TIME SERIES FOR AN EAST SIBERIAN DBO?

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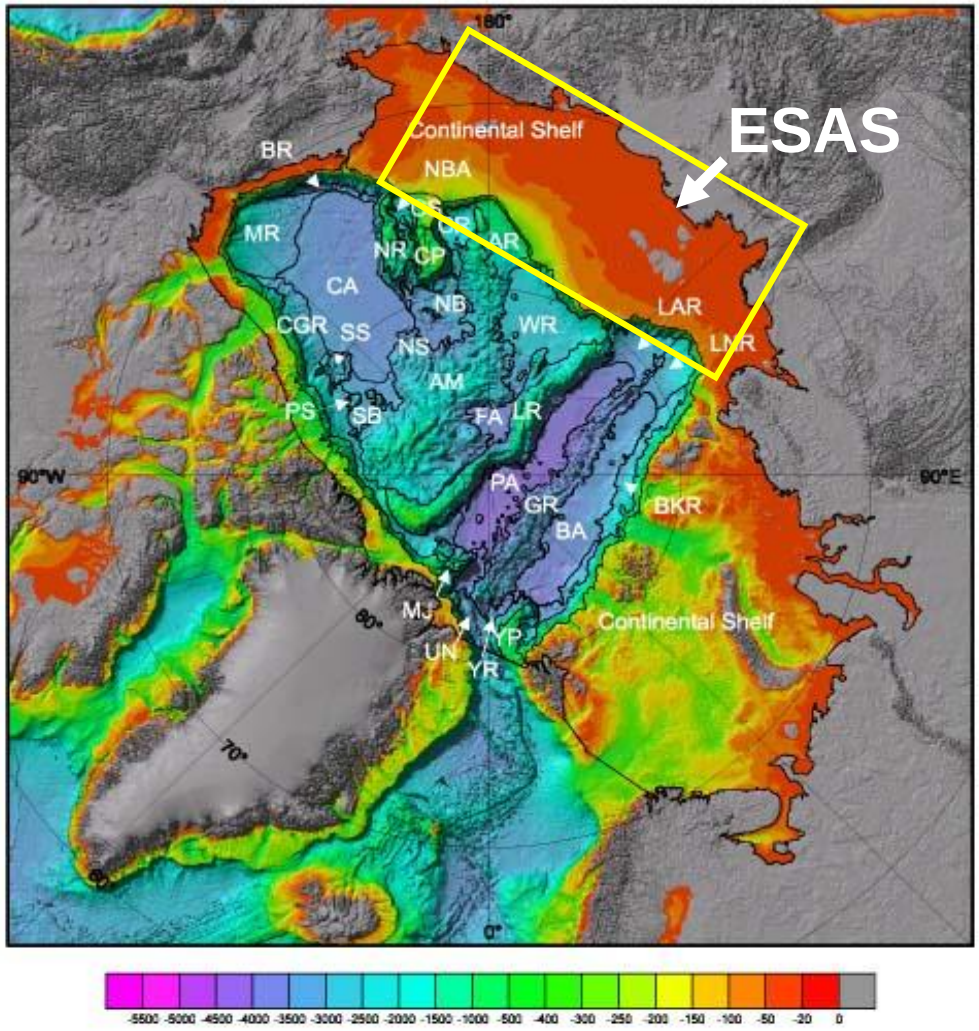
Outline:

- The East Siberian Arcic Shelf (ESAS) is an unique natural laboratory;
- Initial results;
- Future plans.

ESAS is an unique natural laboratory comprising most of the accessible Arctic Shelf

