



Geotraces - RUSSIA Scientific Report

2015- SSC Meeting

Vancouver, Canada,
15-18 July 2015

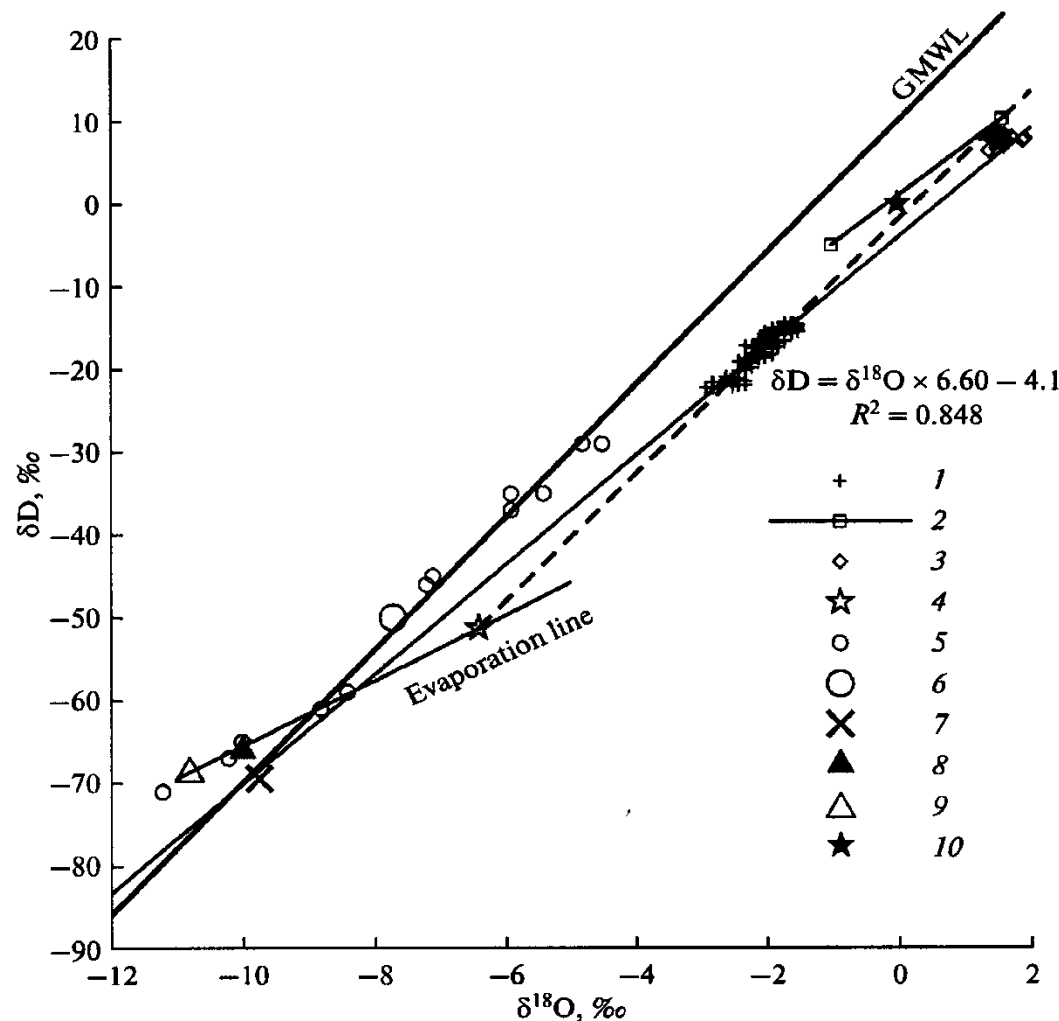
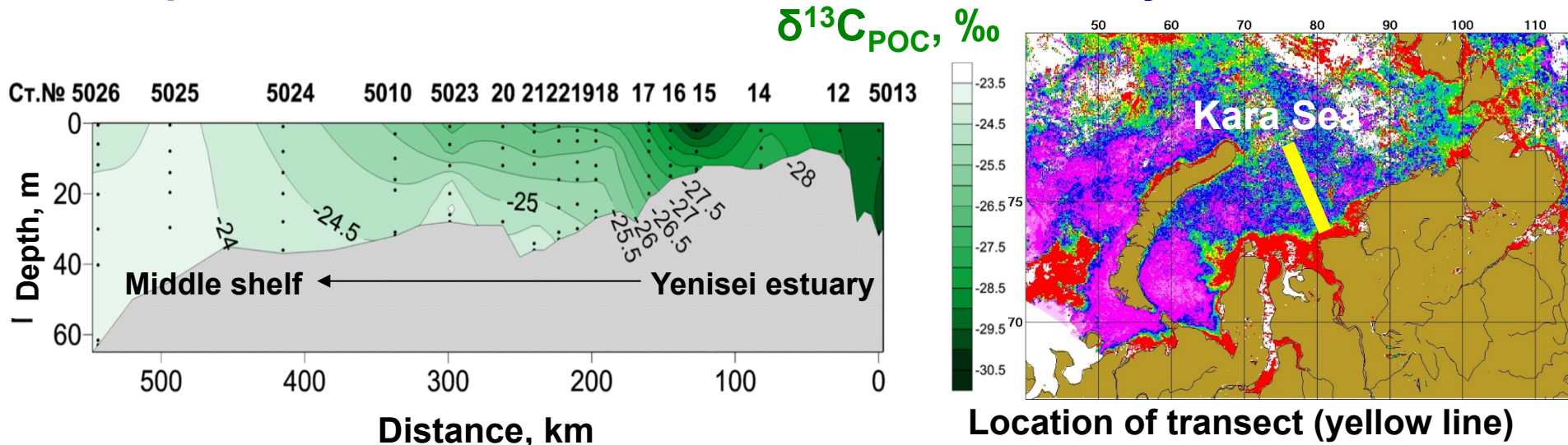


