

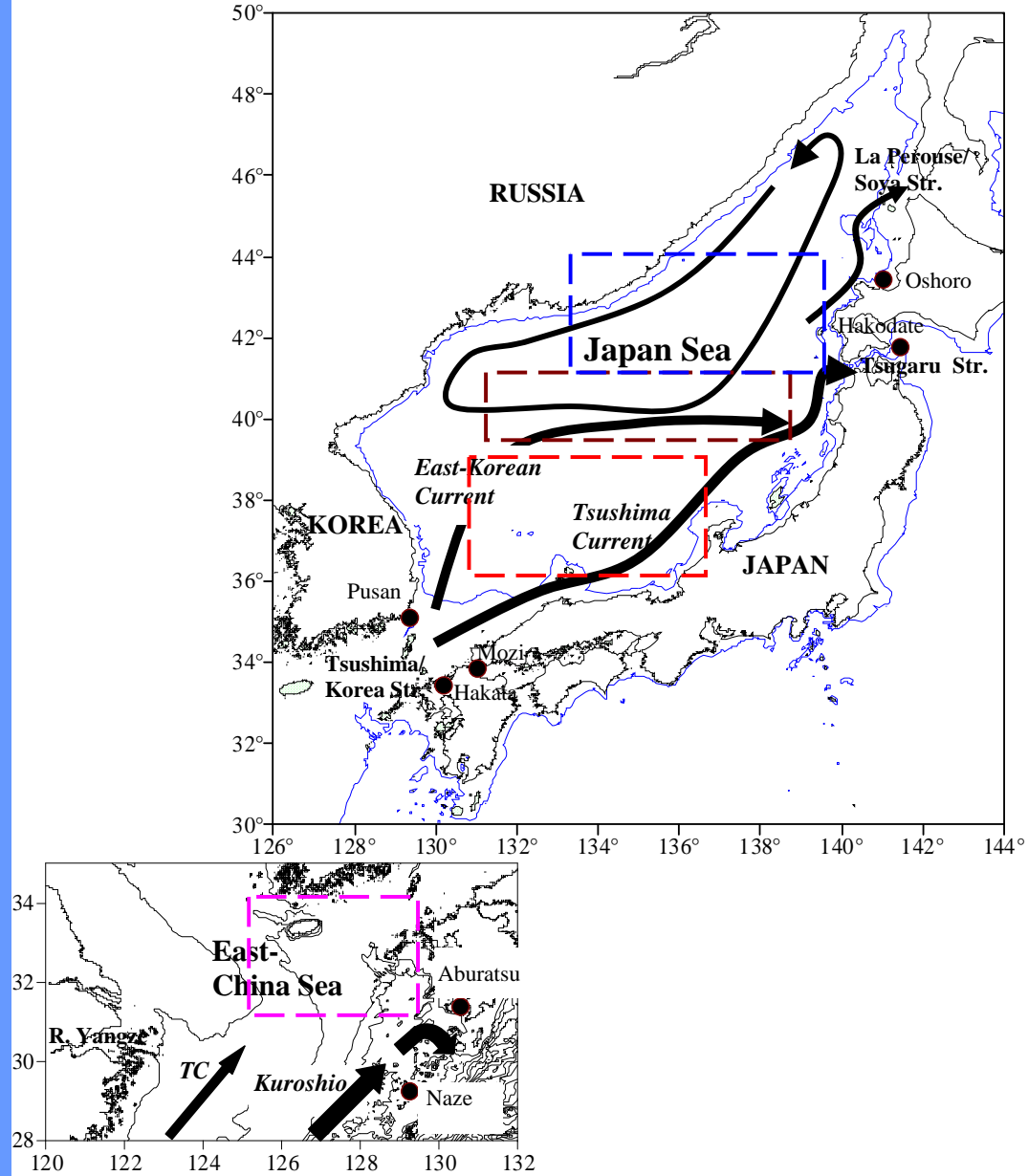
# Interannual variations of the water transport through the Tsushima Strait and its impact on the chemical parameters and chlorophyll-*a* in the Japan/East Sea

Andrey G. Andreev

Pacific Oceanological Institute, Baltiyskaya, 43, Vladivostok, 690041, Russia.

