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DYNAMICS OF DOM IN THE LENA DELTA REGION (SIBERIA) REVEALED BY PARALLEL FACTOR ANALYSIS

INTRODUCTION

- Lena River one of the largest rivers in the world \rightarrow high riverine input into Arctic Ocean
 - Fresh water: ~20% total fresh water in the Arctic (Cauwet & Sidorov, 1996)
 - High amounts of sediments and organic matter
- Greatest discharge of organic matter in the Arctic Ocean (Stedmon et al., 2011)
- Large, shallow, dynamic and high diverse ecosystem (Kraberg et al., 2013)
- Under climate changing pressure (Yang et al., 2002)
 - Increasing temperatures \rightarrow permafrost thaw

MATERIAL AND METHODS

- Lena expedition: 1-7 September 2013 R/V "Dalniye Zelentsy"
 - 4 transects 18 oceanographic stations 60 samples
- Sensors: CTD casts \rightarrow Temperature, salinity, UMLD and stratification
- Water samples: CDOM (colored DOM), FDOM (fluorescent DOM) and DOC
- Analyses: EEM/PARAFAC modeling for DOM (Stedmon & Bro, 2008; Murphy et al., 2013) - DOM modification indices: CDOM slope (S_{CDOM}), specific UV abs (SUVA), humification index (HIX), biological index (BIX)
- Theoretical conservative mixing: Salinity 0 (Stedmon et al., 2011) Salinity 34.5 (Granskog et al., 2012)

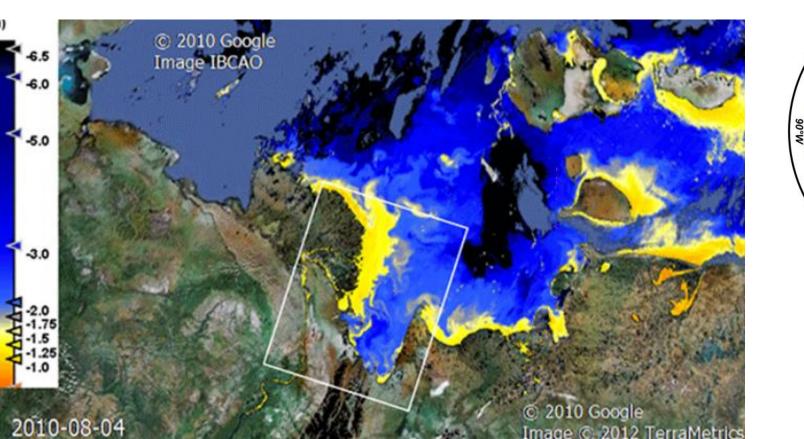
- Increase in river discharge and riverine material export to the Arctic Ocean

DOM DYNAMICS IN THE LENA DELTA

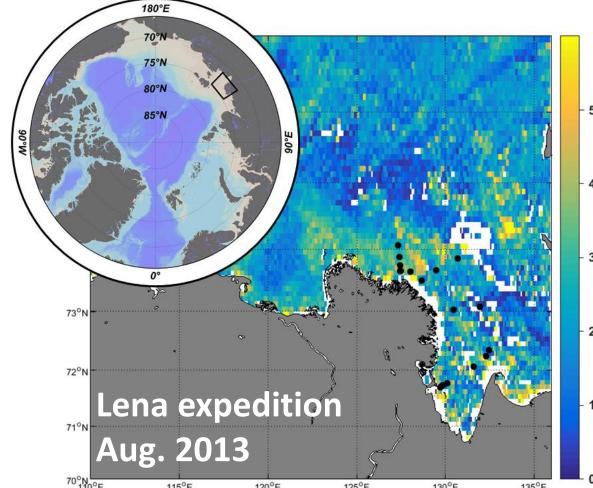
- Previous works: conservative mixing of DOM - Cauwet & Sidorov (1996) - Kattner, et al. (1999)
- Non-conservative mixing (Alling et al., 2010) - Removal up to 50%
- Changes in molecular composition - Dubinenkov et al. (2014)

