Geophysical Research Abstracts
Vol. 18, EGU2016-4203, 2016
EGU General Assembly 2016
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Key plant species and succession patterns associated to past fen-bog transitions – perspective to future

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Minerotrophic fens and ombrotrophic bogs differ in their hydrology, vegetation and carbon dynamics and their geographical distribution seems to be linked to certain climate parameters, such as temperature and effective precipitation. Currently bogs dominate the southern boreal zone but the climate warming with altered temperature and effective precipitation may shift the distribution of bog zone northwards. In this study, we first used plant macrofossil method and radiocarbon analysis to identify and date past fen-bog transitions. These transitions were compared to major Holocene climate phases. Subsequently, palaeoecological data were associated to ecological and environmental data collected along the current fen-bog ecotone in Finland. We identified three successional phases 1) initial minerotrophic fen phase 2) Eriophorum vaginatum–dominated oligotrophic fen phase which was followed by 3) ombrorophic bog phase. Duration of these phases varied but late Holocene timing of fen-bog transition showed some consistency. Based on palaeoecological data 57 % of the modern ecotone peatlands were classified to be in a fen phase, 10 % were in an Eriophorum-dominated phase and 33 % were going through a transition from fen to bog. The study showed that regime shifts are driven by autogenic succession and climate but also fires may efficiently control succession pathways. Our results support the hypothesis that climate change can promote the ombrotrophication process in the southern border of the fen-bog ecotone due to changes in hydrology balance.