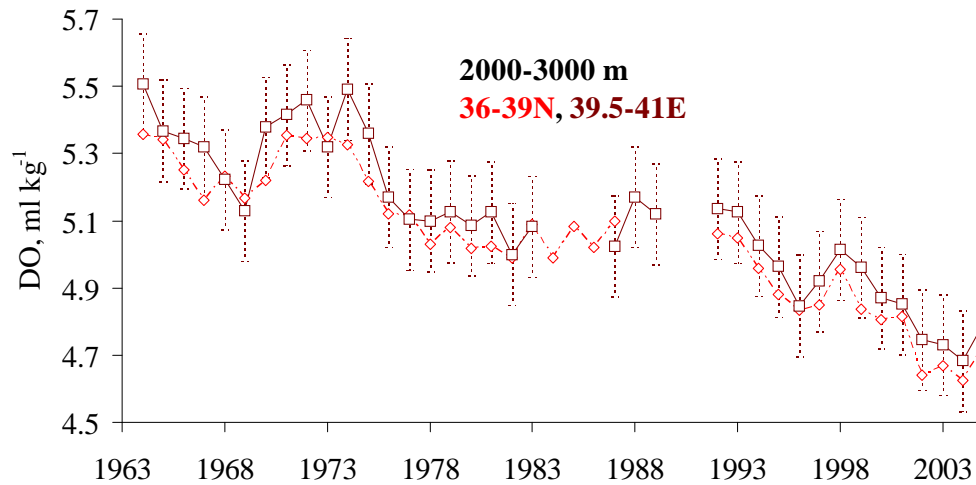
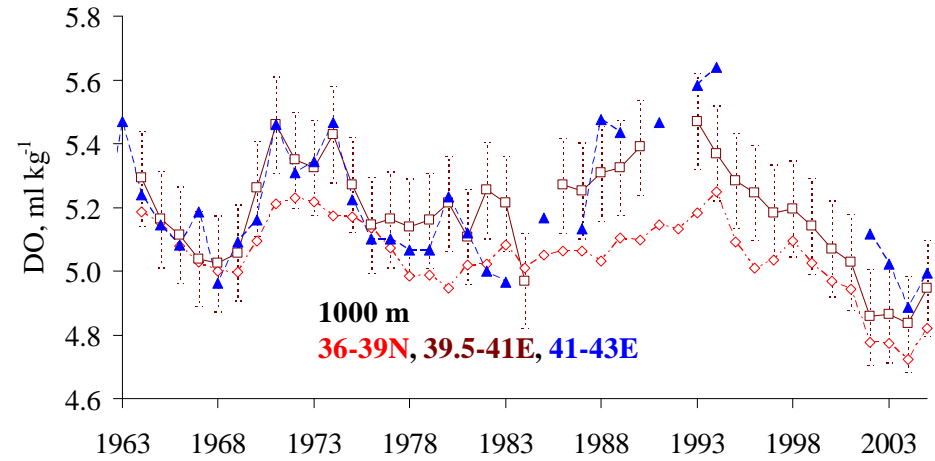
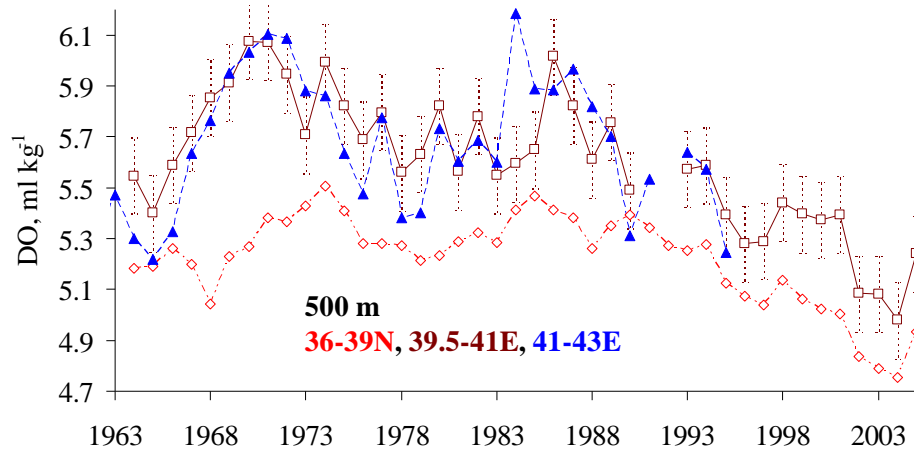
E-mail: andreev@poi.dvo.ru

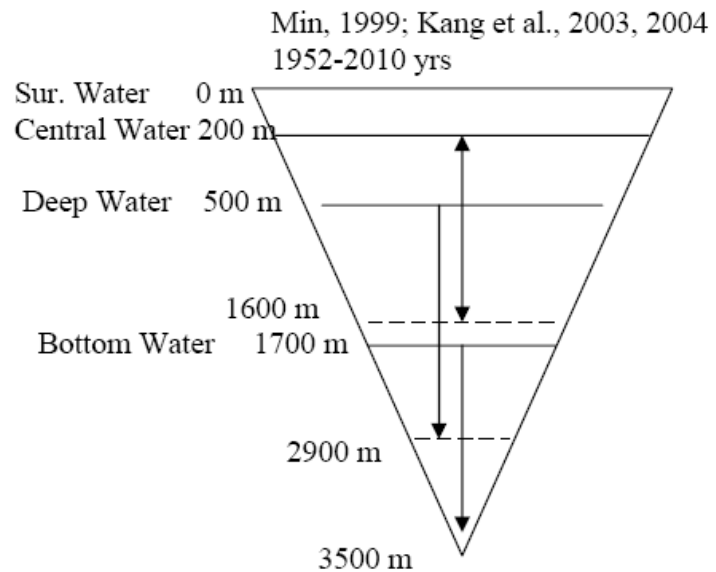
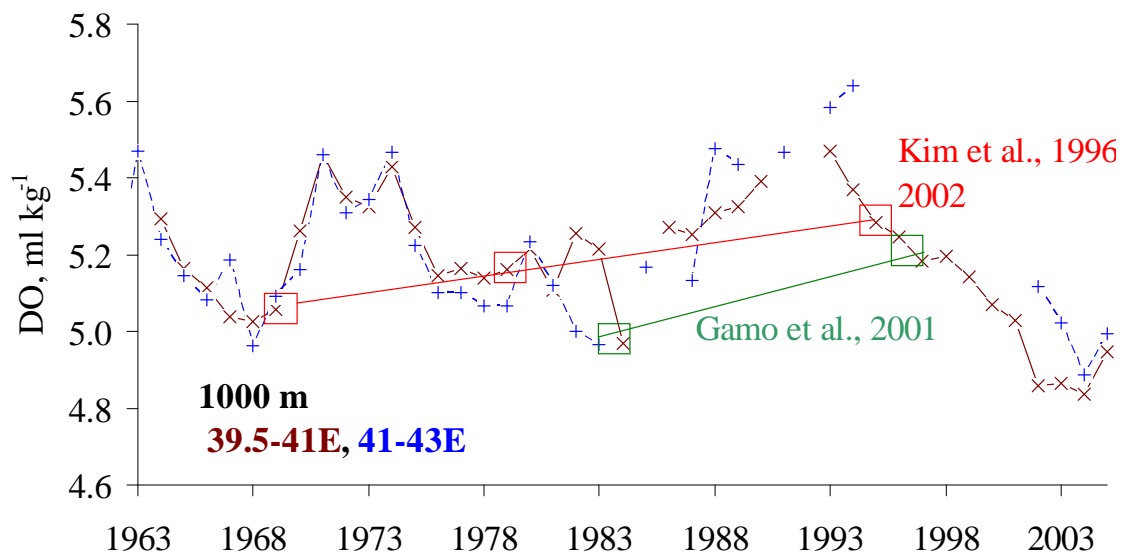
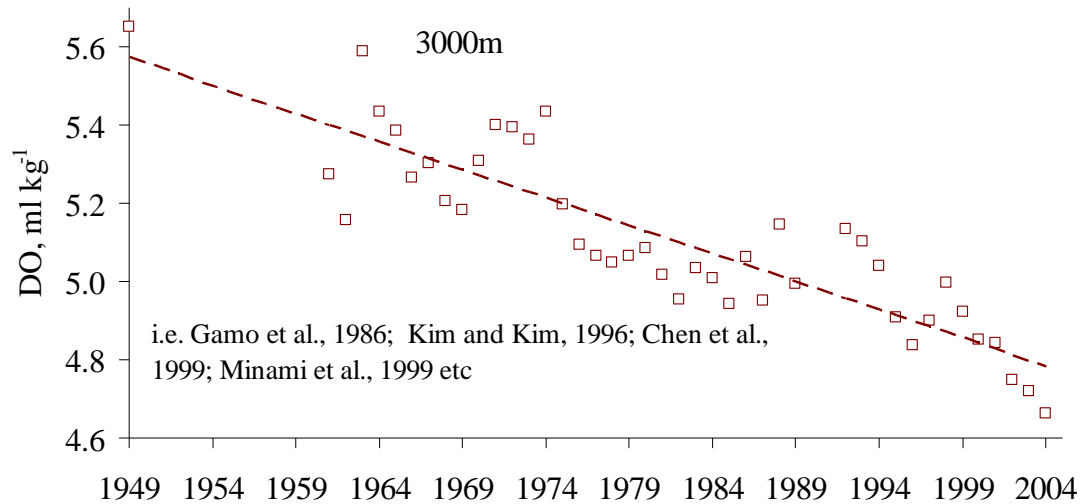
Interannual variations of the sea-level at coastal stations in the Japan/East Sea and water