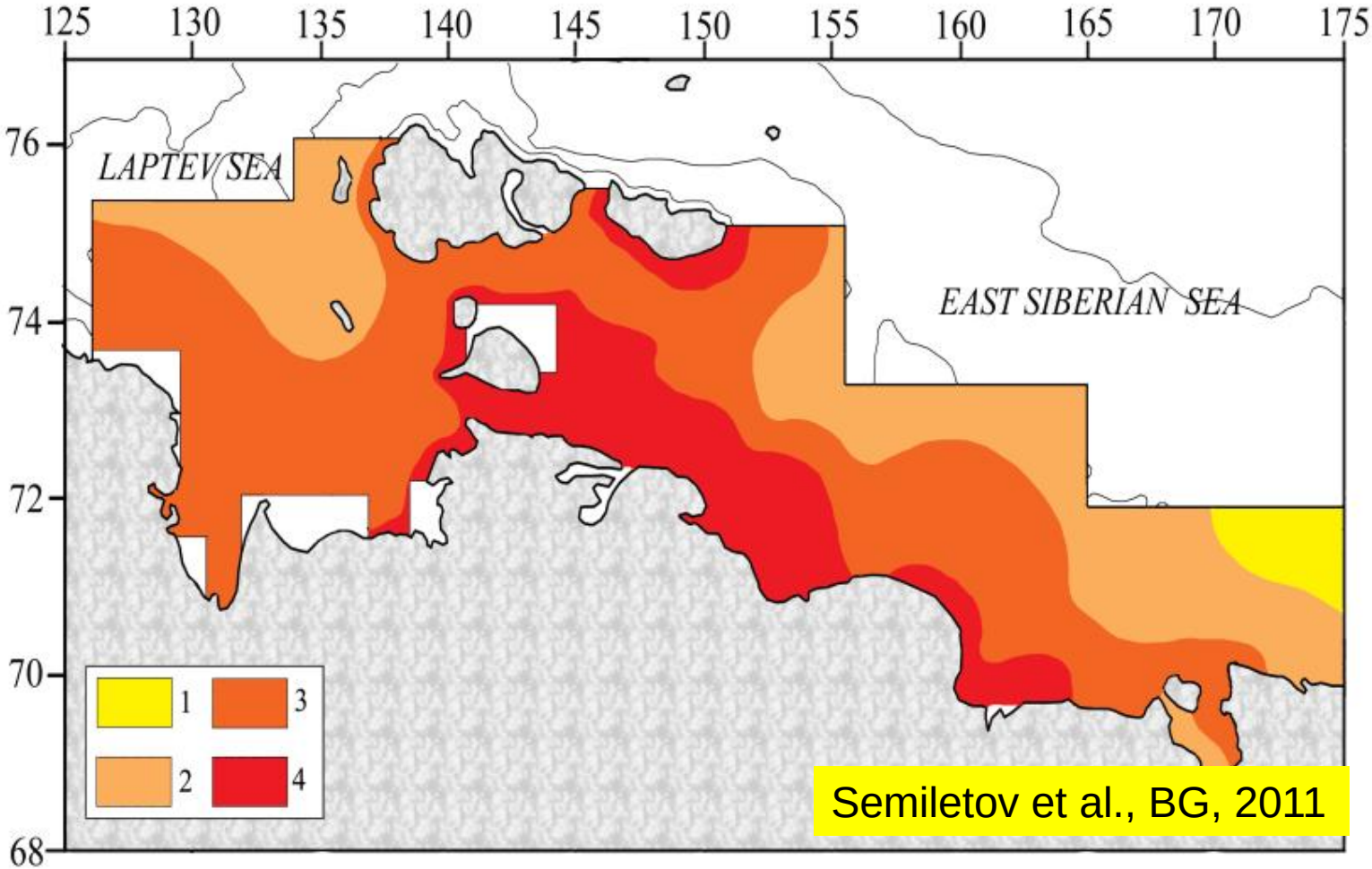


- The total area is **2.1×10^6 km^2** area **(~25%** of the Arctic Shelf, **~8%** of the World Ocean's continental shelf;

- **~75%** is shallower than **50 m** (*mean depth of the continental shelf is **130 m**)*; this provides very short conduit for GHGs to escape to the atmosphere;

- shallowness determines alteration of dry position (cold epochs)/ submerged position (warm epochs), which occurs due to lea level fluctuation

Land-shelf export of terrestrial organic carbon plays a dominant role in the regional carbon cycle.



