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ACS > Vol.2 No.1, January 2012

OPEN ACCESS

Asymmetric Variation in Soil Carbon Emission in Sub-Tropics

PDF (Size: 232KB) PP. 101-106 DOI: 10.4236/acs.2012.21012

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ABSTRACT

Carbon dioxide emission from soil, known as soil respiration, is one of the major sources of the atmospheric carbon. Understanding the relationship between emission rate and the factors associated with the emission process is important in global carbon emission management. The present study investigated soil respiration at three ecologically diverse locations in northern India. CO₂ emission was measured in-situ by modified alkali absorption method at three different depths, top-soil (0 cm - 2 cm depth), mid-soil (20 cm depth) and deep-soil (40 cm depth) at each location. Rate of carbon emission from soil varied with location and time. The rate was higher at Riverine Zone (RZ) which had high soil moisture content and profuse ground vegetation compared to Hilly Zone (HZ) containing dry soil and scarce vegetation. The emission rate was also greater in grassland than the plantation area. Rate of carbon emission from soil was heterogeneous along different depths below the ground. Diel variation in emission rate was greater at HZ compared to RZ. Higher microbial population in soil was detected in RZ than HZ. However, the bacterial count out-numbered the fungal count in soils at most places. The study indicates a positive relationship between soil respiration rate and microbial abundance. The fungal population was strongly correlated with CO₂ emission rate.

KEYWORDS

Soil Respiration; Carbon Emission; Bacterial Abundance; Fungal Population; Soil Depth; Climate Change

Cite this paper

R. Kant and C. Ghosh, "Asymmetric Variation in Soil Carbon Emission in Sub-Tropics," *Atmospheric and Climate Sciences*, Vol. 2 No. 1, 2012, pp. 101-106. doi: 10.4236/acs.2012.21012.

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