transport rate through the Tsushima/Korea Strait were analyzed. It is shown that interannual changes in the transport rates through the Tsushima/Korea Strait are determined by the Kuroshio (East China Sea) and Oyashio (western subarctic Pacific) transports and the zonal wind stress over Japan/East Sea in winter. Variations of the East China Sea subsurface waters transport through the Tsushima/Korea Strait are responsible for the observed dissolved oxygen interannual changes in the intermediate and deep waters of the Japan/East Sea. The human impact on the Yangtze River waters leads to the increased dissolved inorganic nitrogen/dissolved inorganic phosphorus ratio in the upper (0-300 m) layer of the Japan/East Sea. There is a relationship between the water transport rate through the Tsushima/Korea Strait and the chlorophyll-*a* concentration in the surface waters of the Japan/East Sea in fall.

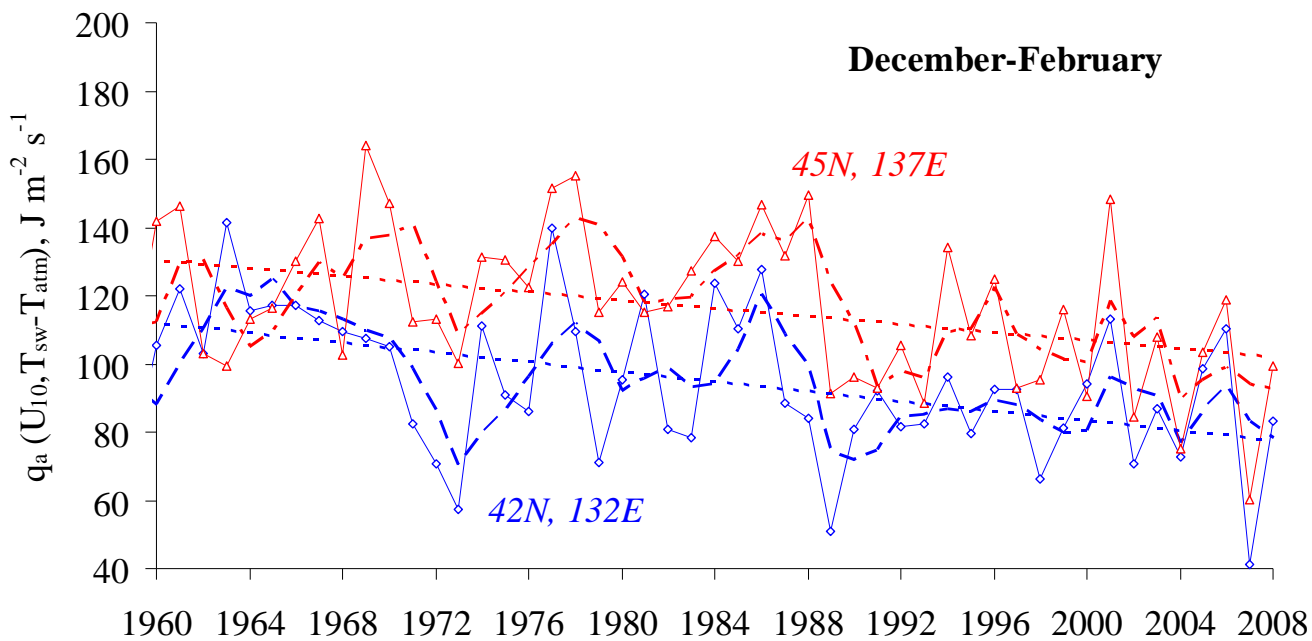
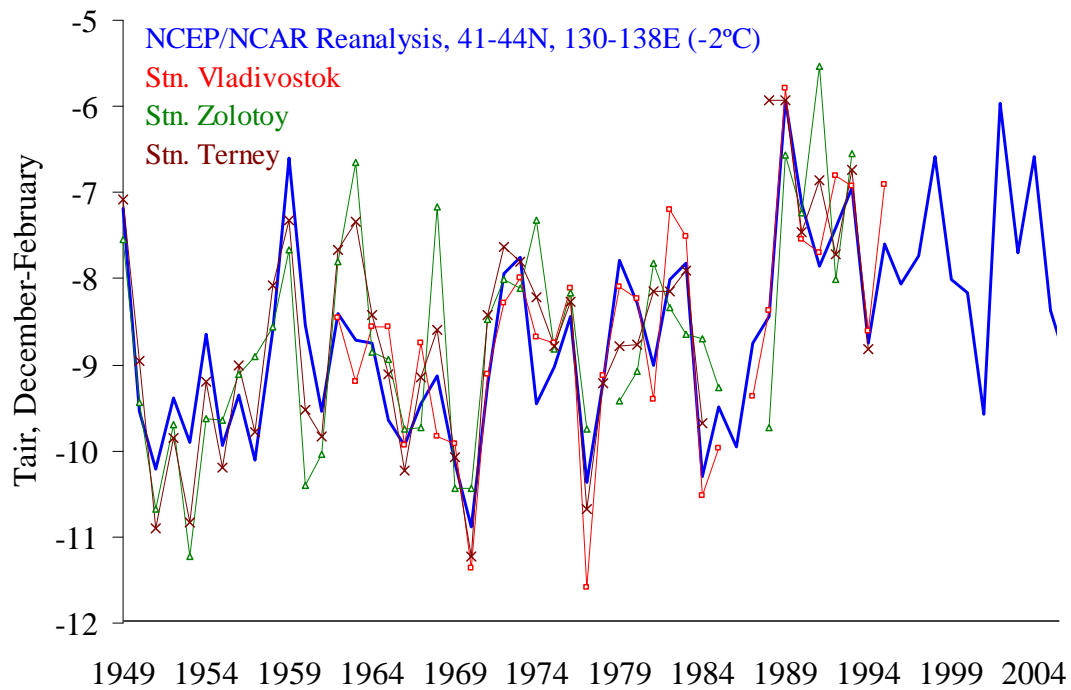


*M. Kawabe. Interannual variations of sea level at the Nansei Islands and volume transport of the Kuroshio due to wind changes// J. of Oceanography, 57, 2001, 189-205;*  
