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東シベリアのカラマツ林2サイトにおける過去150年間のカラマツ年輪幅と炭素同位体比
Tree growth and tree-ring delta-13C over the past 150 years at two larch forests in eastern Siberia

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Global climate change scenarios predict an increase in average global precipitation in the present century and this change will be most pronounced in high latitudes [IPCC, 2007]. Previous studies reported that decrease in precipitation with global warming cause quite severe drought stress and consequently significant reduction of tree growth [e.g. Barber et al., 2000; Sarris et al., 2007]. However, it is not clear whether increase in precipitation causes better tree growth even under global warming, especially in dry region like as eastern Siberia. Here, we report an analysis of larch tree-ring width and delta-13C over the past 150 years in eastern Siberian.

Radial growth and delta-13C of larch tree rings were measured at two larch dominated forests; Yakutsk (YK; 62N, 129E) and Elgeeii (EG; 60N, 133E) in eastern Siberia.

Negative responses of larch tree growth to summer temperature were observed in YK for the past 100 years, which may be explained as temperature-induced drought stress [Barber et al., 2000]. On the other hand, larch trees in EG had shown no negative response to summer temperature probably due to large summer precipitation until 1990. However, the negative response with rapid temperature rise was observed after 1990 even in EG. Since 1990, higher tree ring delta-13C reveled iWUE (intrinsic water-use efficiency) improvements at both two sites sharply. These results indicate that higher temperature after 1990 cause more severe drought resulting in great improvement of iWUE and reduction of tree growth, suggesting that the improvement of iWUE seem to be insufficient to compensate for the negative effects of the increasing water limitation on growth.

Therefore, even if precipitation increases, reduction of larch tree growth and in consequence the fall of the carbon assimilation of a forest in eastern Siberia under global warming might is expected.

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