Geophysical Research Abstracts
Vol. 14, EGU2012-2547-1, 2012
EGU General Assembly 2012

Element transport to riverine system from forest-peatland complexes: ZOTTO footprint area

A.S. Prokushkin (1,3), O.S. Pokrovsky (2), M.A. Korets (1), L.V. Karpenko (1), S.V. Titov (1), and E.-D. Schulze (3)

(1) V.N. Sukachev Institute of Forest SB RAS, Krasnoyarsk, Russia (prokushkin@ksc.krasn.ru), (2) LMTG/OMP, Université Paul Sabatier-CNRS-IRD, Toulouse, France (oleg@get.obs-mip.fr), (3) Siberian Federal University , Krasnoyarsk, Russia

West Siberian peatlands store at least 70.2 Pg C and cover ca. 600,000 km2. The region experiences warming faster than the Arctic as a whole, so these peatlands receive large attention in last decades primarily because of their great potential for carbon release to the atmosphere through enhanced CO_2 and/or CH4 gas emissions. The release of dissolved and/or particulate organic carbon to streams and rivers has emerged as an additional and crucial negative term in the carbon balance of peatlands throughout the world. The Ob' and Yenisey Rivers, draining Western Siberia Lowland en route to the Kara Sea, transport more dissolved organic carbon (DOC) than any other river of the Arctic Ocean basin. Thus, to predict the response of West Siberia peatlands to warming requires also exploring riverine element fluxes in the sense of (i) terrestrial sources and (ii) controlling mechanisms.

Since 2006, the scientific and infrastructural platform of Zotino Tall Tower Observatory (ZOTTO) provides the unique opportunity to monitor and quantify the anticipated changes in biogeochemical cycles in this important region of the globe. Although the major efforts of ZOTTO are devoted to the atmospheric processes, the aim of this synergetic study was to link terrestrial ecosystems to aquatic chemistry with emphasis on carbon species. Remote sensing and field campaigns in footprint zone of ZOTTO have been done to investigate hydromorphic landscapes and link their properties to riverine element concentrations and export. In total, 12 bogs of ombrotrophic and minerotrophic genesis have been selected and comprehensively investigated for peat depth, peat layer elemental composition, biochemical composition (lignin CuO oxidation products), and carbon accumulation rates. Peat samples were analyzed for microbial composition and activity, and had their peat-forming plant species identified. In parallel, regular water sampling was performed on several rivers draining the research area to obtain the spatiotemporal variation of chemical composition and export; sampling was done biweekly on Bolshaja Khojba and Razvilki rivers, and intermittently from spring to fall on 10 streams and rivers of different orders (watershed area 1.3-730 km2). Comparative analysis of chemical composition, including dissolved lignin, in river and peat water up to 200 cm depth (0-50, 50-100 and 200 cm) has been conducted to determine the likely terrestrial sources of matter in surface waters. Additionally, GIS-based analysis of 12 selected watersheds has allowed the evaluation of key watershed parameters (total area, peatland area, burn area etc.) influencing chemical composition of surface waters (e.g. DOC, Ca, Mg, K and other elements concentrations).