*T. Takikawa, J.-H. Yoon. Volume transport through the Tsushima Straits estimated from sea level difference. J. of Oceanography, 61, 2005, 699-708;*  
*T. Takikawa, J.-H. Yoon, C.-D. Cho. The Tsushima Warm Current through the Tsushima Straits estimated from ferryboat. J. of Phys. Oceanography, 35, 2005, 1154-1168*

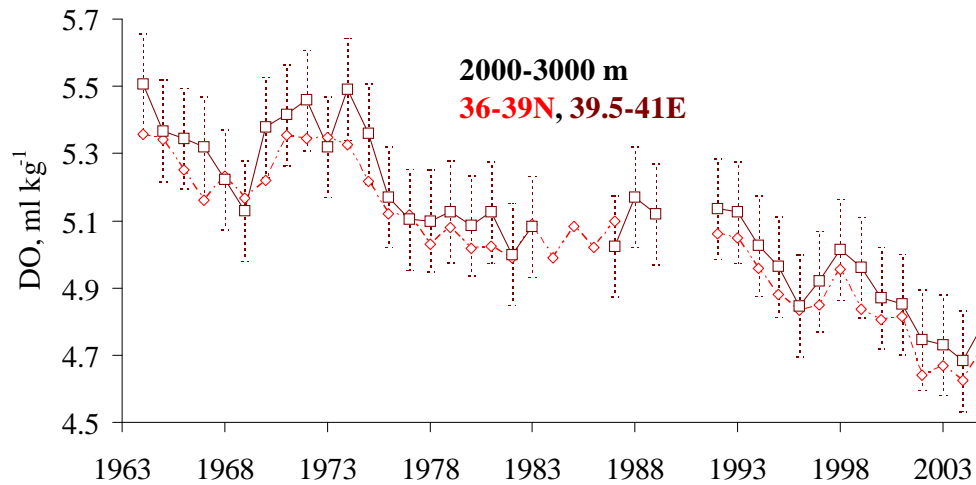
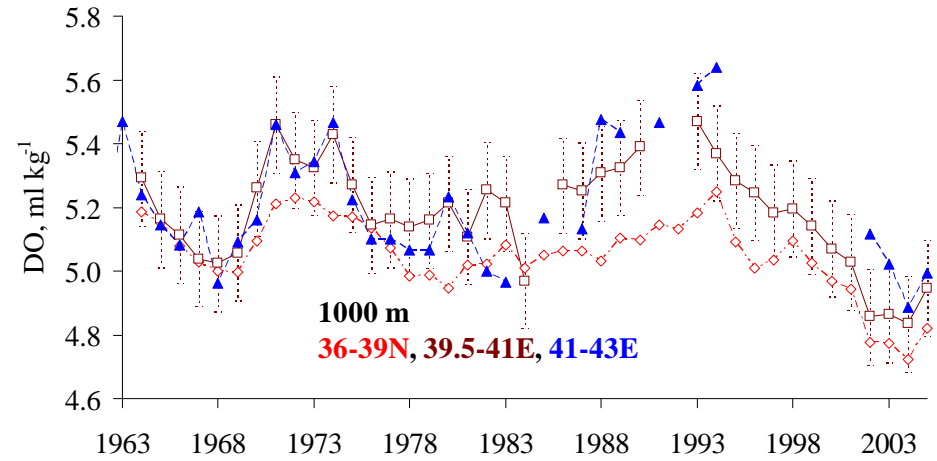
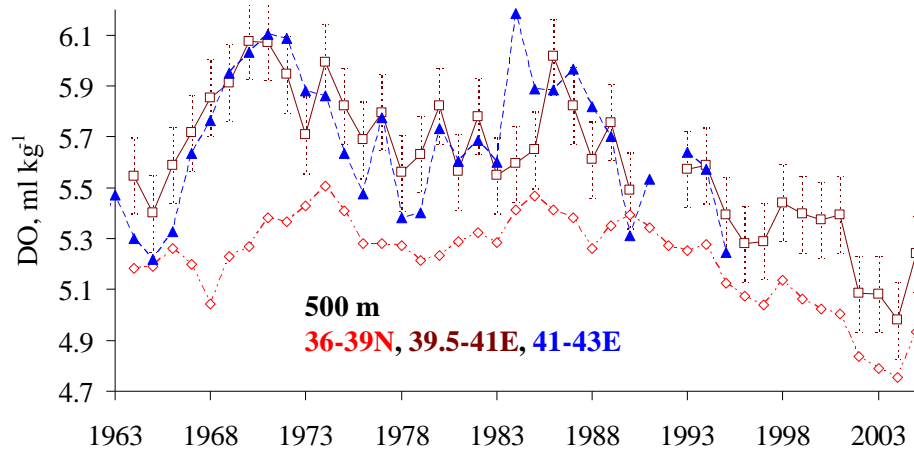
# Japan/East Sea

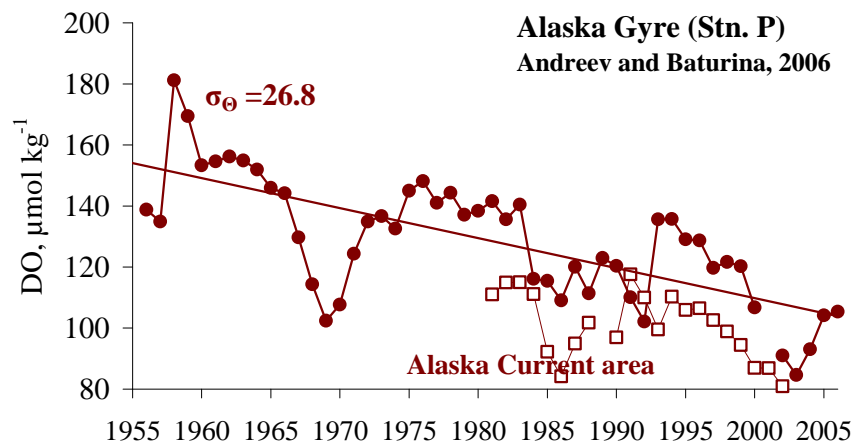
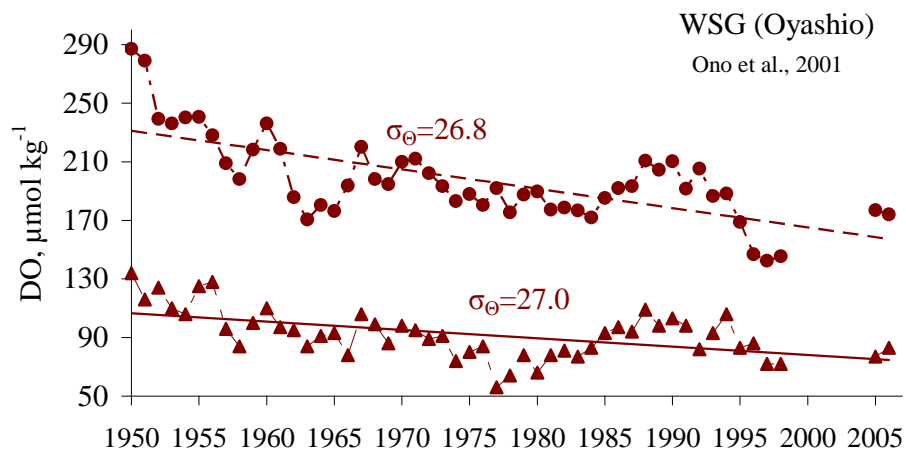
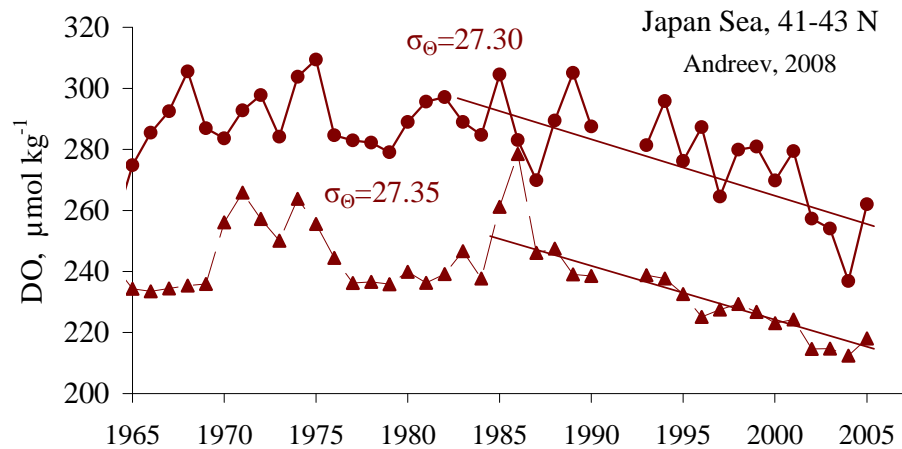
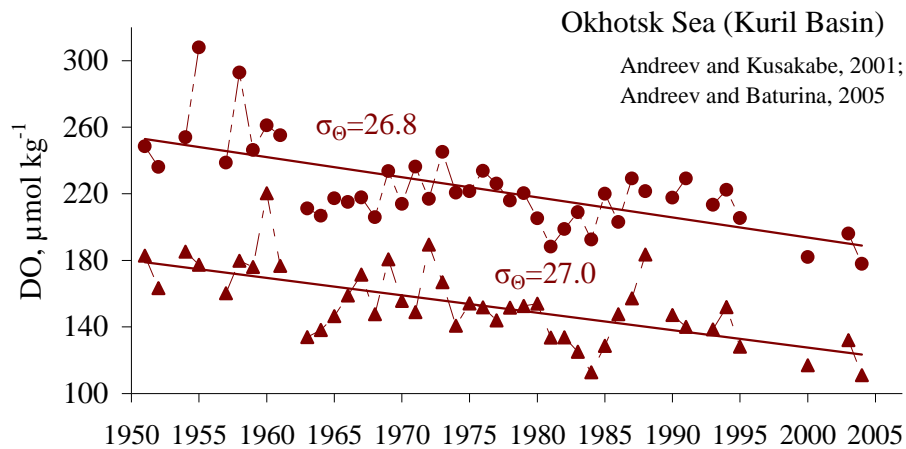




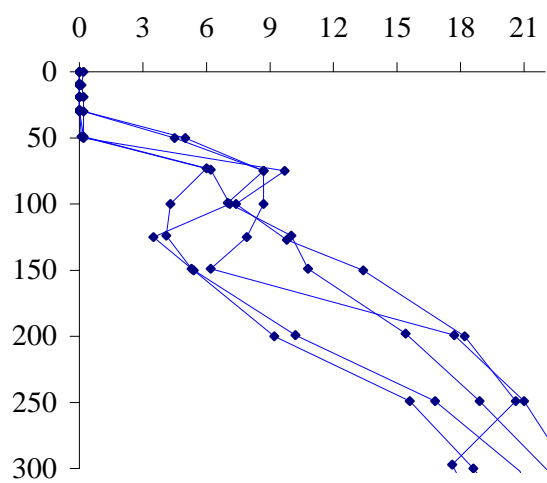
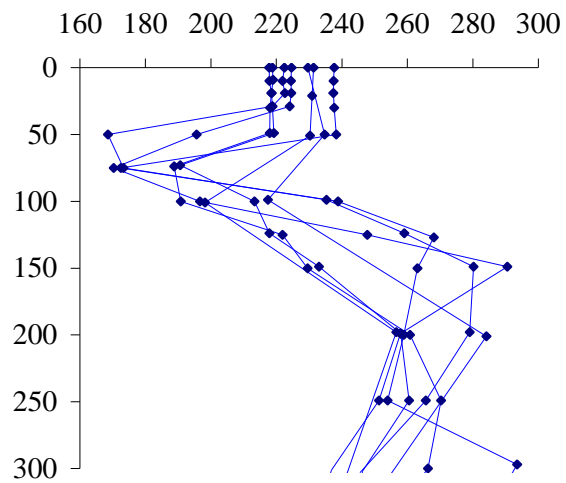
