IJG> Vol.3 No.2, May 2012

OPEN ACCESS

Dominant Factors of the Nature Regulating CO2 Release from Boreal Forest Land

PDF (Size:932KB) PP. 333-338 DOI: 10.4236/ijg.2012.32036

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ABSTRACT

Temperature is often considered as a primary factor for microbial decomposition of soil organic carbon. Boreal forests are the large terrestrial carbon pool: if carbon stored in this region is transferred to the atmosphere as CO_2 by a warming-induced acceleration of its decomposition, there will be positive feedback to global warming. It is reported that real issue regarding the release of carbon from soils to the atmosphere is how natural factors interact to influence decomposition of soil organic matter, so we observed mass losses (indicating decomposition rates) from litter and litterfall in a Northern Fennoscandia forest over 3 years under natural conditions. Our field survey has demonstrated that mass losses from most kinds of sample had moderate correlation with the temperature. Of the various samples, the canopy-gap litter alone had a greater rate (~70%) of mass loss. It is at least necessary to make a clear distinction of monitoring sites (under the canopy and in the canopy gap) when discussing the effect of climate on soil CO_2 release from high-latitude forests. Though temperature, soil moisture and soil properties are prioritized in the issue of soil CO_2 release, our results suggest that the fungi/bacteria rate and the wind-related mix/fragmentation are also important factors to be considered; however, this speculation is just tentative, and more detail research is called for.

KEYWORDS

Fragmentation; Global Warming; High-Latitude Forest; Microbial Decomposition; Wind

Cite this paper

R. Kikuchi and T. T. Gorbacheva, "Dominant Factors of the Nature Regulating CO2 Release from Boreal Forest Land," *International Journal of Geosciences*, Vol. 3 No. 2, 2012, pp. 333-338. doi: 10.4236/ijg.2012.32036.

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