Fig. 7. Isotope composition of oxygen and hydrogen in the water of the Black Sea (1) in δD – $\delta^{18}O$ coordinates. For comparison, the water composition of the Sea of Marmara (2) by [23] and of the East Mediterranean (3) [13], the composition of the freshwater source of the Black Sea (4), that of the meteoric waters averaged for each of the months (5) [11], the annual average composition of the meteoric precipitation (6) [10], the average composition of the Danube River water in September (7) [24], the annual average composition of the water vapor calculated using the freshwater balance by Simonov and Al'tman (8) and a summary of the water balance by Unluata et al. (9) [4], and the point of the SMOW composition (10) are plotted. The GMWL is the line of the meteoric waters [12]. The equation $\delta D = \delta^{18}O \times 6.60 - 4.1$ is the linear δD – $\delta^{18}O$ dependence for the Black Sea waters. The dotted line shows the dependence $\delta D = \delta^{18}O \times 7.7 - 2.0$ involving the salinity for the water of the Black Sea (see the text for details). The line of evaporation is calculated using the composition of the freshwater input of the Black Sea ($S = 0$ psu) and the data on the isotope composition of the oxygen and hydrogen in the annual averaged water vapor.

New results

Distribution of particulate organic carbon (POC) isotopic composition at the transect from the Yenisei estuary to the Kara Sea



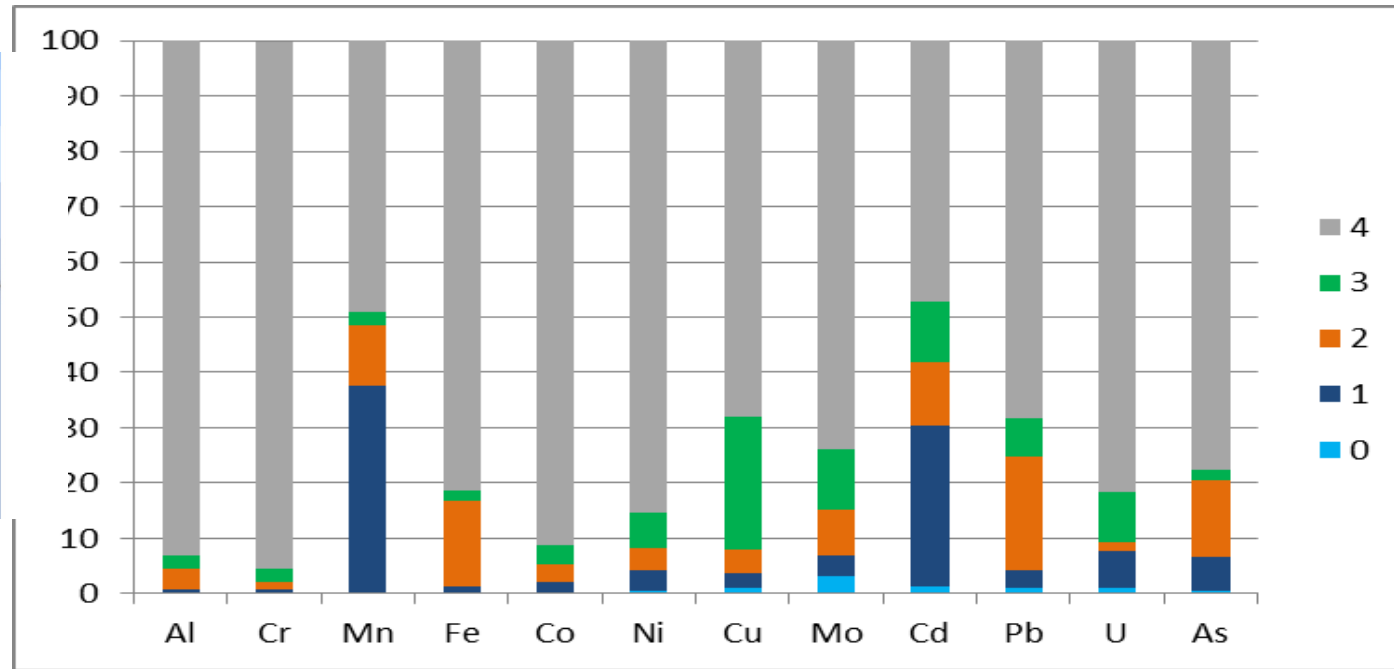
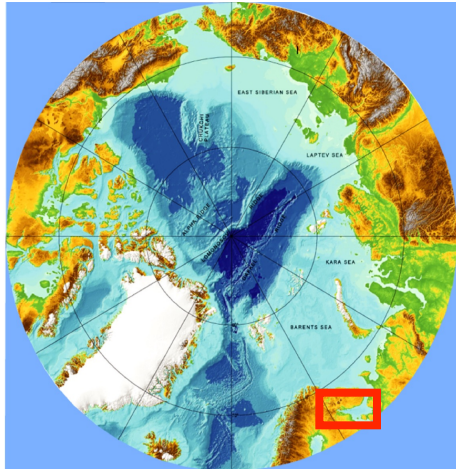
The POC concentrations in the surface layer decreased from the estuary toward the outer shelf from 1400 and 407 $\mu\text{g/L}$ to 110 and 66 $\mu\text{g/L}$ in the Ob and Yenisei Rivers' transects.