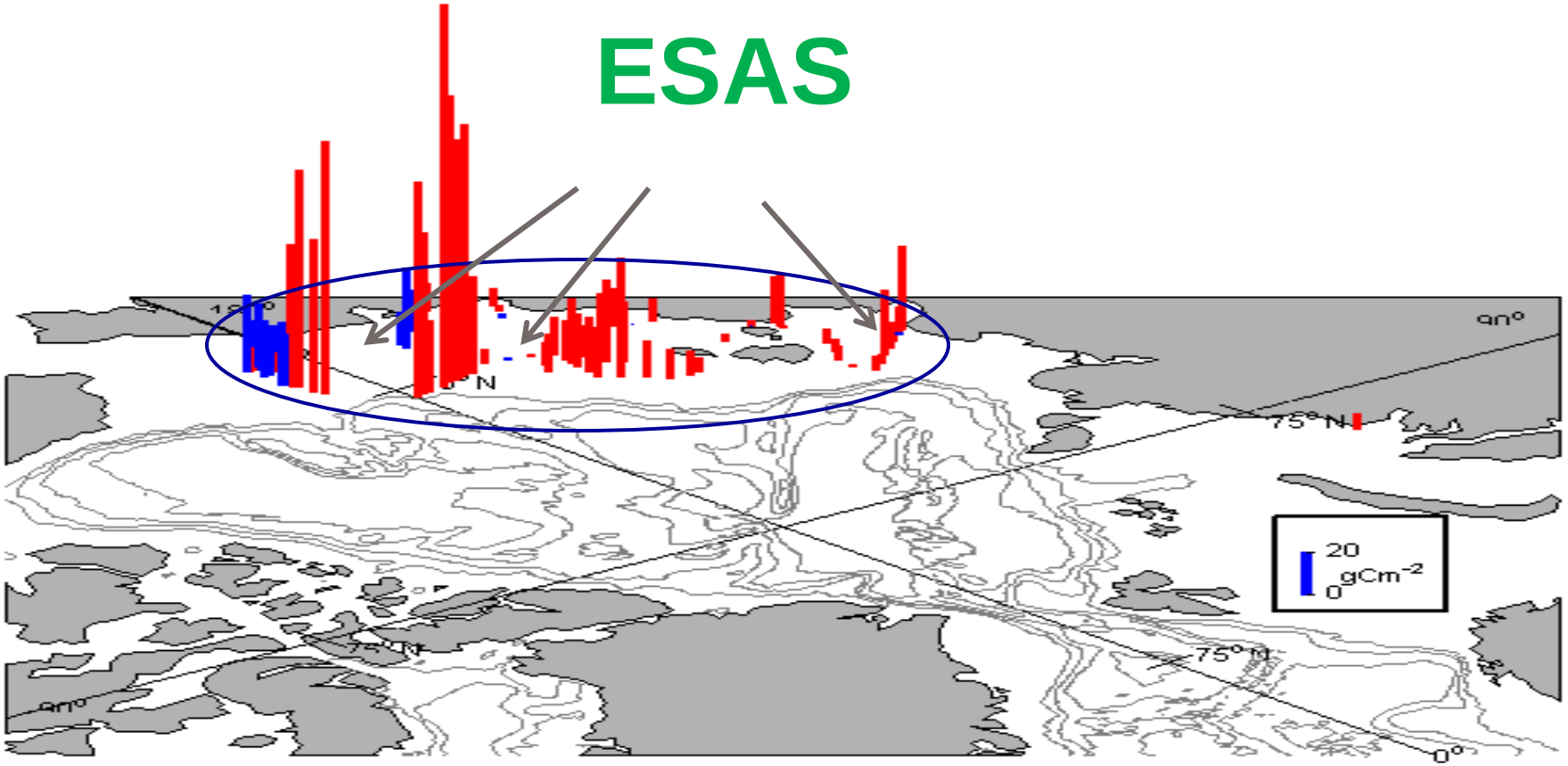
Contribution of terrestrial organic carbon (CTOM, %) in the ESAS surface sediment: 1) <40%, 2) 40-69%, 3) 69-98%, 4) 98-100%

