Nitrogen and stable isotope inventories in the Lena Delta

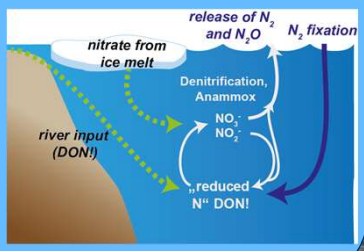
Tina Sanders[1], Helmholtz-Zentrum hereon, tina.sanders@hereon.de
Claudia Fiencke[2,3], Matthias Fuchs[4], Charlotte Haugk[4,5], Gesine Mollenhauer[6], Olga Ogneva[6], Juri Palmtag[7], Jens Strauss[4], Robyn Tuerena[8], and Kirstin Dähnke[1]

Introduction

- Huge input of fresh water and nutrients from the river into the Arctic Ocean
- Permafrost-affected soils stored high amount of organic matter including carbon and nitrogen
- Nitrogen mainly bonded in organic matter, so that the ecosystems are nitrogen limited

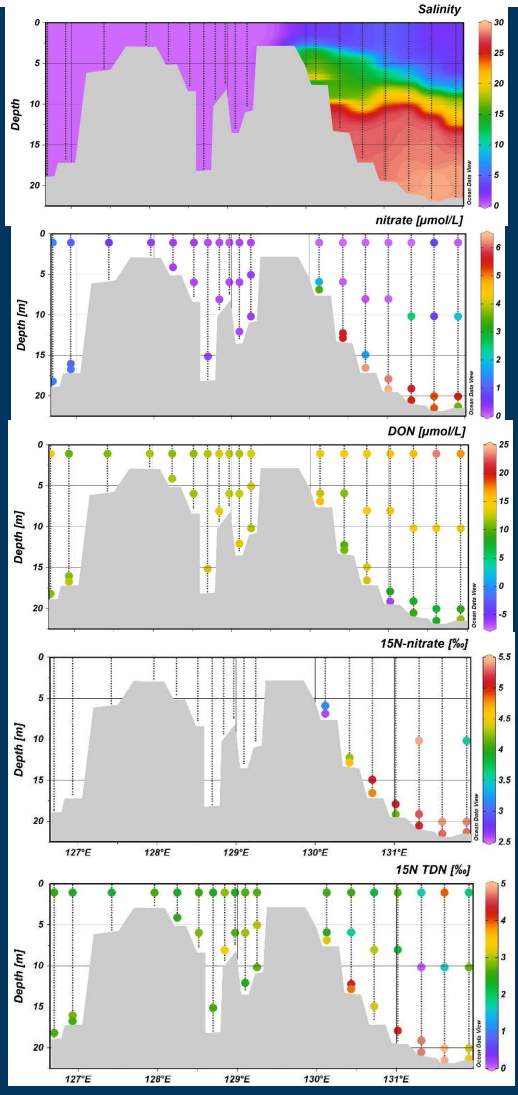
- Global warming and degradation of permafrost release reactive nitrogen
- Higher input into the arctic ocean may stimulate the primary production and further on the food web in the Arctic

Nitrogen Cycle in coastal Arctic



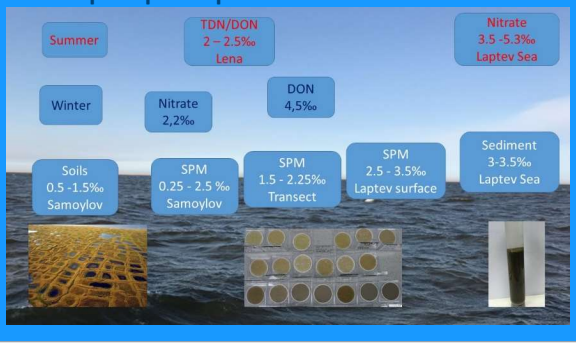
1. **Helmholtz-Zentrum Hereon**
2. Universität Hamburg, Institut für Bodenkunde
3. Center for Earth System Research and Sustainability, Universität Hamburg
4. Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Permafrost Research Section,
5. Department of Environmental Science and Analytical Chemistry, Stockholm
6. Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Marine Geochemistry Section
7. Department of Geography and Environmental Sciences, Northumbria University
8. Scottish Association for Marine Science, Dunstaffnage, Oban PA37 1QA, UK

Lena cruises in **summer**

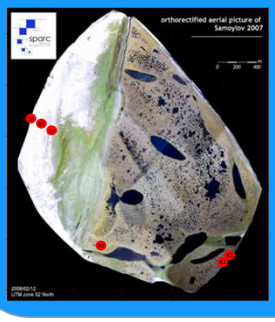


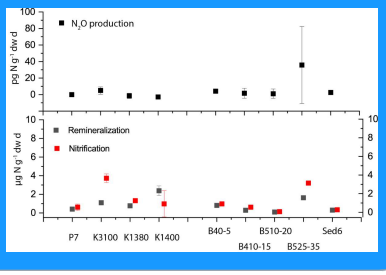
Paper: Sanders et al, Seasonal Nitrogen Fluxes of the Lena River Delta, accepted for publication in Ambio Special Issue

Isotopic perspective

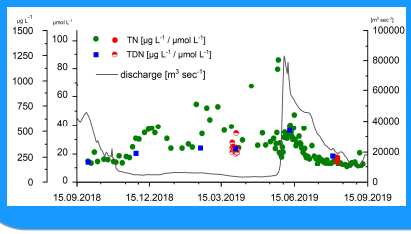


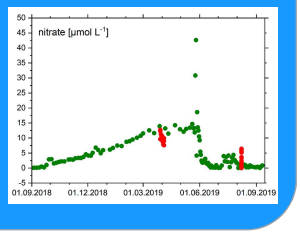
Soil incubations





One-year data: Samolyov Island





Take home message

- Thawing permafrost increase the transport of organic matter from the River and Delta to the Arctic Ocean
- Nitrogen: DON plus PON, nitrate just in winter

- **Lena Delta region source of reactive nitrogen**

- Enrichment of the nitrogen ^{15}N stable isotope composition from soils over SPM and DON/Nitrate to the Arctic Ocean
- Nitrogen in soils stem from N-Fixation ~0‰

- **Higher reactive nitrogen in the aquatic and marine environment enhance the primary productivity in the Artic Ocean and potential N_2O emissions**

Helmholtz-Zentrum **Hereon** • Max-Planck-Straße 1 • 21502 Geesthacht I Germany • T +49 4152 87-0 • contact@hereon.de • www.hereon.de
Contact: Prof. Dr. Manfred Mustermann • T +49 4152 87-0 • M +49 147 12345678 • muster@hereon.de