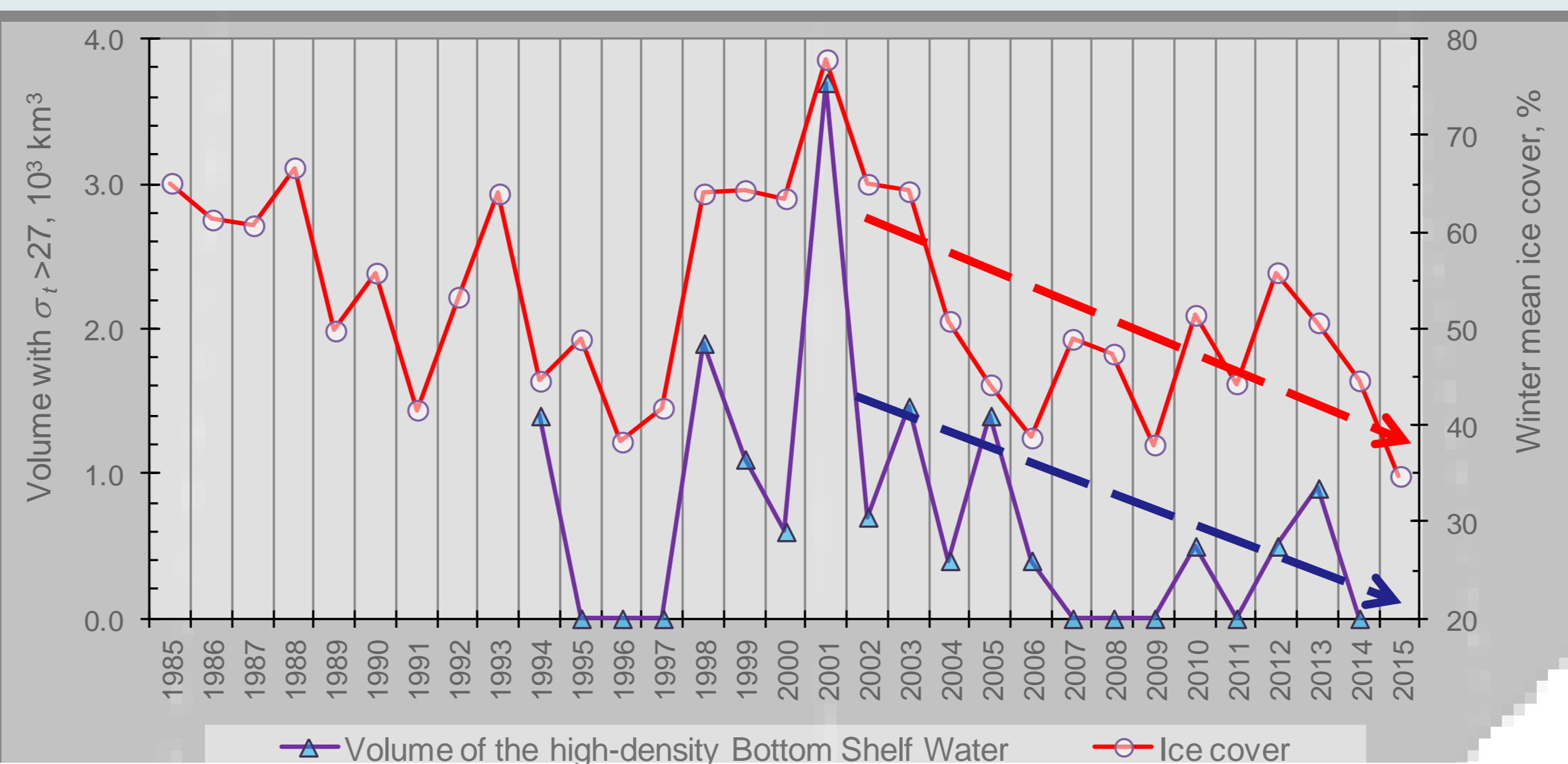




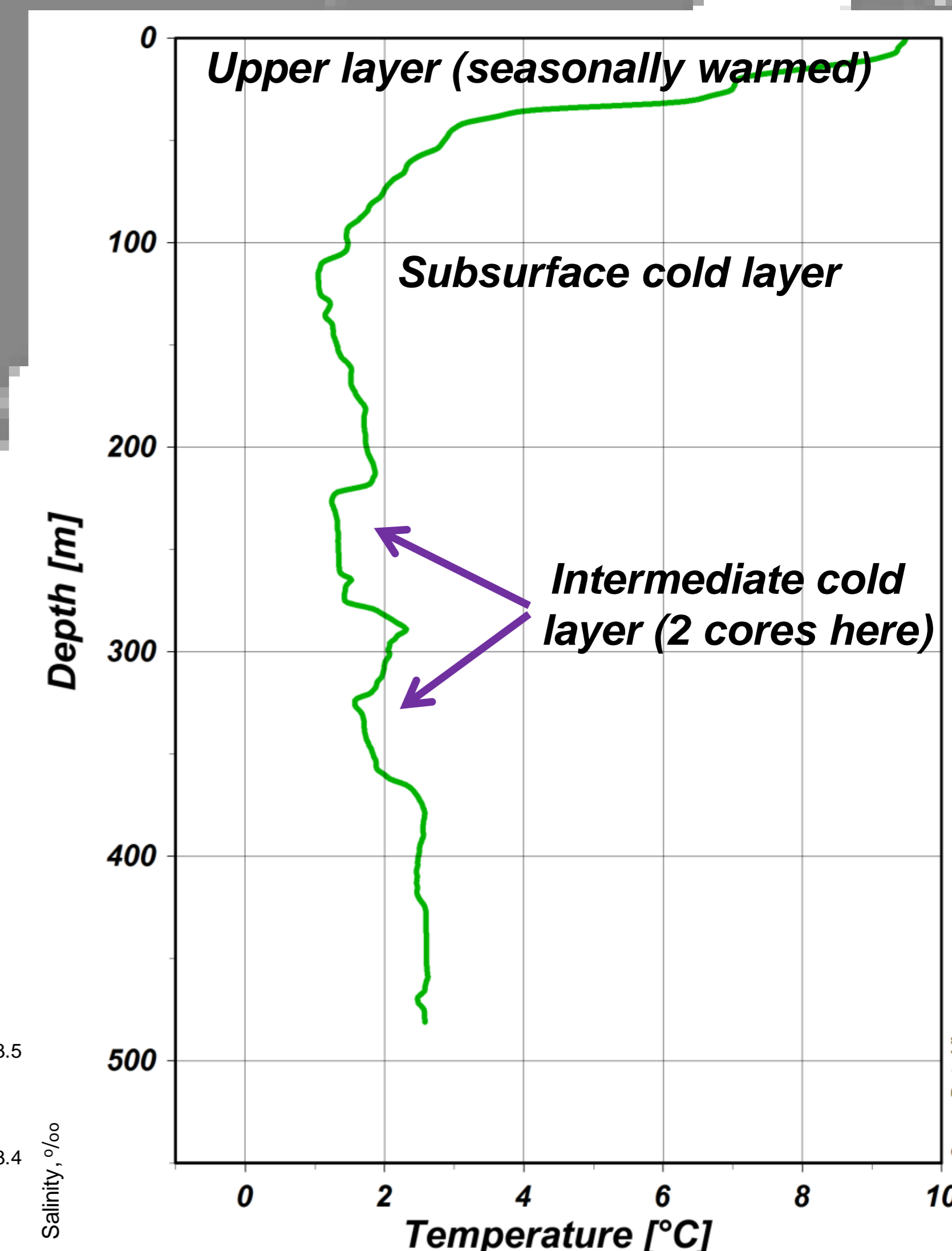
Change of the dense bottom water production on the northern Okhotsk Sea shelf and its transport to the intermediate layer of the North Pacific

poster presentation on PICES 24th Meeting; Qingdao, China, October 2015

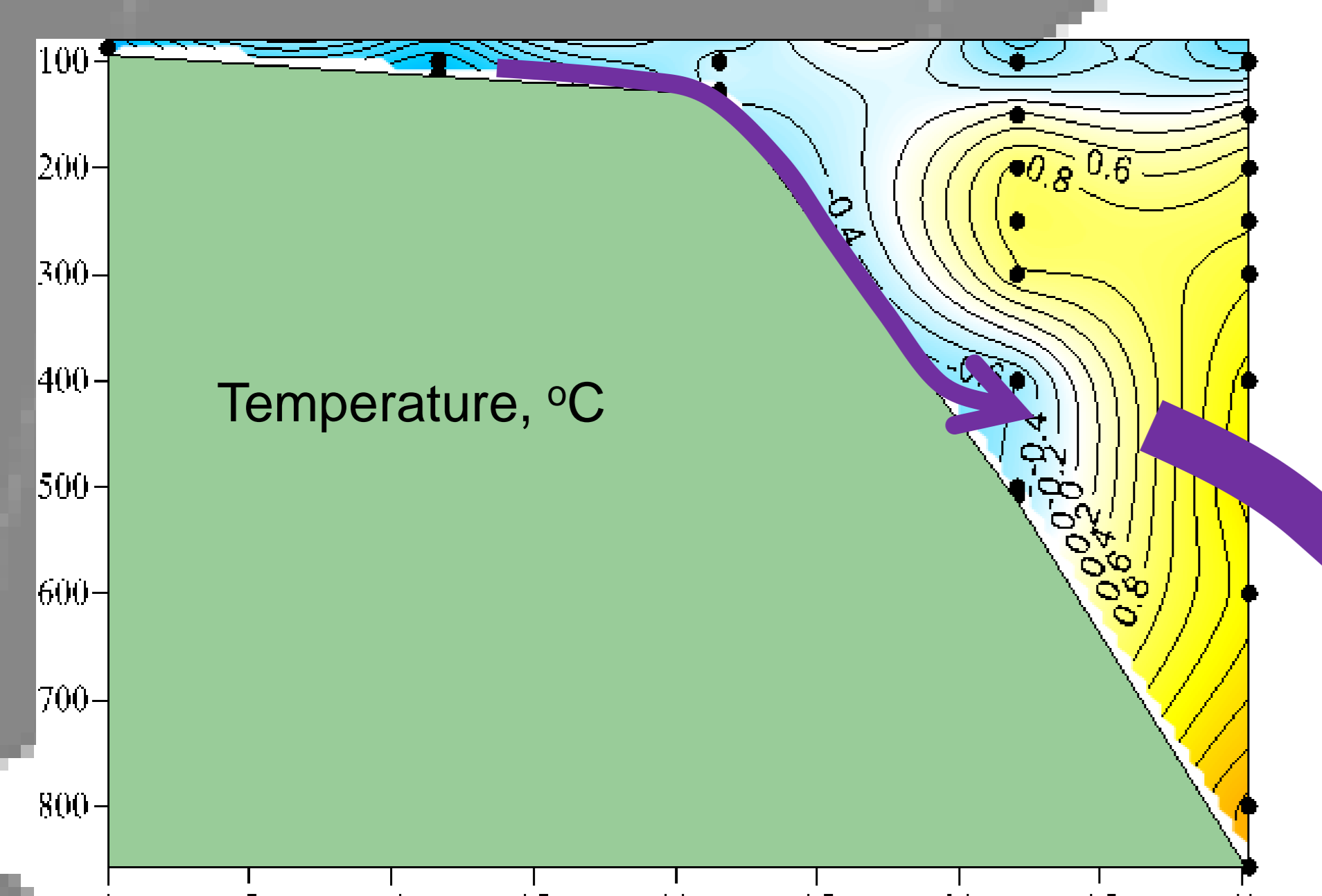
Goal: on the base of regular observations to trace signal of climate variation