

Migration Behavior of Organic Matter in the Amur River

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Abstract

Middle Amur River Basin includes the floodplains of the Amur River, Ussuri River, and Songhua River. The extensive lowland wetlands on these floodplains play an important role in buffering floods, providing biogeochemical processes, and protecting the productivity of ecosystem. Water level and discharge are one of factors controlling transport of dissolved organic matter in the watershed. Objective of this study is to identify the effects of water discharge on export of dissolved organic matter (DOM) in the middle and lower Amur River.

River waters were collected at five sampling stations from the upper part of lower Amur River (from Khabarovsk to Malymysh) on August 16-18 in 2005 and August 6-8 in 2007 during the summer research expedition of R/V Ladoga. We studied characteristics of humic substances, major part of DOM, in the Amur River using 3-D EEM spectroscopy and HPSEC-FL detection after filtration with GF/F filters.

Maximum water level at the Khabarovsk observatory in August was ca. 220 cm in 2005 and ca. 170 cm in 2007. Water quality of the Amur River was also different from the summer expedition in 2005 and 2007. The pH was 7.2-7.8 in 2005 and 6.6-6.7 in 2007. Turbidity was 64-163 NTU in 2005 and 29-55 NTU in 2007. However, characteristics of fulvic-like materials were almost similar with the both research expedition. The water samples have two broad maxima at an excitation wavelength (Ex.) of 313-318 nm and an emission wavelength (Em.) of 427-433 nm and Ex. 338-356 nm/ Em. 465-480 nm. Two peaks correspond to the riverine fulvic acid in wetland area. There is a good correlation between absorbance at 280 nm and RFI at Ex. 320/ Em. 430 nm. These results indicate that fulvic-like materials are derived from wetland area, though water level and discharge are different in each year.

Keywords: Dissolved organic matter, fulvic acid, humic acid, wetland