

The variable sensitivity of soil respiration to temperature is determined by the climatic gradient along the GEOMON catchments.

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Abstract

Soil respiration (R_s) is an important part of the global carbon cycle. The current focus centers around the rising levels of carbon dioxide in the atmosphere and the endeavour to discover additional capacity within existing carbon storage systems. Soil respiration emerges as a pivotal factor in the exchange of gases between the soil and the atmosphere, significantly impacting the global carbon equilibrium and exerting an influence on the dynamics of climate change.

Measurements are conducted within the GEOMON catchments located in the Czech Republic. These catchments consist of fourteen forested experimental basins situated at various altitudes throughout the region. To monitor changes in R_s , measurements are taken periodically using the LiCor LI-8100A device over a three-year period. The variable sensitivity of R_s to temperature is determined by the climatic gradient along the GEOMON catchments. Temperature is the main predictor of R_s rates under moist temperate forest conditions. The temperature sensitivity of R_s increases with increasing elevation, which is a consequence of the accumulation of soil labile dissolved organic matter under cooler conditions.

Thus, as average temperature increases, we cannot expect a rapid increase in R_s (as long as ecosystem productivity remains unchanged), only a short-term increase before the "stock" of labile organic matter is depleted and a new balance between litter production and decomposition is established.