Highest rates of coastal erosion were found in the ESAS

Rates of coastal erosion can be as high as 30 m during two weeks

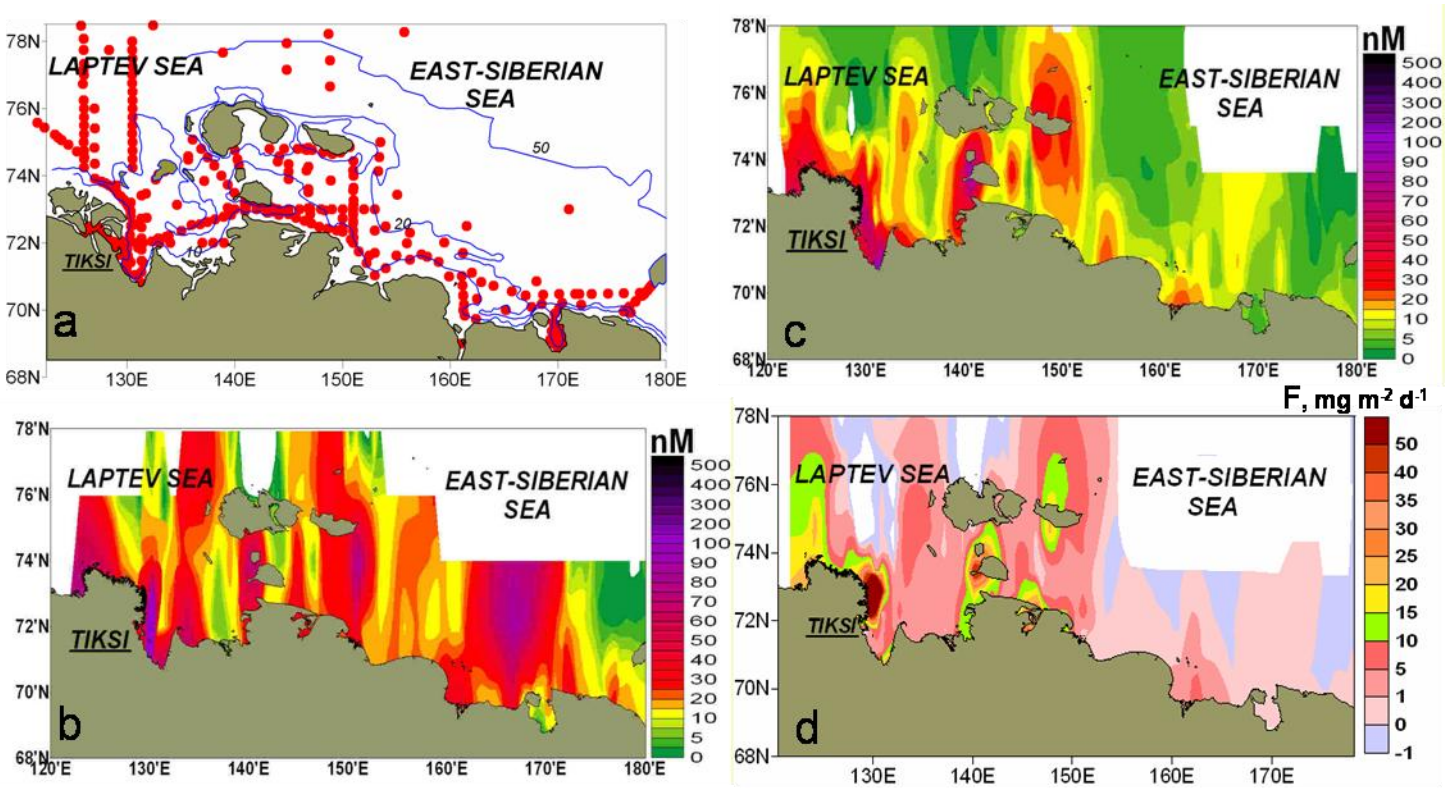
Photo by I. Semiletov

In general, the western low-product. and turbid ESAS is a source of CO2 (red color), while the eastern high-productive area is a sink (blue color)