from the sea ice formation in the northern Okhotsk Sea to the North Pacific Water (NPIW) ventilation



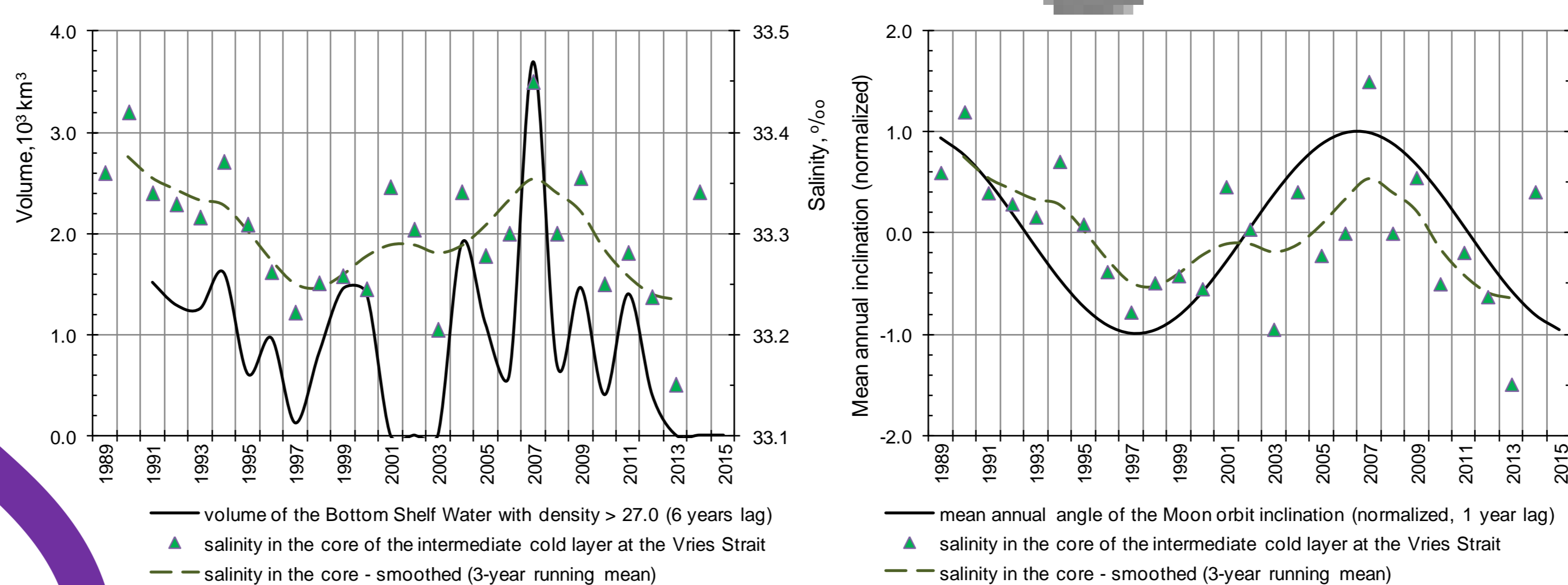
Year-to-year changes of the ice cover in the Okhotsk Sea and the volume of the high-density Bottom Shelf Water on its northern shelf. Both ice cover and high-density water production decrease recently



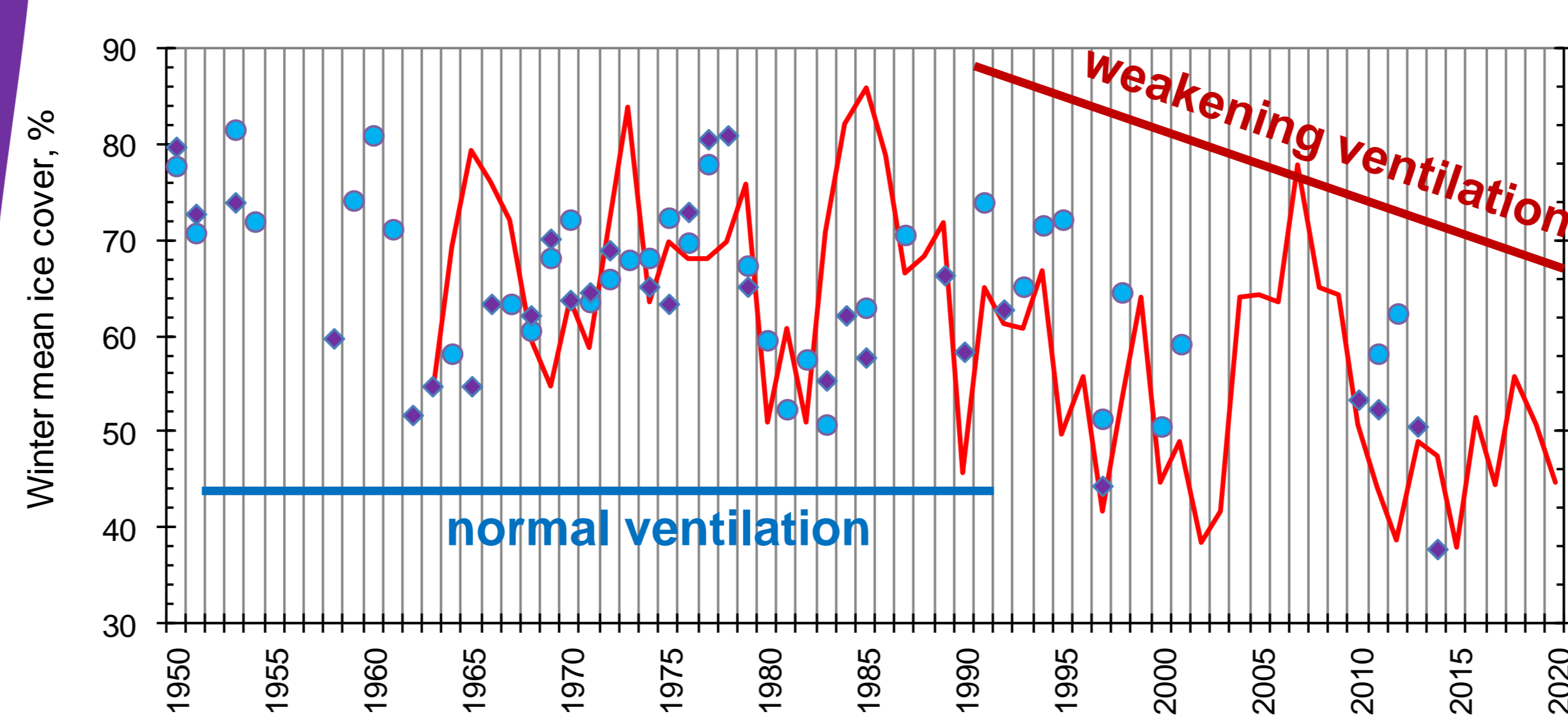
