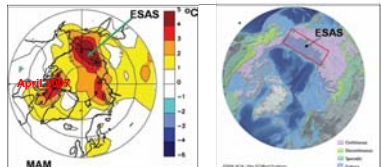


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Motivation:

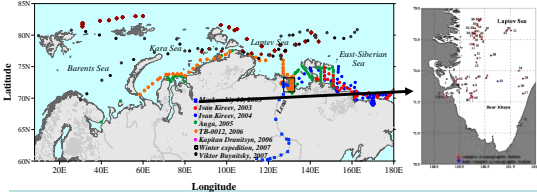


- Arctic Ocean is small (~4% from total World Ocean), but it is unique because one is surrounded by onshore and underlain with offshore permafrost which contains a huge reservoir of organic matter and trapped methane, including methane in form of gas hydrates (about 6,000Gt);
- Area of subsea and land permafrost (near 14 mln sq.km) is equal to the total area of Arctic Ocean;
- Arctic shelf is the broadest and shallowest shelf (yet least explored) in the World Ocean and is the most strongly impacted by warming (enhanced fresh water and heating impact from river plumes, sea ice retreat, coastal and bottom erosion).
- East Siberian Arctic Shelf (ESAS) is most impacted by warming.
- ESAS exhibits > 90% of the sub sea permafrost which is now in transition phase

Goals:

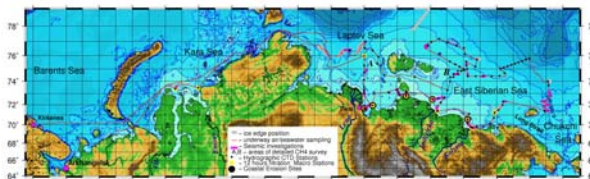
- 1) elucidate the role of the ESAS in the regional carbon cycle.
- 2) identify the main processes driving the carbon cycle on the ESAS;
- 3) evaluate the response of Arctic marine ecosystems to ongoing climate change.

Field FEBRAS-IARC studies: 1999-2007



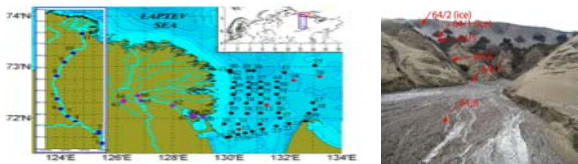
During the 2003-2007, 7 cruises and 1 winter expeditions on the sea ice were conducted, 670 oceanographic stations were performed, and >4000 of measurements of dissolved methane were done.

ISSS-2008



A complex program was accomplished during the 50-days ISSS-08 cruise August – September 2008 using three vessels by participants from 12 organizations in Russia, Sweden, USA and UK.

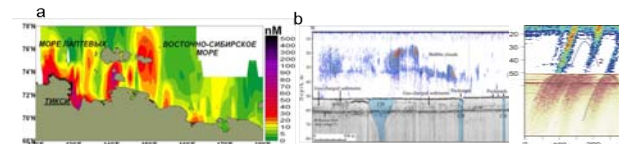
The main vessel H/V *Yacob Smirnitzyi* traveled the entire length of the Siberian coast from Kirkenes, Norway to Herald Canyon, Chukchi Sea and back along the outer shelf.



A second ship (*Neptun*) sampled the Lena River, and its delta channels and third (*TB-0012*) - the southeastern shallow Laptev Sea visiting eroded coastal ice-complexes



Some ISSS-08 initial results



Non-gradual bubbling release of methane from the ESAS was discovered. This result is agreed well with our hypothesis (Shakhova et al., 2005; Semiletov et al., 2004; Semiletov, 1999), and previous data: 1999-2007

Evidence of ebullition: water column and sea ice, the Laptev Sea