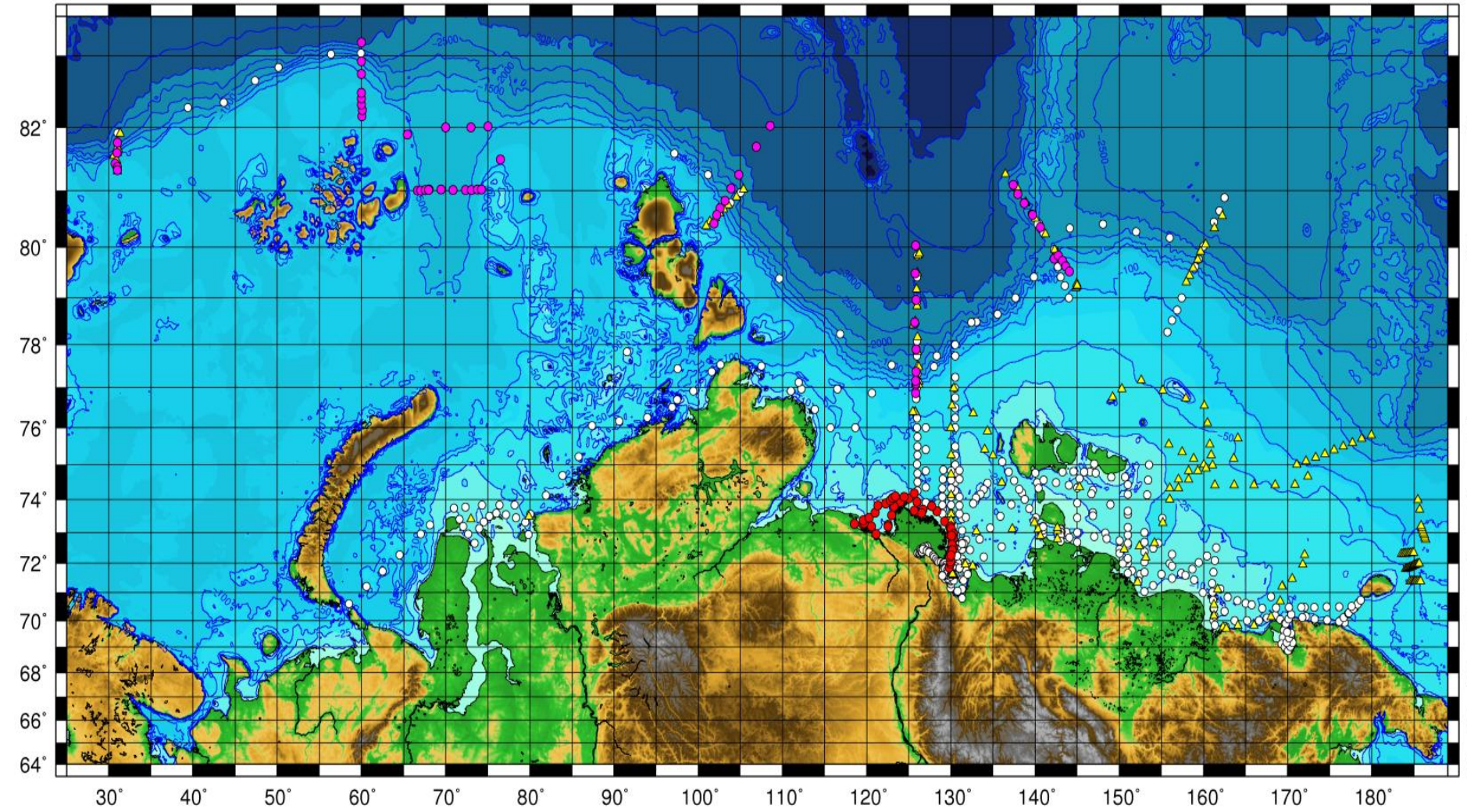
modified from Anderson et al., GRL, 2009; Semiletov et al., JMS, 2007

ESAS is a strong source of methane into the atmosphere



Shakhova et al., Science, 2010

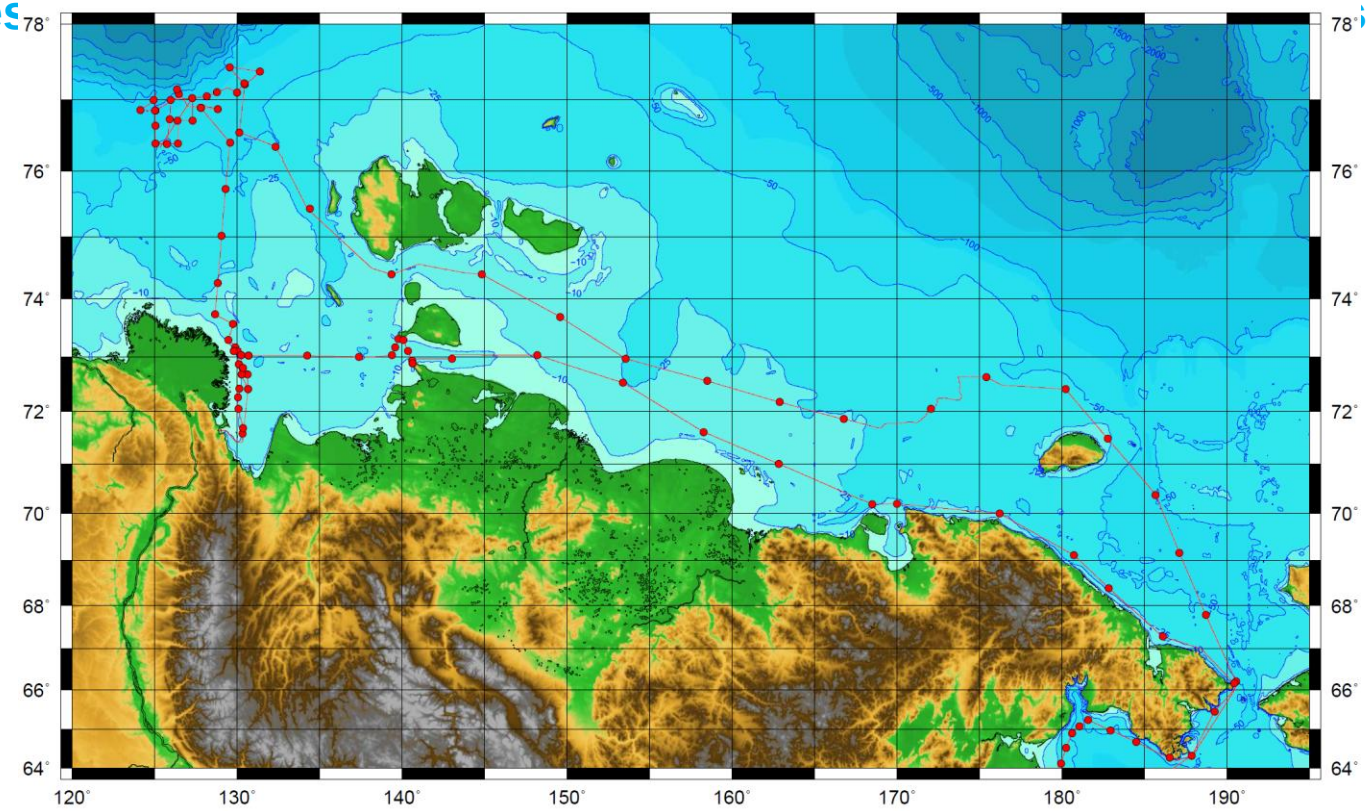
Location of oceanographic stations accomplished with NOAA-support, FEBRAS, and OPP NSF in (2003-2010)



