Changing precipitation regimes and photosynthetic performance of the East-Siberian taiga

H. Saito (1), T. Shirota (1,2), L. Lopez (2), G. Iwahana (2), T. Maximov (3), M. Shibuya (1), K. Takahashi (1)

(1) Graduate School of Agriculture, Hokkaido University, North 9, West 9, Kitaku, Sapporo, Japan, 060-8589, (2) Institute of Low Temperature Science, Hokkaido University, Sapporo 123-4567, Japan, (3) Institute for Biological Problems of Cryolithozone, Siberian Division of Russian Academy of Sciences, 41, Lenin ave. Yakutsk, Russia, 678891
(saitoo@for.agr.hokudai.ac.jp / FAX: non / Phon: +81-11-706-2523)

Observational and experimental evidence demonstrated that CO₂ uptake by a mature larch forest in eastern Siberia was sensitively, strongly, and frequently limited by air and soil drought. These results challenge the previously accepted concept that soil drought causes little limitation in CO₂ uptake because thawing soil in the deep active soil layer supplies sufficient water. Current decreases in precipitation will accelerate soil moisture losses and cause drier atmospheric conditions, creating positive feedback between increasing atmospheric CO₂ concentrations and reduced CO₂ uptake by the carbon sink.