Oral | Symbol M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

[M-IS21_28AM2]Biogeochemistry

Convener:*Muneoki Yoh(Tokyo University of Agriculture and Technology), Hideaki Shibata(Field Science Center fot Northern Biosphere, Hokkaido University), Naohiko Ohkouchi(Japan Agency for Marine-Earth Science and Technology), Youhei Yamashita(Faculty of Environmental Earth Science, Hokkaido University), Chair:Yoshinori Takano(Institute of Biogeosciences, Japan Agency for Marine-Earth Science and Technology (JAMSTEC)), Seiya Nagao(Institute of Nature and Environmental Technology, Kanazawa University), Ichiro Tayasu(Center for Ecological Research, Kyoto University), Tomoya Iwata(Faculty of Life and Environmental Sciences, University of Yamanashi)

Mon. Apr 28, 2014 11:00 AM - 12:45 PM 511 (5F)

Biogeochemistry is an interdisciplinary study field including ecology, geochemistry, oceanography, limnology, hydrology, soil science and environmental sciences. However, researches tended to be conducted separately so far. This session aims to provide a common platform for biogeochemists of different disciplines, which facilitates the interactive discussion and information exchanges for further development of biogeochemical studies.

12:00 PM - 12:15 PM

[MIS21-P05_PG]Effects of clear-cutting on the loss of ion and DOC from cool-temperate forested watershed in northern Japan

3-min talk in an oral session

*Karibu FUKUZAWA[1], Hideaki SHIBATA[1], Kentaro TAKAGI[1], Mutsumi NOMURA[1] (1.FSC, Hokkaido University)

Keywords:nitrate, DOC, cation, Sasa, stream discharge

Nitrate and dissolved organic carbon (DOC) concentrations in stream water before and after clear-cutting of trees and subsequent strip-cutting of understory vegetation, dwarf bamboo (Sasa spp.) were investigated to understand the effect of these disturbances on biogeochemical processes in forested watershed in Teshio Experimental Forest in northern Japan. Trees of 8 ha watershed except riparian zone were clear-cut in January-March of 2003. Sasa was strip-cut in October of 2003 and larch seedlings were planted on the cut line immediately after the Sasa cutting. Stream water was sampled every two or three weeks from 2002 to 2013. Tree-cutting did not cause a significant increase of nitrate concentration in stream water during the growing season after the cutting. Subsequent Sasa-cutting caused significant increase of stream nitrate concentration to ca. 15 micro mol L-1. At the cut site, it has been reported that Sasa compensated the decrease in tree fine root biomass. Thus, we suggest that nitrogen uptake by Sasa was very important in mitigating nitrogen leaching after tree-cutting, and the decline of this nitrogen uptake after Sasa-cutting lead to marked nitrate leaching to the stream. However, after that stream nitrate concentration fluctuated in the range of 20 micro mol L-1 depending on date and year, and was especially high in 2007 throughout the year. It did not get back to pre-cutting level. Cation (K+, Na+, Ca2+, Mg2+) concentration and pH fluctuated much depending on the flow rate and changes by both cutting were not observed. On the other hand, ammonium was detected in 2007 and synchronized with increase in nitrate concentration. DOC concentration in stream water was not changed after both cuttings of tree and Sasa and had clear seasonal pattern that peaked in late summer. Stream DOC concentration increased in growing period with low runoff from late May to August and then decreased after runoff increased in fall, indicating that dilution by the runoff reduce stream DOC

concentration after late summer. However, DOC concentration remained low during winter when runoff was stably low, suggesting that high temperature also promote DOC production in soil during the early summer. DOC loss from ecosystem was not influenced by the cutting of trees and Sasa in this watershed owing to the adsorption to the soil at the cut area. These results indicate the response to cutting is different between NO3- and DOC due to the different source area of these solutes in the watershed with cool climate and the gentle basin topography.