**ESTIMATION OF GLOBAL CO2 EMISSION FROM SOIL USING TEMPERATURE AND WATER CONTENT MEASURED BY MODIS**

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Abstract

Soil is a major carbon (C) reserve in terrestrial ecosystems, and the CO2 flux from soil (soil respiration: SR) is an important component of the C balance between terrestrial ecosystems and atmosphere. Soil respiration is a result of integration of autotrophic (root) and heterotrophic (soil organic matter and litter) respiration processes. SR rate was affected by soil temperature and/or soil water content, therefore it had a spatio-temporal variation. There were few studies which estimated the global annual soil respiration based on experimental equation. Therefore, the object of the present study is to estimate the annual SR on the global scale using the experimental equations and climate data of MODIS. The experimental equations for estimation of SR rate were selected from field observation at 17 ecosystems. The field observation studies indicated that SR rates in boreal and tropical region were varied by soil temperature and soil water content respectively. And, SR in temperate region was changed by temporal variation of both soil temperature and water content. On the basis of these relationships between SR and environmental factors, we calculated SR at global scale using soil temperature and water content of MODIS global data set. And we compared the result of biogeochemical model (VISIT) and previous studies (Bond-Lamberty and Thomson, 2010; Hashimoto, 2012) with the result of the present estimation.

Keywords: soil respiration, soil temperature, soil water content