

## Coastal carbon dynamics in Siberian-Arctic shelf waters

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Northern permafrost regions store ca. 50% of the total belowground soil organic carbon (OC) pool<sup>1</sup> and are currently subject to intense climate warming. The shallow coastal region of the East Siberian Arctic Shelf (ESAS) is heavily influenced by terrestrial OC input, both from coastal erosion<sup>2</sup> and rivers. Recent increases in permafrost thaw and river discharge, along with a decrease in ice cover, impact terrestrial OC fluxes, but our understanding on transport and fate of terrestrial OC in shelf waters is still limited.

During the International Siberian Shelf Study-2008 we collected surface suspended particulate matter (SPM), sinking SPM, and surface sediments throughout the ESAS. Previous results<sup>3</sup> highlight the globally-unusual observation that, despite the shallow water column (10-40m), surface sediment OM is older yet less degraded than surface suspended OM.

We show here that radiocarbon ages of bulk OC increase from surface SPM ( $3.0 \pm 2.5$  <sup>14</sup>C-ky; mean  $\pm$  stdev) and sinking SPM ( $3.2 \pm 1.5$  <sup>14</sup>C-ky; younger) to surface sediments ( $7.9 \pm 3$  <sup>14</sup>C-ky), suggesting a release of pre-aged permafrost OC, and preferential settling of older, mineral-bound OC. Additionally, radiocarbon ages of lipid biomarkers, serving as tracers for terrestrial permafrost OC, were <sup>14</sup>C-dated in surface SPM (ranging from 5.1 to 13 <sup>14</sup>C-ky) and in surface sediments (5.5 to 18 <sup>14</sup>C-ky). Lipid biomarker ages in surface SPM and surface sediment are older with increasing distance from Lena River, and with closer proximity to active coastal erosion sites.

[1] TARNOCAI *et al.*, 2009. *Global Biogeochem. Cycles* 23  
[2] VONK *et al* 2012. *Nature* 489, 137-140 [3] KARLSSON *et al* 2011. *Biogeosciences* 8, 1865-1879