

Change in soil respiration rate of Sugi plantation for seven years

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It is known that soil respiration rate has large spatial variation even within the same forest. We measured soil respiration rates at 21 points in a *Cryptomeria japonica* plantation of Tokyo University of Agriculture Okutama Forest, from January 2013 to August 2019, and examined temporal changes and factors of spatial variation. From the relationship between soil temperature at 5 cm depth and soil respiration rate, the soil respiration rate at each measured point at a soil temperature of 20 °C (R_{20}) was estimated and compared. The observation showed that the measured points with higher R_{20} in 2013 tended to have higher R_{20} throughout the observation period, and the measured points with lower R_{20} in 2013 tended to show lower R_{20} throughout the seven years. There wasn't significant correlation between the amount of carbon of the surface soil (0-30 cm in depth) and the soil respiration rate. However, the amount of light fraction ($<1.6 \text{ g cm}^{-3}$) of soil or fine root biomass of the surface soil had a significant positive correlation with the soil respiration rate. Since the light fraction of soil contains organic matter that is easily decomposed by microbes, the variation of the easily decomposable organic matter content was considered to be the cause of the spatial variation in soil respiration rate.

Keywords: soil respiration rate, soil temperature, soil carbon content, density fractionation, fine root biomass