Typical water temperature profile in the central Okhotsk Sea (RV Vladimir Safonov, summer 2012). The cold, saline water originated from the Bottom Shelf Water forms intrusions within the intermediate layer, usually at $\sigma_t 26.7$ surface, known as the "Second temperature minimum" or "Cold intermediate layer"



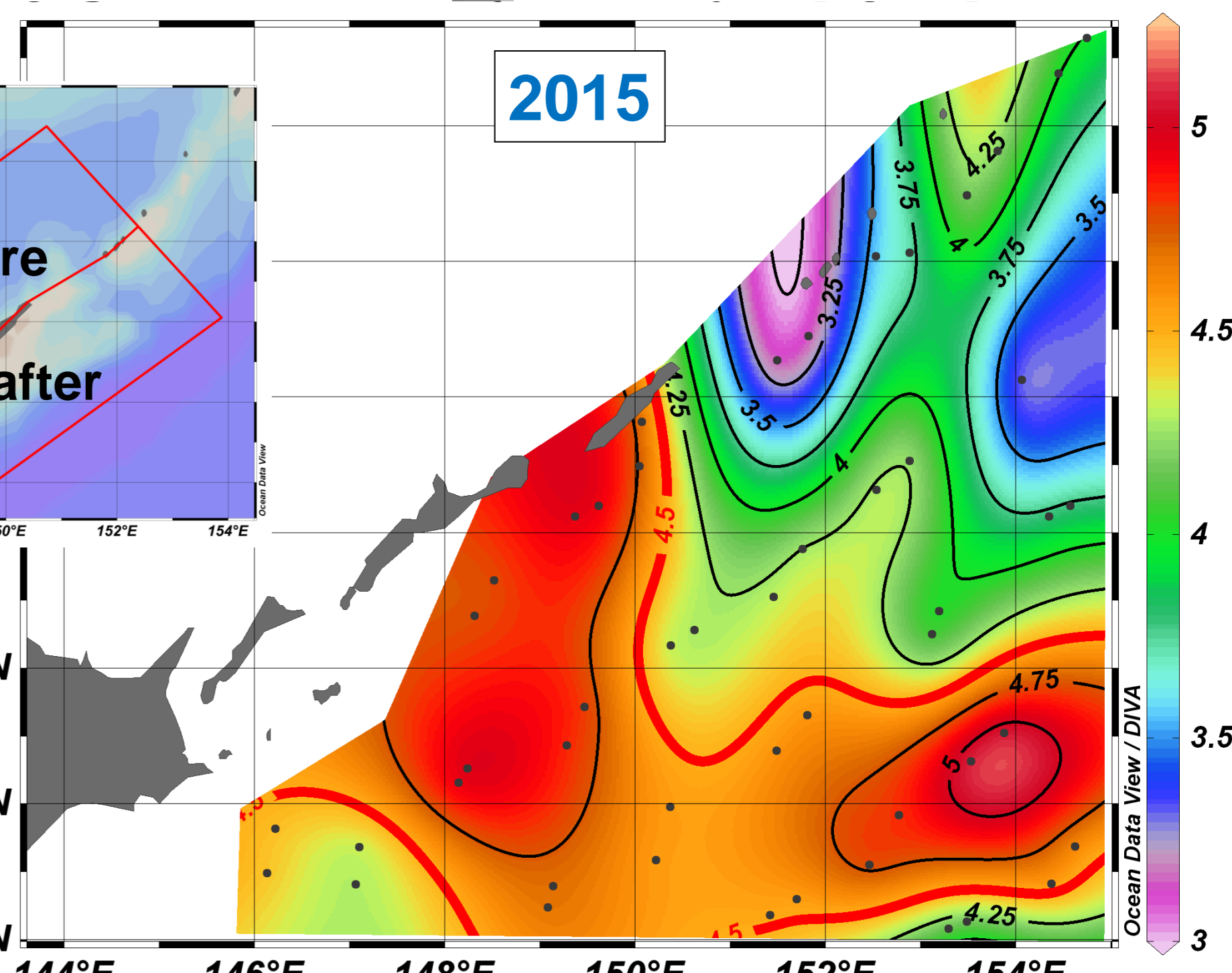
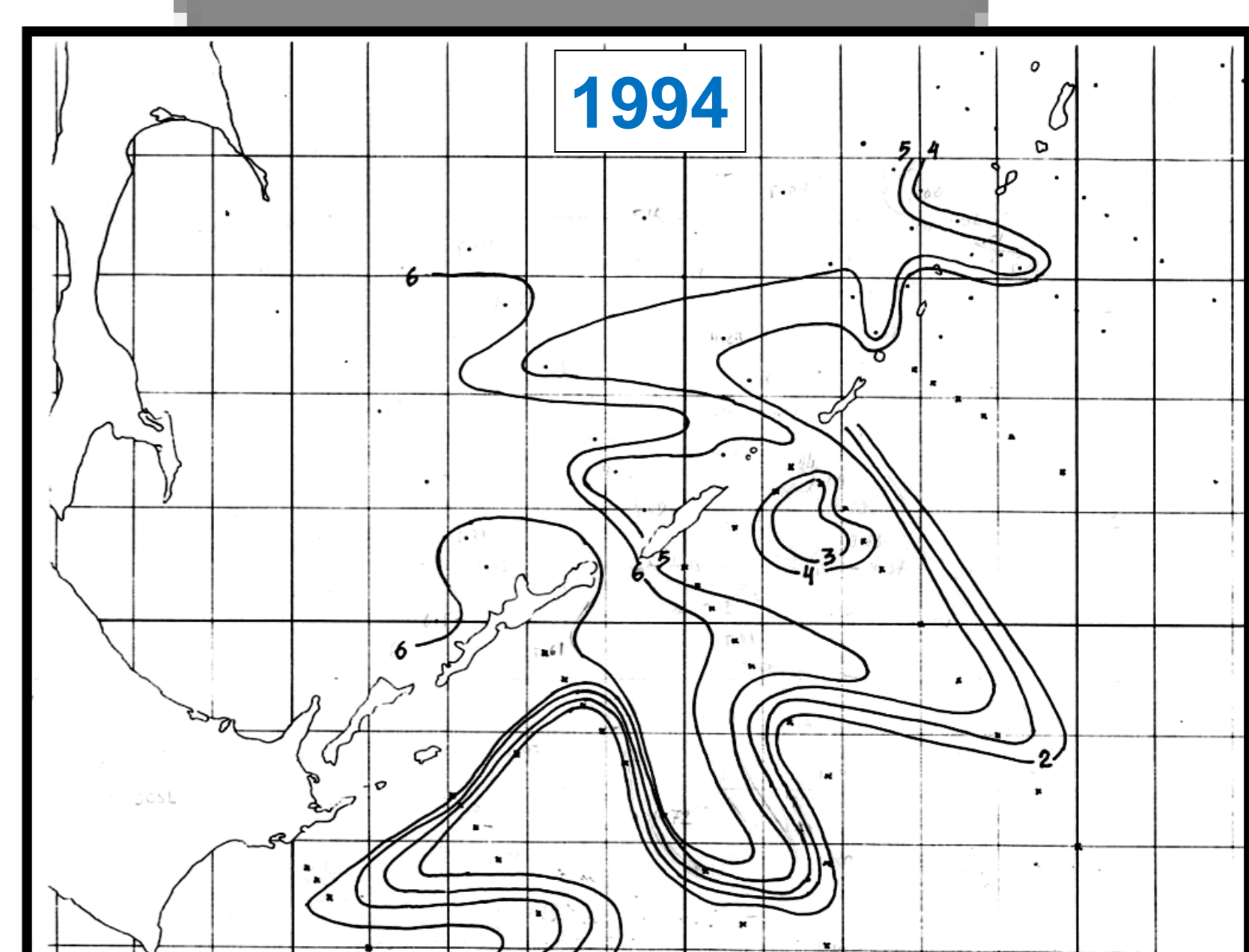
