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**CONTROL ID:** 1813883

**TITLE:** Comparison of $CO_2$ fluxes in a larch forest on permafrost and a pine forest on non-permafrost soils in Central Siberia

**ABSTRACT BODY:** Inter-annual and seasonal variations of energy, water and carbon fluxes and associated climate variables in a middle taiga pine (*Pinus sylvestris*) forest on warm sandy soils and a northern taiga larch (*Larix gmelini*) forest on permafrost in Central Siberia were studied from eddy covariance measurements obtained during growing seasons of 1998-2000 and 2004-2008 (except 2006) respectively. Both naturally regenerated after fire forests grew in different environments and differed by their tree stand characteristics. The pure Gmelin larch stand was 105 yr old, stem density of living trees was about 5480 trees/ha, LAI was 0.6 $m^2/m^2$, biomass (dry weight) was 0.0044 $kg/m^2$, with average diameter of the trees at breast height 7.1 cm and mean tree height 6.8 m. The pure Scots pine stand was 215 yr old, stand structure was relatively homogenous with a stem density of 468 living trees/ha, LAI was 1.5 $m^2/m^2$, biomass (dry weight) was 10.7 $kg/m^2$, with average diameter of the trees at breast height 28 cm and mean tree height 23 m. The climatic and soil conditions of these ecosystems were very distinctive. The habitat of the larch forest was much colder and dryer than that of the pine forest: the growing season was 1 month shorter and growing-degree days 200°C less and winters were about one month longer and colder with January temperature -37°C versus -23°C; annual precipitation was 400 mm in the larch versus 650 mm in the pine forest and maximal snow pack was 40 cm vs 70 cm. The soils were Gelisols with permafrost table within the upper 1 m in the larch stand and Pergelic Cryochrept, alluvial sandy soil with no underlying permafrost. Average daily net ecosystem exchange (NEE) was significantly smaller in the larch ecosystem – (-3-6) $\mu mol/m^2s$ compared to that in the pine forest (-7-8) $\mu mol/m^2s$, however daily maximal NEE was about the same. Seasonal NEE in the larch forest on continuous permafrost varied from -53 to -107 and in the pine forest on non-permafrost from -180 to -245 $gC/m^2$season. Our maximal net $CO_2$ uptake was close to that of a Gmelin larch forest on the continuous permafrost in eastern Siberia characterized by 6 $\mu mol/m^2s$ in the mid-summer. Compared to a *L. cajanderi* forest on sandy soil within a wide flooded valley of Lena River characterised by the flux of (-10-18) $\mu mol/m^2s$, our fluxes were 3 times less. Seasonal carbon dioxide exchange in our Gmelin larch ecosystem appeared to be the weakest among Siberian and other boreal ecosystems studied worldwide we found in literature.

**CURRENT SECTION/FOCUS GROUP:** Global Environmental Change (GC)

**CURRENT SESSION:** GC049. Environmental, Socio-Economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System

**INDEX TERMS:** 1615 GLOBAL CHANGE Biogeochemical cycles, processes, and modeling , 0428 BIOGEOSCIENCES Carbon cycling.

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