Geophysical Research Abstracts
Vol. 12, EGU2010-10961, 2010
EGU General Assembly 2010


# Spatial distribution, sources and inventories of particulate organic carbon in the Laptev and East Siberian Seas

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The Eurasian Arctic Shelf (EAS) is the world's largest continental shelf [1] and covers over 50% of the total area of the Arctic Ocean. It drains the huge Siberian taiga and tundra regions, where about one third of the global soil carbon is stored, much held in the form of permafrost. Organic matter (OM) is exported to the EAS through the Great Russian Arctic Rivers (GRARs) and coastal erosion [2]. Climate change may affect the fluxes of OM, due to thawing of the permafrost underlying a substantial fraction of the Arctic drainage areas. This could release large amounts of carbon mainly as particulate organic carbon (POC) [3], influencing the carbon cycle on a global scale.

Despite the relevant role of the EAS in climate patterns, there is a deficit in the understanding of the OM fate once it enters the shelf, as well as basic aspects of OC cycling such as distribution, inventories, properties, sources and extent of degradation. It is of immediate interest to assess the potential contribution of the warming-forced coastal erosion process on the delivery of continental OM to the ocean, and the impact on the marine and global carbon cycle.

A benchmarking study of core OM parameters of the water column was achieved as part of the ISSS-08 expedition (International Siberian Shelf Study, 2008) through the understudied Barents – Kara – Laptev – East Siberian and Chukchi Seas. We intend to provide a geographically-extensive baseline of the distribution of POC in relation with other water column parameters, such as salinity, turbidity, aromatic moieties ($\varepsilon_{280}$), DOC and humic substances (HS) in the EAS, contributing to an improved understanding of the basic aspects of OC cycling in the Arctic Ocean. A total set of 218 seawater samples were collected from 94 sites at different depths, spanning from the surface mixing layer to the seawater column bottom.

The EAS presented POC contents ranging from 0.98 and 152 $\mu$M (mean $\pm$ 95% confidence interval of 14.7$\pm$2.9 $\mu$M). The higher values were observed in the Laptev Sea, in particular, around Muostakh Island intensively affected by coastal erosion. Based on the origin of dominant OM inputs, we consider three major regimes in the EAS: marine-offshore, riverine and coastal erosion. Offshore waters contain low amounts of POC, $\varepsilon_{280}$, DOC and HS, as well as planktonic $\delta^{13}$C imprints ($\sim$ -24‰). Coastal areas under direct riverine influence show $\delta^{13}$C signatures $\sim$ -30‰ and high contents of DOC and HS, mirroring river salinity plumes. Coastal erosion in this area produces large amounts of POC and $\varepsilon_{280}$, as well as terrestrial signatures of $\delta^{13}$C in between riverine and marine signatures ($\sim$ -28‰).

**References**

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