Cascading of the cold, high-density Bottom Shelf Water along the continental slope in the northern Okhotsk Sea (RV TINRO, spring 2001)



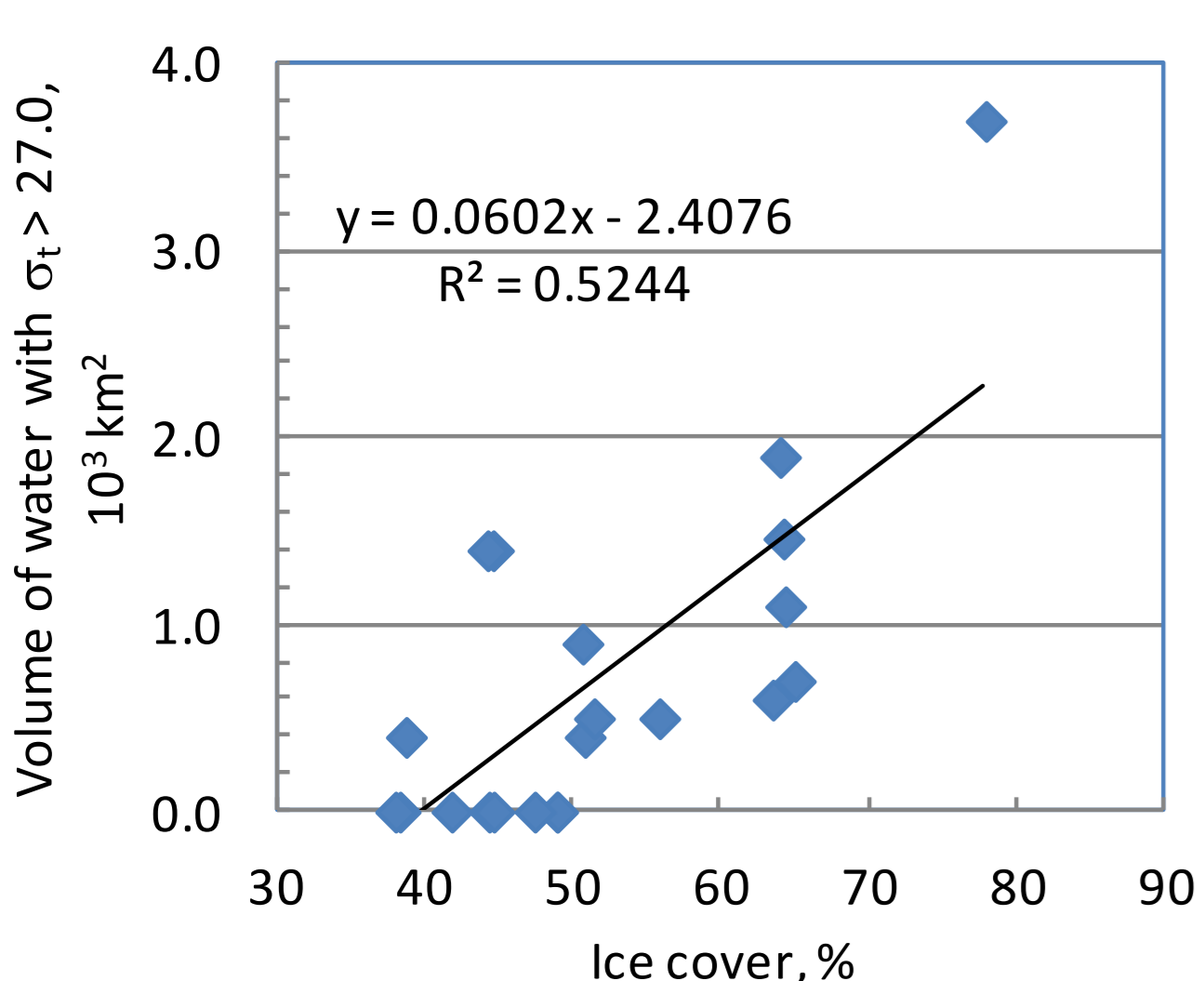
Variations of salinity in the core of the intermediate cold layer at the Vries Strait vs volume of the high-density Bottom Shelf Water on the northern Okhotsk Sea shelf with 6 years lag (left) and inclination of the Moon orbit with 1 year lag (right). The ice cover itself is supposedly influenced by tidal variations



