on CO₂ emission and on climate change. When studying the effects on climate change, Borren took into account the northwards shift in bioclimate zones in West Siberia as a result of global warming. The results revealed that from the Holocene up until now, peat moorlands have counteracted the

greenhouse effect by functioning as a net storage place for greenhouse gasses; more CO₂ is stored than methane released, even if the stronger greenhouse effect of methane is allowed for.

Borren developed a new calculation method to determine the significance of peat moorlands for climate change. To date, limits on greenhouse gas emissions (Kyoto protocols) have been calculated on the basis of instantaneous emissions and not the gradually changing emissions, which is the case for woods and natural peatlands. With this new method the researcher could also clearly show that non-drained peatlands will eventually be extremely important net storage areas for greenhouse gasses from the atmosphere, even in the case of global warming.

If global warming and the northward shift of bioclimate zones continue, however, then the peat moorlands will enhance the greenhouse effect says Borren. After about 250 years this effect will once again be reversed, as the increase in carbon dioxide uptake will then be greater than the increase in methane emissions. Drainage always contributes to a strengthening of the greenhouse effect. Borren therefore believes that the reclamation of peatlands will enhance global warming far more than the natural effects he describes in his thesis.

Source: NWO

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