The 8th Russia-US cruise-2011 in the ESAS and sub-arctic Pacific seas

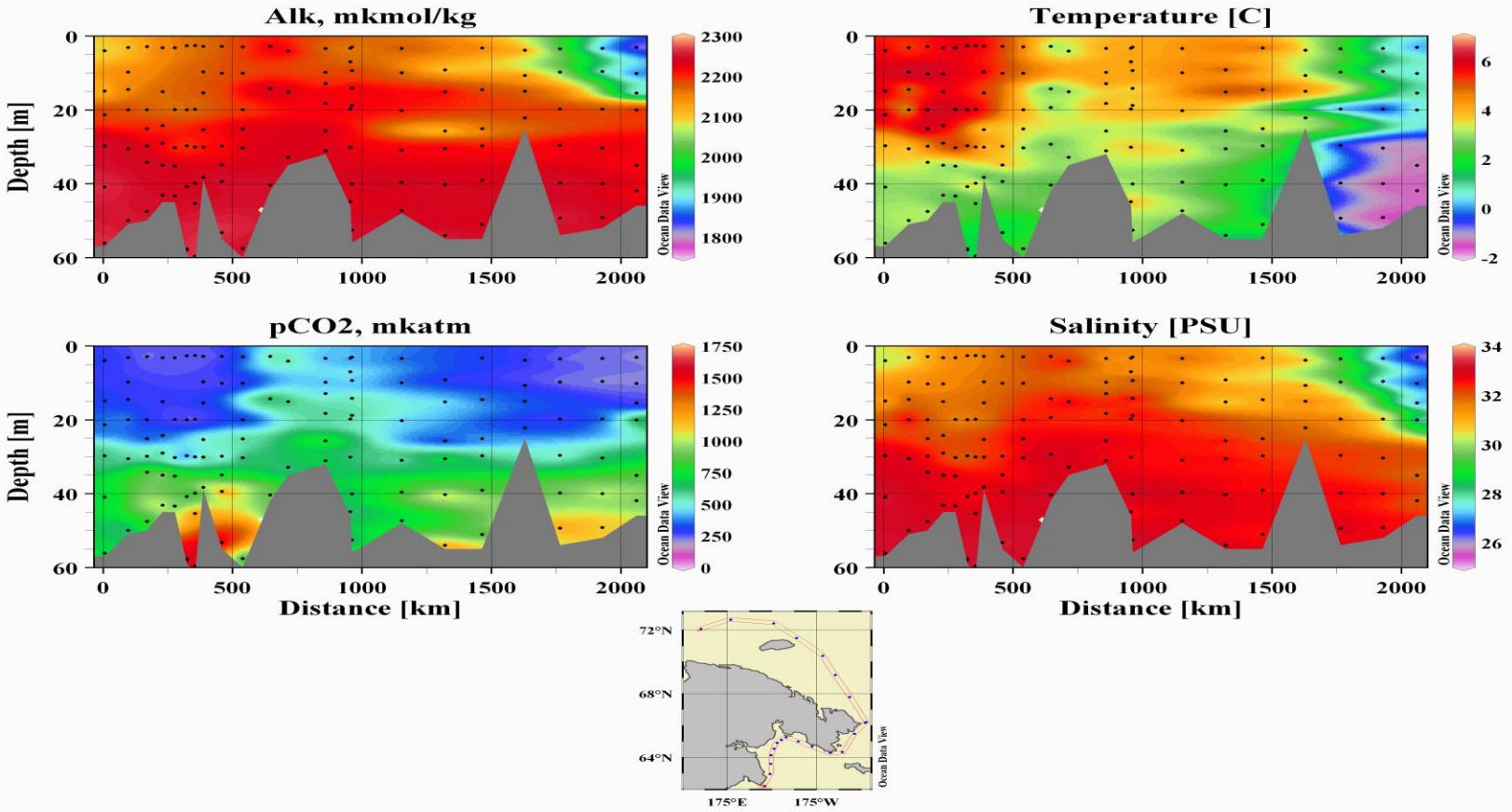
Locations of complex oceanographic stations accomplished in September-October of 2011 in the 8th Russia-US joint cruise onboard RV Academician Lavrentiev (funded by Russian Foundation for Basic Research, NOAA, and OPP NSF)