OBJECTIVES

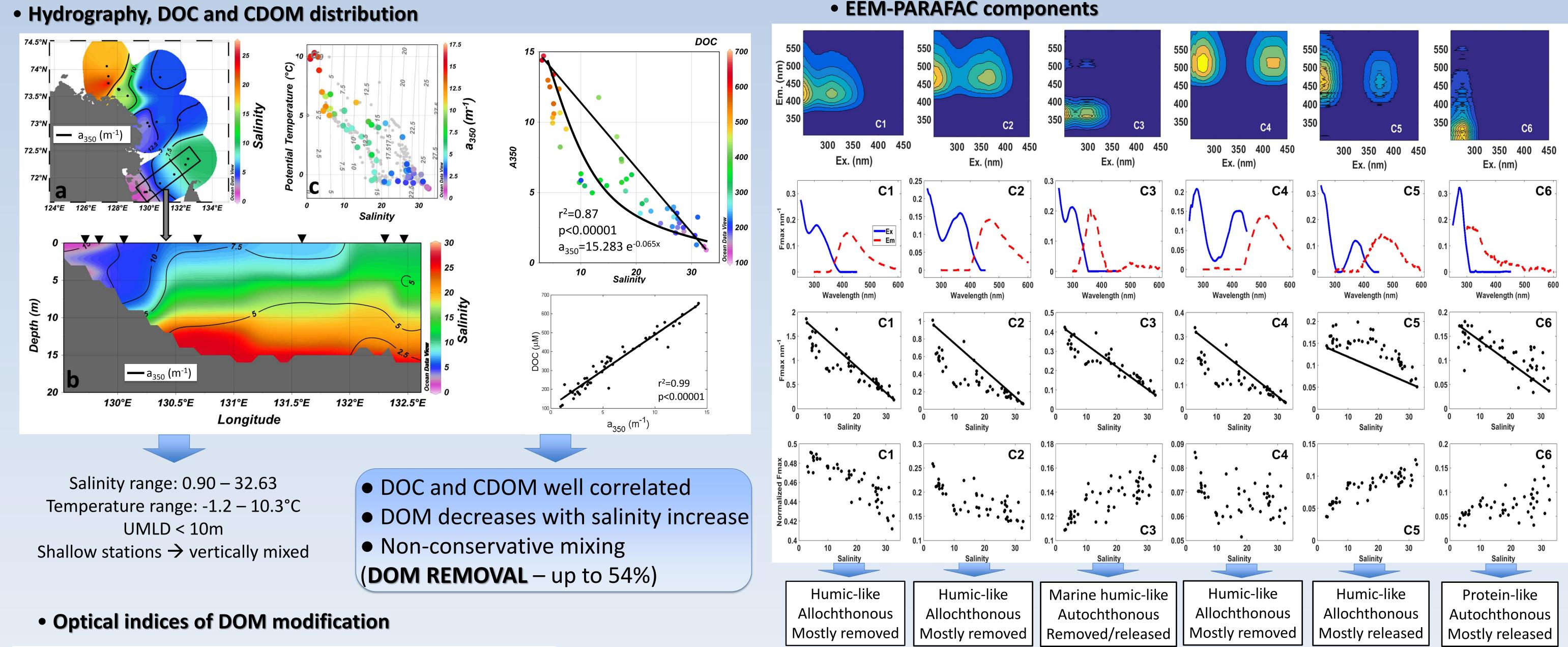
- to characterize FDOM components
- to assess the DOM mixing behavior
- to evaluate the reactivity of DOM
- to investigate the processes modulating DOM transformation and mixing



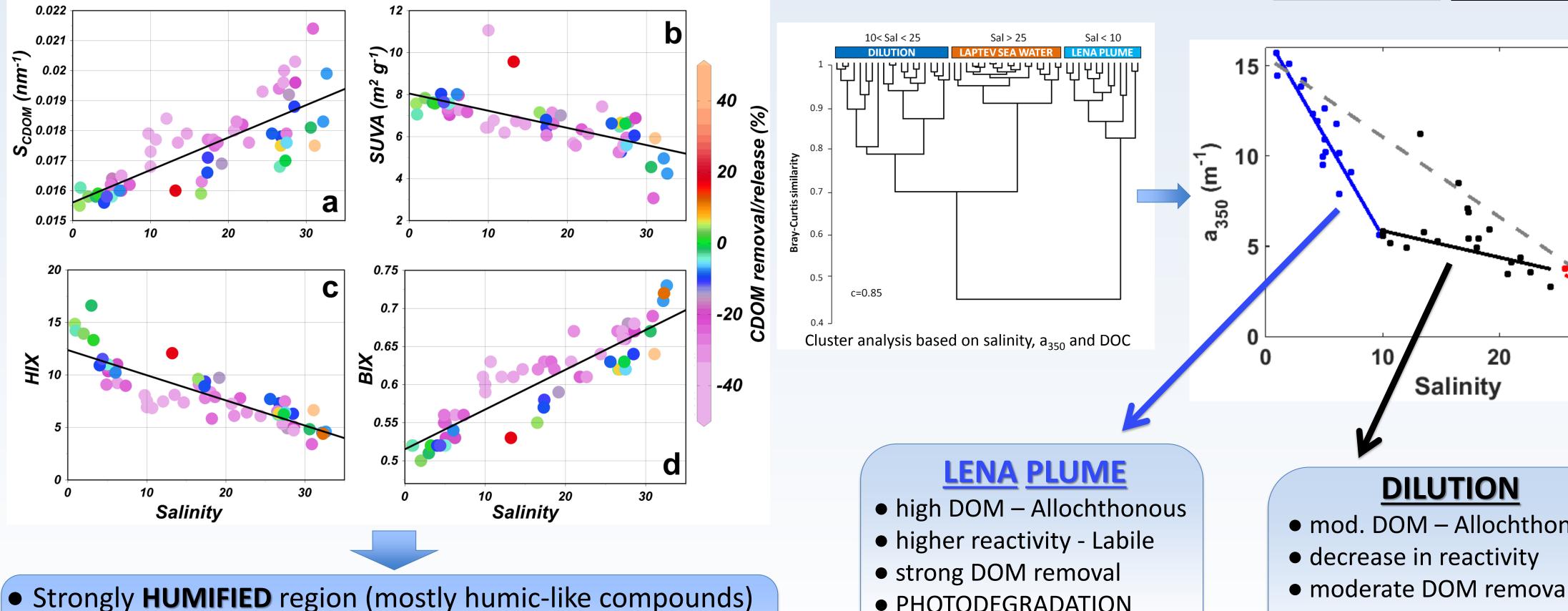
MERIS - First attenuation depth (Heim et al., 2014)



RESULTS AND DISCUSSION



Hydrography, DOC and CDOM distribution



30 • mod. DOM – Allochthonous moderate DOM removal PHOTODEGRADATION • PHOTODEGRADATION • SORPTION/FLOCCULATION • SORPTION/FLOCCULATION • LOW RELEASE (C3, C5 & C6)

(3 different regimes) Changes composition/reactivity • Different processes over DOM

CONCLUSIONS

Strongly humified region

Non-conservative mixing

• Strong DOM removal

MARINE SHELF WATERS

Iow DOM

- low reactivity Refractory
- low input/removal
- PSEUDO-CONSERVATIVE
- LOW TRANSFORMATION

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• **NO BIOLOGICAL DEGRADATION** (Mopper & Kieber, 2002)

• Molecular weight/reactivity decreases with salinity



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