Geophysical Research Abstracts
Vol. 17, EGU2015-13579-4, 2015
EGU General Assembly 2015

Global peat erosion risk assessment for the 21st Century

Pengfei Li, Brian Irvine, and Joseph Holden
University of Leeds, School of Geography, Leeds, United Kingdom

Many peatlands across the world are suffering from degradation and erosion exacerbated by human influences. Blanket peat erosion has adverse impacts on terrestrial and aquatic habitats, reservoir capacity and water quality, and also leads to accelerated carbon release. Bioclimatic modelling suggests that some areas, which are currently suitable for active peat growth, may be no longer under a climate supporting the accumulation of peat by the end of the century. Peat erosion in these marginal regions is thus more likely.
A recently developed blanket peat erosion model, PESERA-PEAT, was established through significantly modifying the grid version of the Pan-European Soil Erosion Assessment model (PESERA-GRID) to explicitly include the freeze-thaw and desiccation processes, which appear to be the crucial drivers of peat erosion, and typical land management practices in blanket peatlands such as artificial drainage, grazing and managed burning. Freeze-thaw and desiccation are estimated based on climate (i.e. temperature) and soil moisture conditions. Land management practices interact with hydrology, erosion and vegetation growth via their influence on vegetation cover, biomass and soil moisture condition. The model has been demonstrated to be robust for blanket peat erosion modelling with riverine sediment flux data in the UK.
In this paper, the PESERA-PEAT model is applied to investigate the impact of environmental change on the blanket peat erosion at a global scale. Climatic scenarios to the end of 21st Century were derived, as part of the QUEST-GSI initiative, from the outputs of seven global climate models: CGCM3 and CCCMA (Canada); CSIRO Mark III (Australia); IPSL (France); ECHAM5 (Germany); CCSM (US National Centre for Atmospheric Research (NCAR)); HadCM3 and HadGEM1 (UK). Land management practice such as artificial drainage is considered to examine if it is possible to buffer the impact of climate change on erosion through managing blanket peatlands in different manners. Interactions between climate change and land management shifts will also be taken into account. The modelling results will be beneficial for the planning of land-use strategies in the blanket peatlands across the world.