(~ 10,000 nmiles with continuous measurement of methane and carbon dioxide in air and surface water, 3 frequencies echo sounding, ~ 1,500 nmiles …).

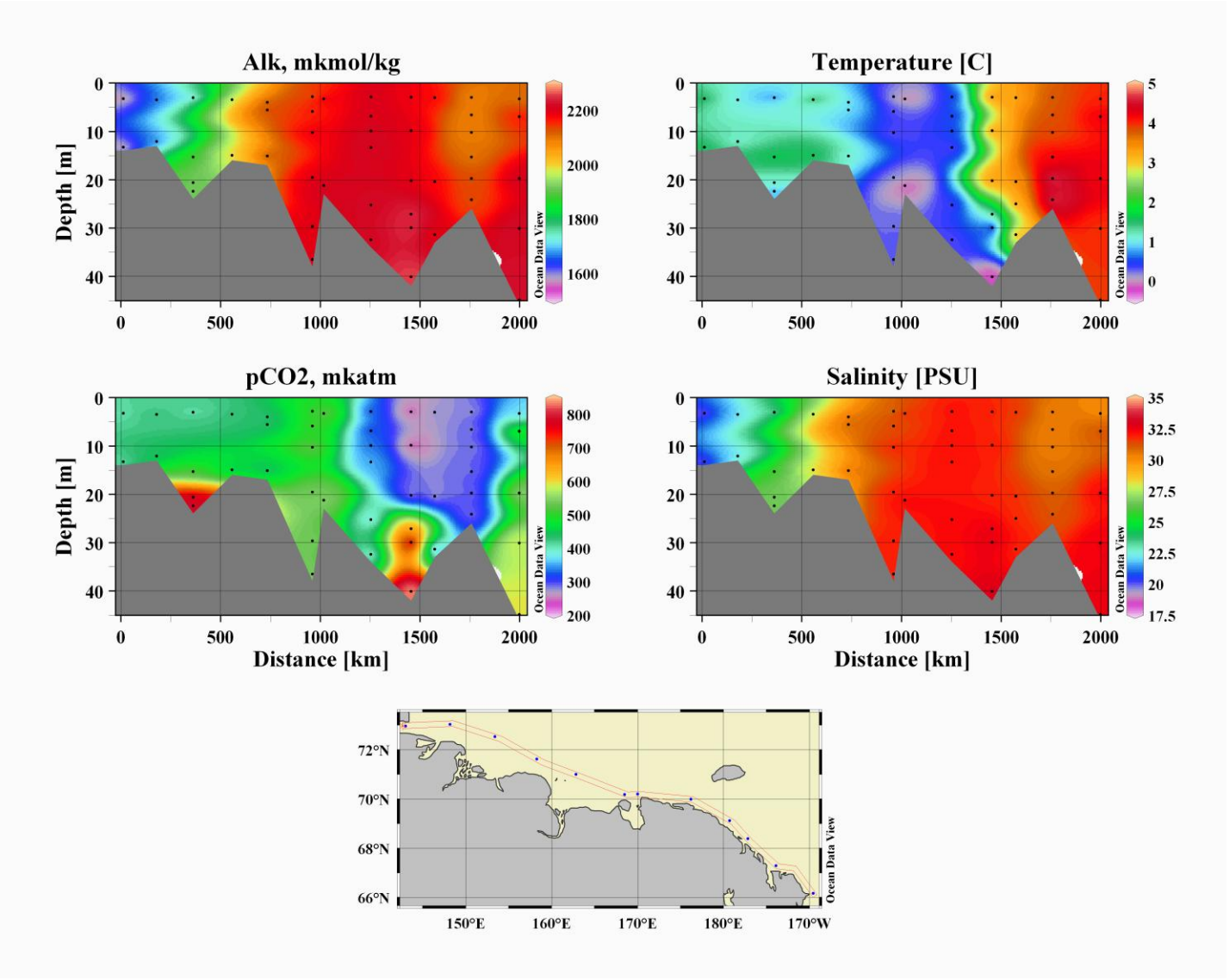


*** only stations located north of 64N are shown on this map**

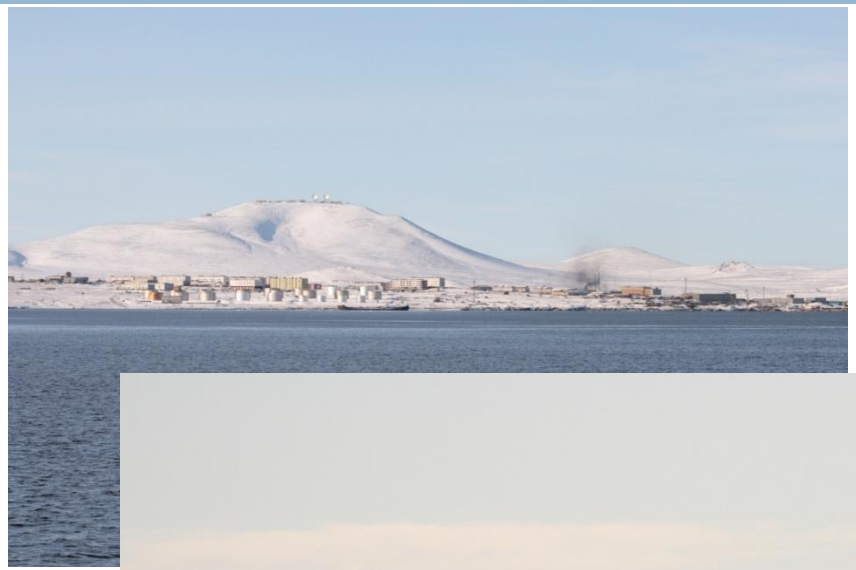
The PAG area: the Bering-Chukchi Sea Transect



