

## The influence of long-term soil warming on heterotrophic respiration in an evergreen broad-leaved forest in Hiroshima

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Soil respiration is the second largest carbon flux in terrestrial ecosystems, and consists of root respiration and heterotrophic respiration ( $R_h$ ). Global  $R_h$  is estimated to be 51–57 GtC yr<sup>-1</sup>, more than the half of global soil respiration. It is commonly observed that  $R_h$  exponentially increases with rising temperature. Therefore, only a tiny rise of temperature will result in remarkable increase of  $R_h$ . That point implies that increased global  $R_h$  under warmer environment might further accelerate global warming (positive feedback). However, long-term soil warming experiment that verify the response of  $R_h$  to global warming is totally limited in Asian monsoon forests where exhibit high productivity. Examining the response of Asian monsoon forest soil to global warming is thought to be critical for precise estimation for future climate change.

To examine the long-term influence of soil warming on  $R_h$  in an Asian monsoon forest, we set multi-channel automated chamber and soil warming systems in an evergreen broad-leaved forest in western Japan, Higashi Hiroshima in September 2007. We prepared 10 trenched chambers (90 cm × 90 cm × 50 cm) to continuously measure  $R_h$ . Half of those trenched chambers were artificially warmed by infrared heaters 1.6 m above the soil surface (+2.5°C), and influence of soil warming on  $R_h$  was examined by comparing  $R_h$  and warmed  $R_h$  for 10 years.

Soil moisture and  $R_h$  were strongly related during summer period from July to September. Few precipitation and low soil moisture level in summer period caused to decrease  $R_h$ , and the decrease resulted in the decline of annual temperature sensitivity of  $R_h$  ( $Q_{10}$ ). Those results suggested that precipitation and soil moisture during summer period is one of the important control factor for long-term response of  $R_h$  to warmer environment.

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