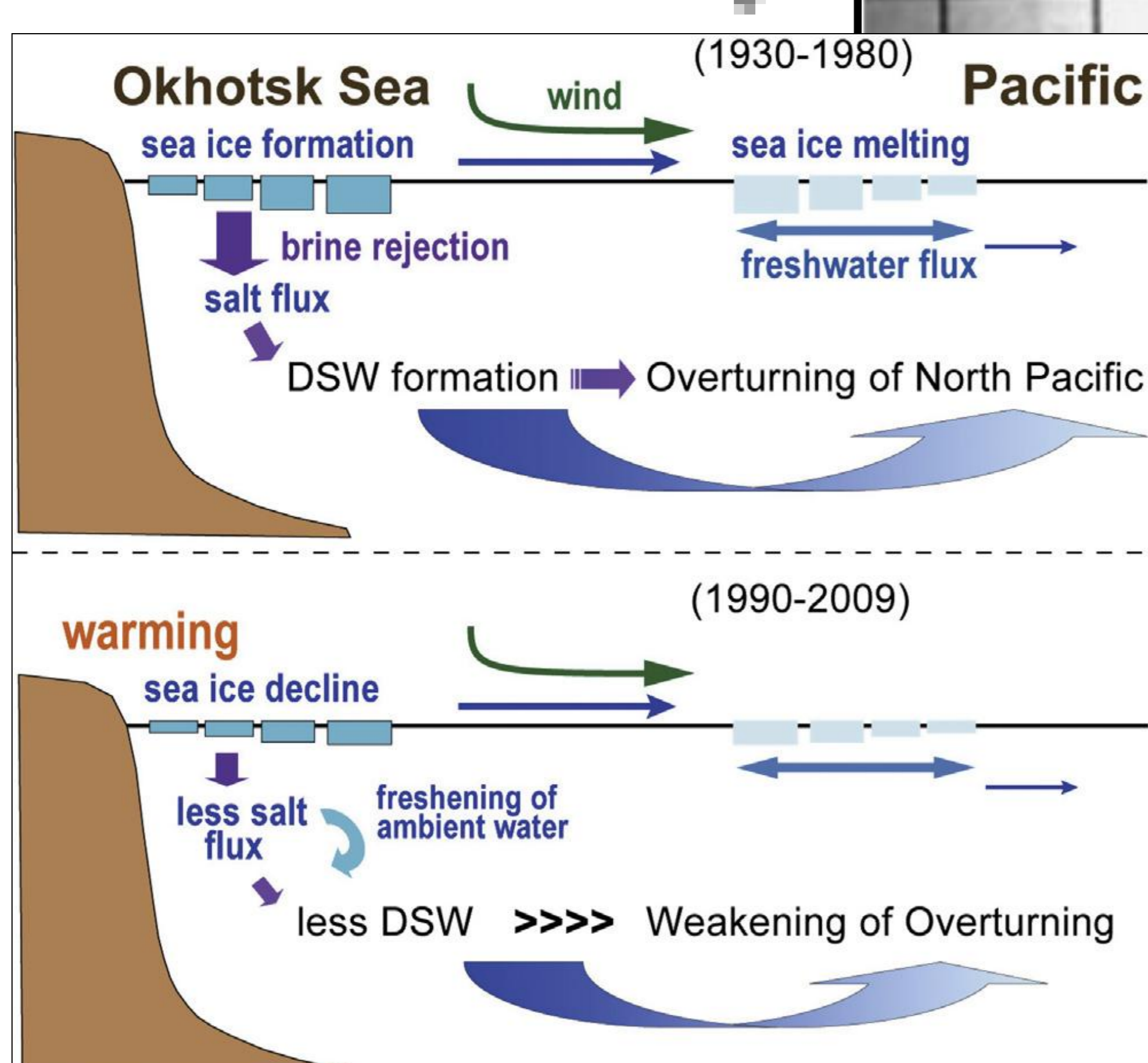
Year-to-year changes of the ice cover in the Okhotsk Sea and dissolved oxygen content at $\sigma_t 26.7$ surface (within the intermediate cold layer) in vicinity of the Vries Strait. Trends of the ice cover and DO coincide but decadal fluctuations of the ice cover aren't reflected in the changes of DO because of opposite influence of tides. Right – the areas of DO averaging



Dissolved oxygen content in the core of the intermediate cold layer (RV Hokko-maru, summer 1994) and at the $\sigma_t 26.7$ surface (RV Professor Kaganovsky, summer 2015). The high-oxygen water flows through the Vries Strait



The Okhotsk Sea ice cover vs volume of the Bottom Shelf Water on the northern Okhotsk Sea shelf. The more the ice, the more high-density water is produced



Hypothesis on the NPIW ventilation by the high-density water formed by freezing in the northern Okhotsk Sea (Oshima et al., 2014)



Minimum temperature in the intermediate cold layer (300-500 m) and streams of the cold intermediate water originated in the northern Okhotsk Sea from the Bottom Shelf Water (RV Hokko-maru, summer 1994)

Conclusions:

- 1) High-density water is formed in the northern Okhotsk Sea by freezing and flows into the Pacific in the intermediate layer, mostly through the Vries Strait
- 2) Volume of the high-density water depends on freezing activity (ice cover) but its properties depend also on tidal mixing (Moon orbit inclination)
- 3) Tendencies to decreasing of the volume of high-density water and softening of its extreme properties are observed recently: it becomes less saline and less oxygenized, that causes worse ventilation of the NPIW