The PAG area: the East Siberian – Chukchi Sea Transect



ESAS represents a vast shelf area east from the Cape Dezhnev to Pevek, Tiksi

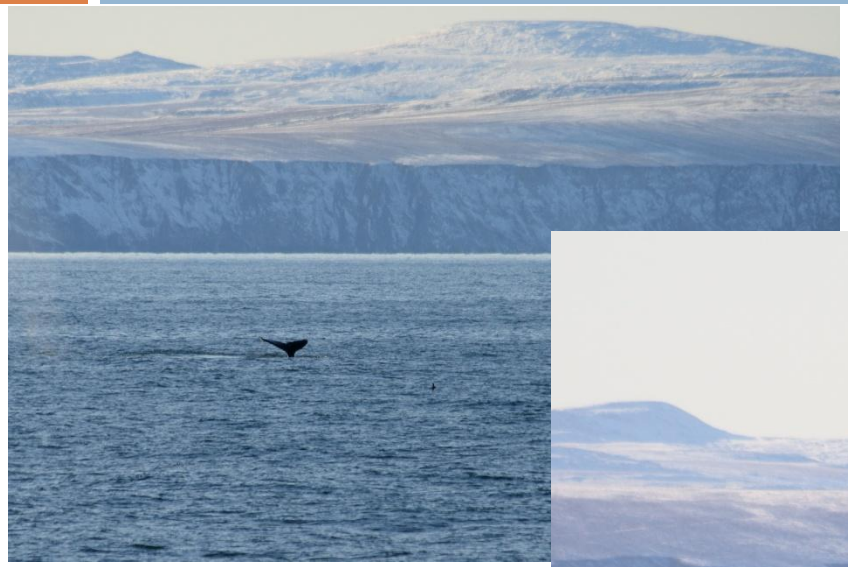


DBO-?

Largest biodiversity and biogeochemical gradients from the oligotrophic western ESAS to the high-productive eastern ESAS

DBO-?

WHALES



WALRUSES

DBO in ESAS (still ?): YES!!!