The $\delta^{13}\text{C}_{\text{POC}}$ values allowed us to estimate proportions between terrigenous (allochthonous) and phyto-planktonogenic (autochthonous) suspended organic matter.

The maximum concentrations of SPM were found for river estuaries, where POC is mostly terrigenous: $\delta^{13}\text{C}_{\text{POC}}$ values amount to -30.2‰ and -30.1‰ in the Ob and Yenisei estuaries with water salinity of 0.05 psu, respectively ([Kravchishina et al., 2015](#))

New results

Trace metal speciation in the surface bottom sediments of the subarctic semi-enclosed White Sea



Average percentage ($n=30$) of the trace metals occurrence forms: 0 – 3 - geochemically labile forms:

1 - exchangeable / bound to carbonates,

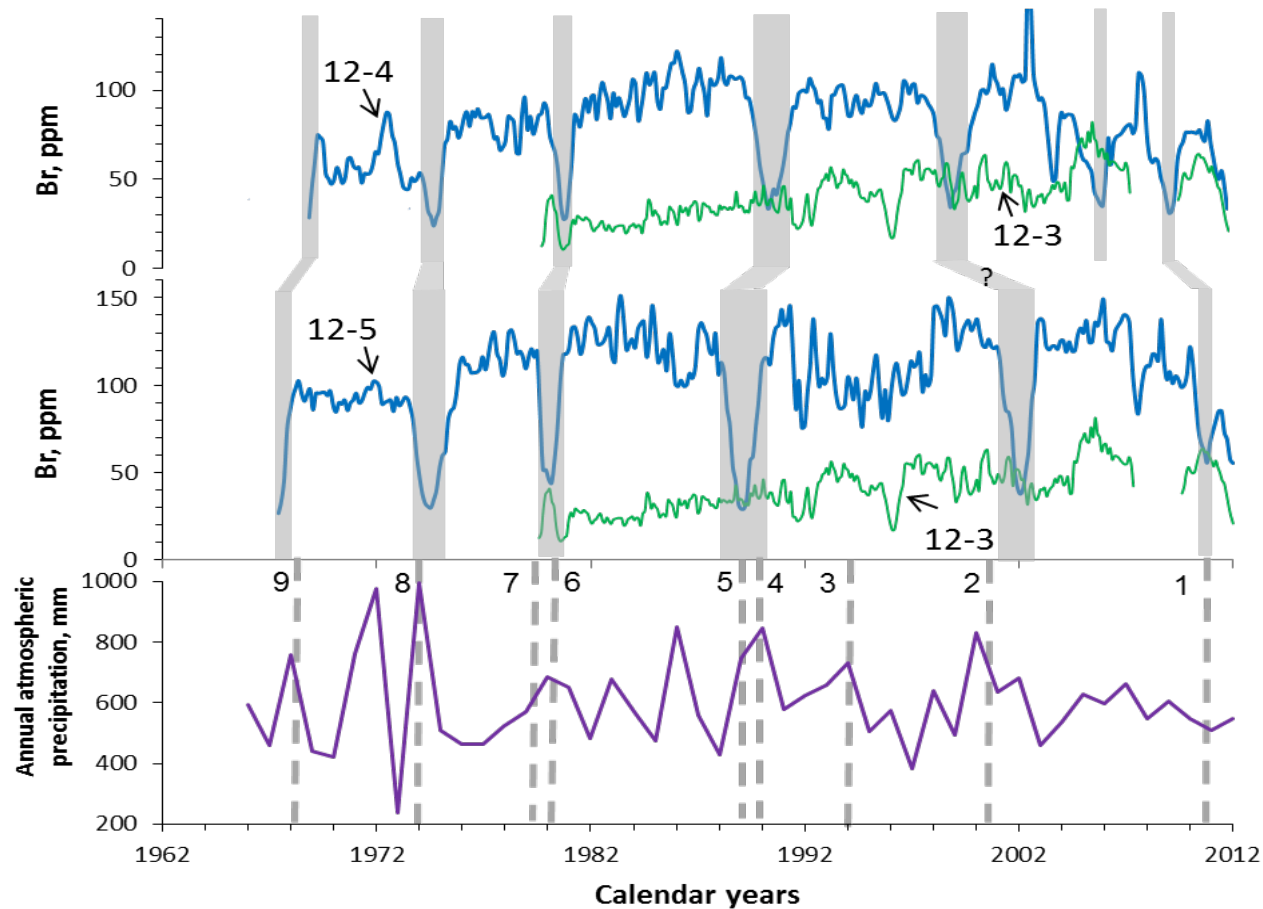
2 - bound to Fe-Mn hydroxides,

3 - bound to organic matter;

4- geochemically inert form or lithogenic ones) which holds metals within the mineral crystal structure.

Our results showed the predominance of the geochemically inert occurrence form of most trace metals but Mn and Cd in the bottom sediments of the White Sea. To a first approximation, this might reflect a major role of terrigenous supply of the trace metals with river-runoff and abrasion processes in their accumulation in bottom sediments ([Demina et al., 2015](#))

New results Geochemical indicators of paleo-typhoons in shelf sediments of the Amur Bay, Sea of Japan



Negative correlation of bromine content peaks in bottom sediments on the timescale with extreme floods caused by typhoons or deep cyclones

Dashed lines with numbers: 1 - typhoon Talas, 09.2011; 2 – cyclone, 08.2001; 3 - typhoon Melissa, 09. 1994; 4 - typhoon Robin, 07.1990; 5 - typhoon Judy, 07.1989; 6 - typhoon Orchid, 09.1980; 7 - typhoon Irving, 08.1979; 8 - typhoon Gilda, 06. 1974; 9 – cyclone, 09.1968. ([Astakhov et al. 2015](#))

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Meetings

Over late 2014 up to date (July 2015) Russian scientists participated in 3 international conference, where they have presented around 30 presentations.

