

Scientific Report of AMBER subproject WP B.2

DOM input and transformation in Baltic Sea estuaries

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One of the deliverables of subproject WP B.2 is a data set of the isotopic signature of the dissolved organic matter (DOM) in the rivers Kalix and Nemunas. Therefore samples for an annual cycle were taken in both rivers, starting in October 2009 for the Kalix River and in April 2009 for the Nemunas River (see also WP B.3).

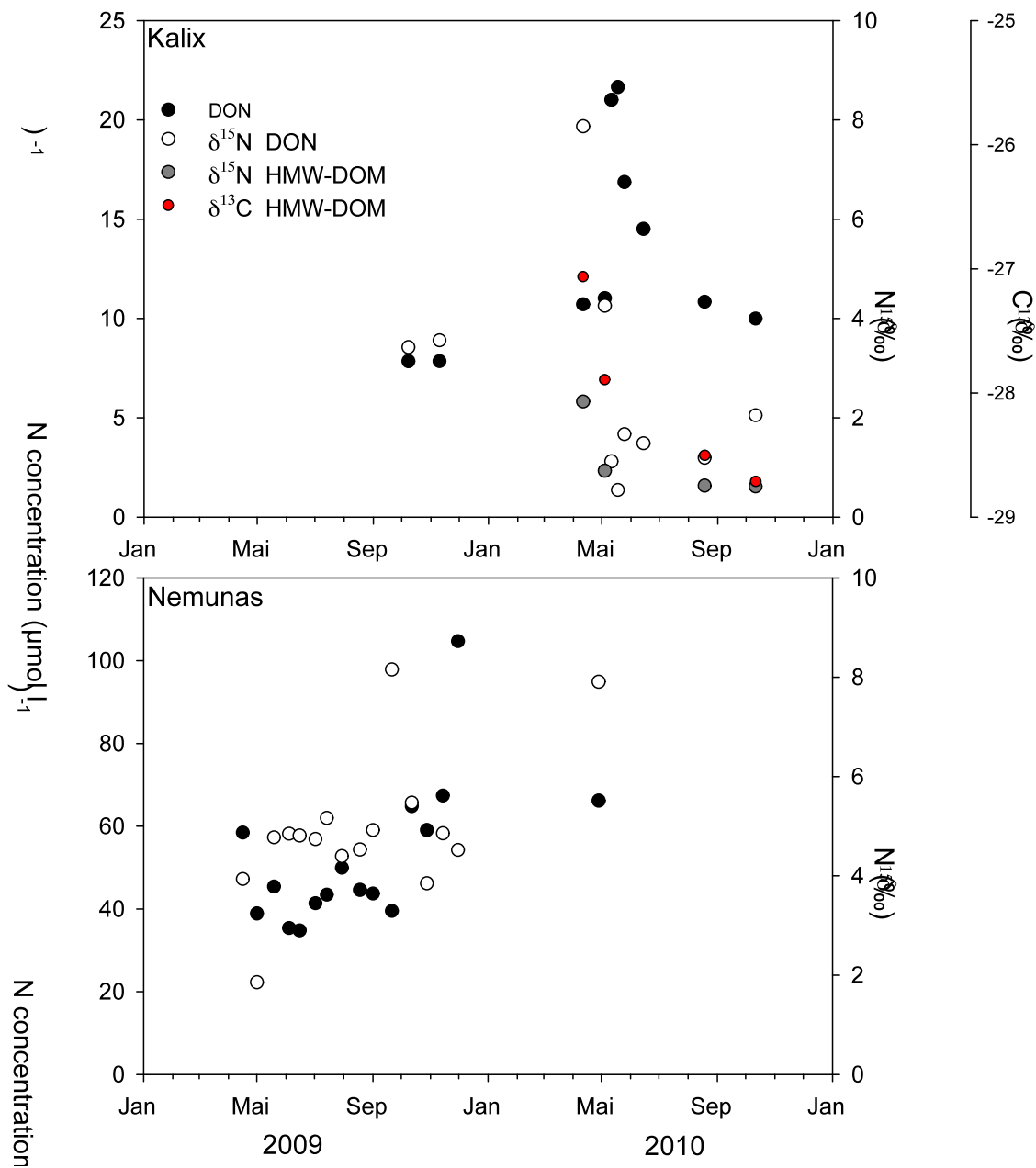


Figure 1: DON concentrations and isotopic signature of DON ($\delta^{15}\text{N-DON}$) and HMW-DOM ($\delta^{15}\text{N-HMW-DOM}$ and $\delta^{13}\text{C-HMW-DOM}$) over the period 2009/2010 for the Kalix and Nemunas Rivers. Note the different scaling on the y axes.

TDN (total dissolved nitrogen) was measured in samples, standards and blanks using the persulfate oxidation technique (Koroleff 1983), where TDN is oxidized to nitrate (NO_3^-). Concentrations of DON were calculated as the difference between TDN and DIN (dissolved inorganic nitrogen). After the oxidation of TDN to NO_3^- , the $\delta^{15}\text{N-NO}_3^-$ of TDN and an unoxidized sample was determined using the denitrifier method (Casciotti et al. 2002, Sigman et al. 2001). $\delta^{15}\text{N DON}$ can be calculated by using the following formula:

$$\delta^{15}\text{N-DON} = \delta^{15}\text{N-TDN} * c(\text{TDN}) / c(\text{DON}) - [\delta^{15}\text{N-NO}_3^- * c(\text{NO}_3^-) + \delta^{15}\text{N-Blank} * c(\text{Blank})] / c(\text{DON}).$$

For isotopic characterization of the high molecular weight (HMW) DOM (1kD - 0.7 μm) the GFF- filtered water samples were ultra filtered by using a Pellicon 2 filter (Millipore). The cross-flow filtration rate was kept well > 15 to ensure a good recovery. After the ultrafiltration step the samples were freeze-dried and analyzed for their isotopic composition in a Thermo Finnigan Delta V advantage.

References

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- Koroleff F. (1983) Determination of total phosphorus. In: Grasshoff K, Erhardt M, Kremling K (eds) *Methods for Seawater Analysis*. Verlag Chemie, Weinheim pp 167-173
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