Among the conferences there was only one relevant to GEOTRACES: 26-th IUGG General Assembly, Prague, 22 June- 02 July 2015. About 15 presentations were made there, among them one titled “GEOTRACES highlights in the Indian Ocean and plans for the future, by E. Masferrer Dodas¹, E. Boyle², C. Jeandel¹, R. Schlitzer³, was presented by L. Demina⁴ (1GEOTRACES International Project Office, Toulouse, France; 2Massachusetts Institute of Technology, Cambridge, USA; 3Alfred Wegener Institute, Bremerhaven, Germany; 4Shirshov Institute of Oceanology, Moscow, Russia.

Cruises.

In November 2014 Shirshov Institute of Oceanology held a cruise in the Caspian Sea (hydrochemistry, currents, sedimentation). In February-April 2015 there were 2 expeditions for collection of snow and ice at the White Sea (winter fluxes of aerosols), besides at the Biological Marine Station of Moscow State University in the coastal zone of the White Sea a continuous collection of aerosols (analysis of black carbon) is carried out by the High volume sampler (UK). In June –July on board the RV “Academik Ioffe” a transect along 60°N in the Northern Atlantic was made to estimate evolution of water masses by hydrochemical and hydrophysical parameters. Just in a few days a cruise of the RV “Academik Mstislav Keldysh” will start in the Northern Atlantic and the Barents Sea to perform a geological and geochemical investigation.

In plans for 2016 there is an international multidisciplinary expedition in the Arctic Ocean which holds Pacific Oceanology Institute (RV “Academik Lavrent’ yev”) where participants from other nations are welcome.

New funding

We have got financial supporting of the 15 initiative projects, related to the GEOTRACES objectives, from the Russian Foundation on Basic Research (rfbr.ru), aimed to investigate Russian Seas.

In addition we have got 2 initiative projects from the recently organized Russian Scientific Foundation (rscf.ru).

Among the aims of these projects, the Northern Atlantic Ocean, Barents and Kara Seas are laid out in July-September 2015.

A large school of fish, possibly sardines, is swimming in the ocean. A shark is swimming in the center of the school. The water is a deep blue color.

Thanks a lot for your attention!