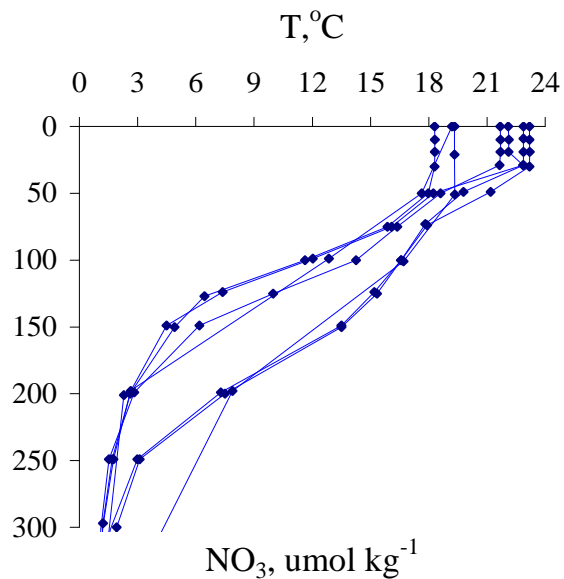
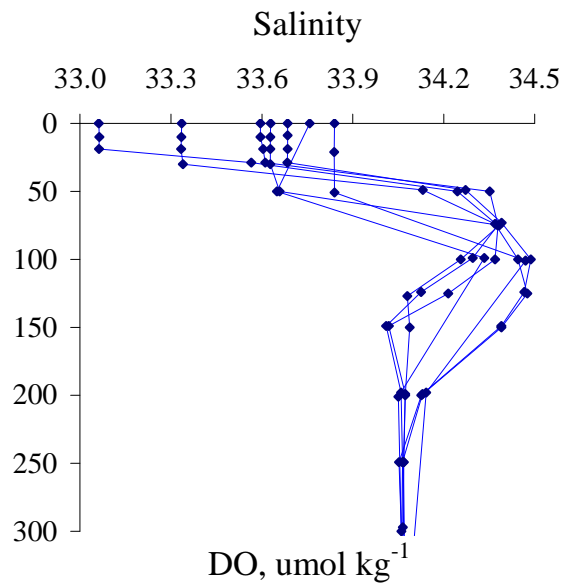


# Japan/East Sea

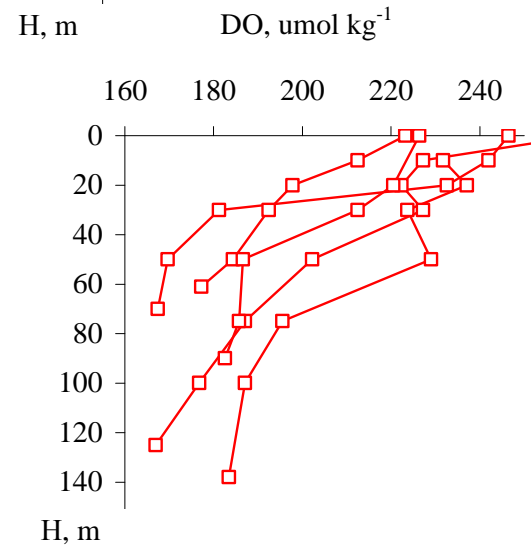
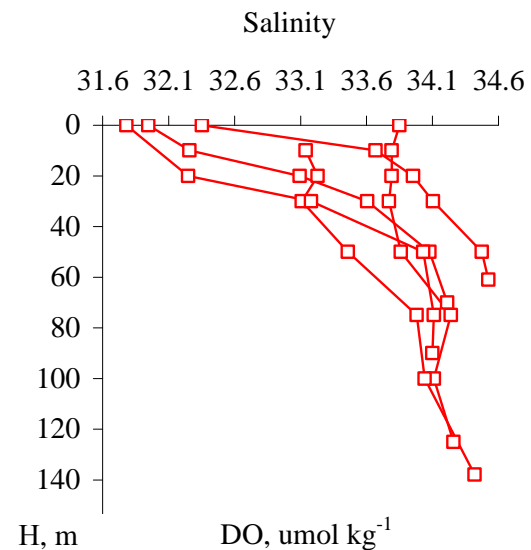


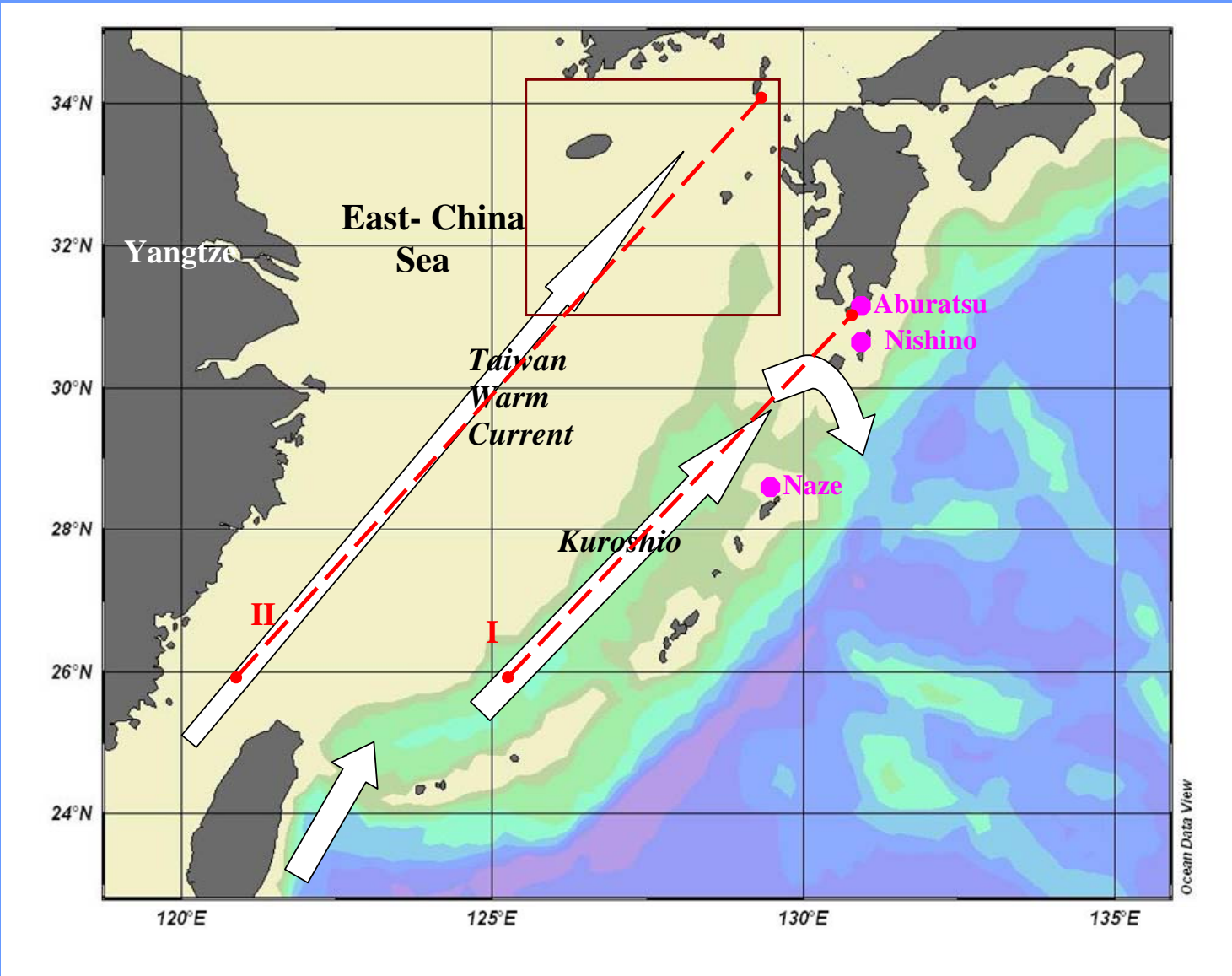


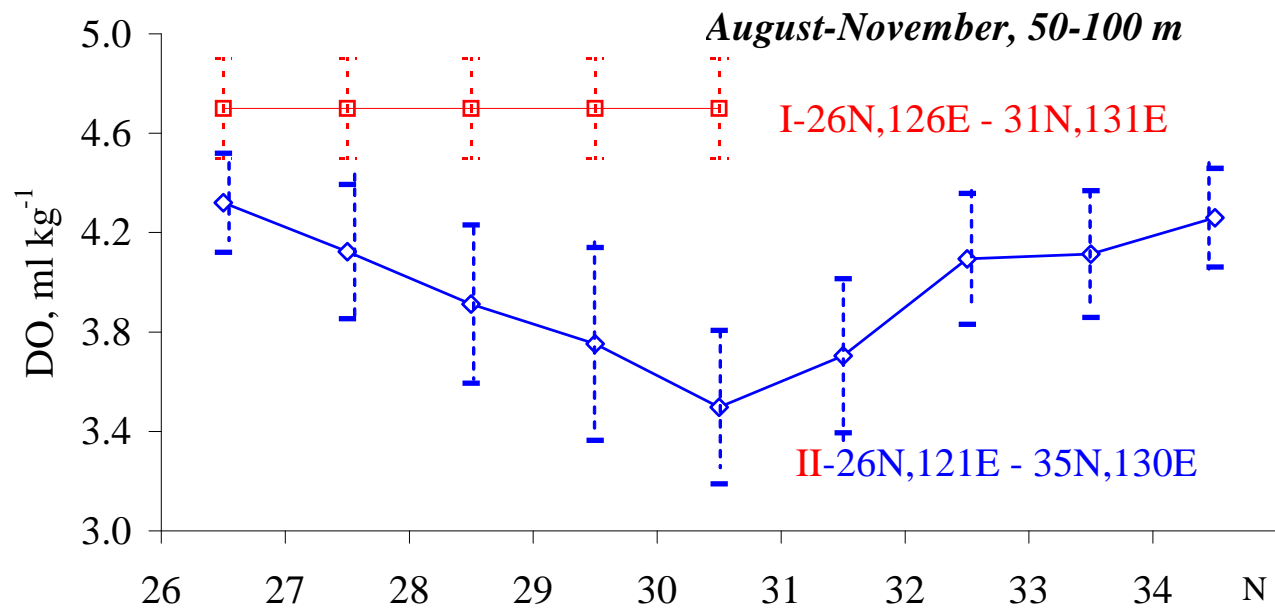
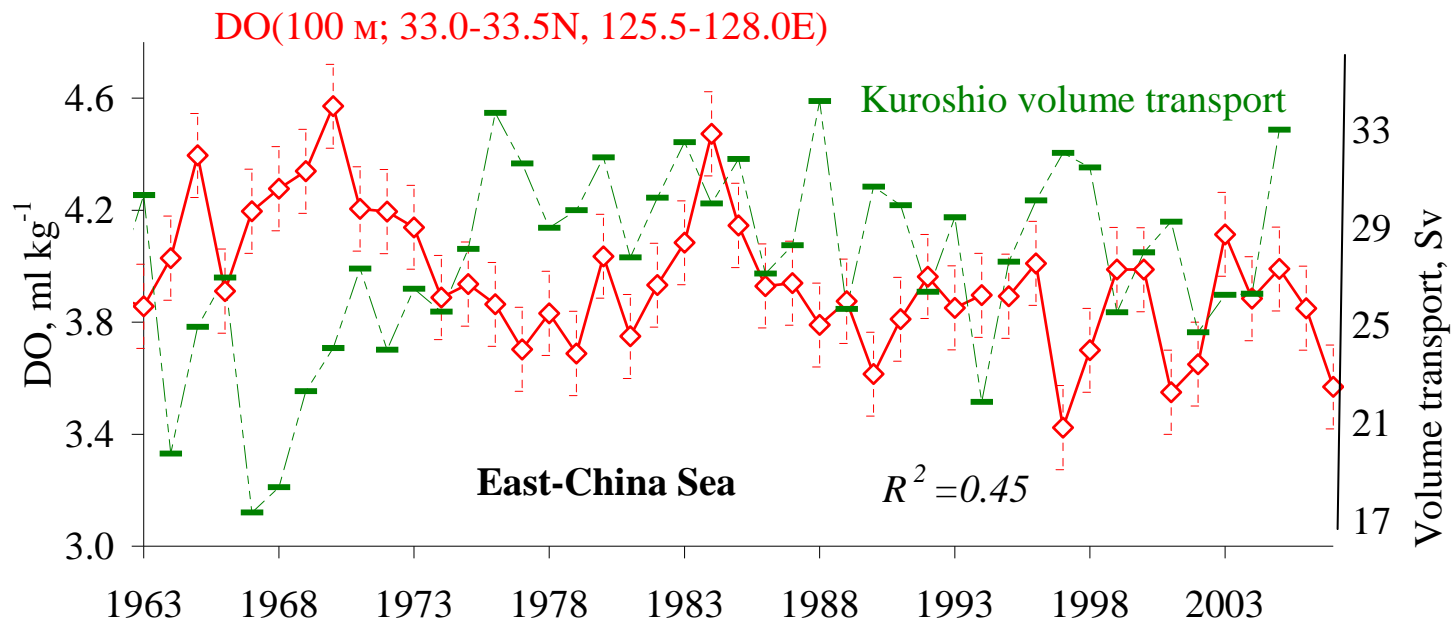
### Japan Sea, 37-41.5°N, 134-137.8°E

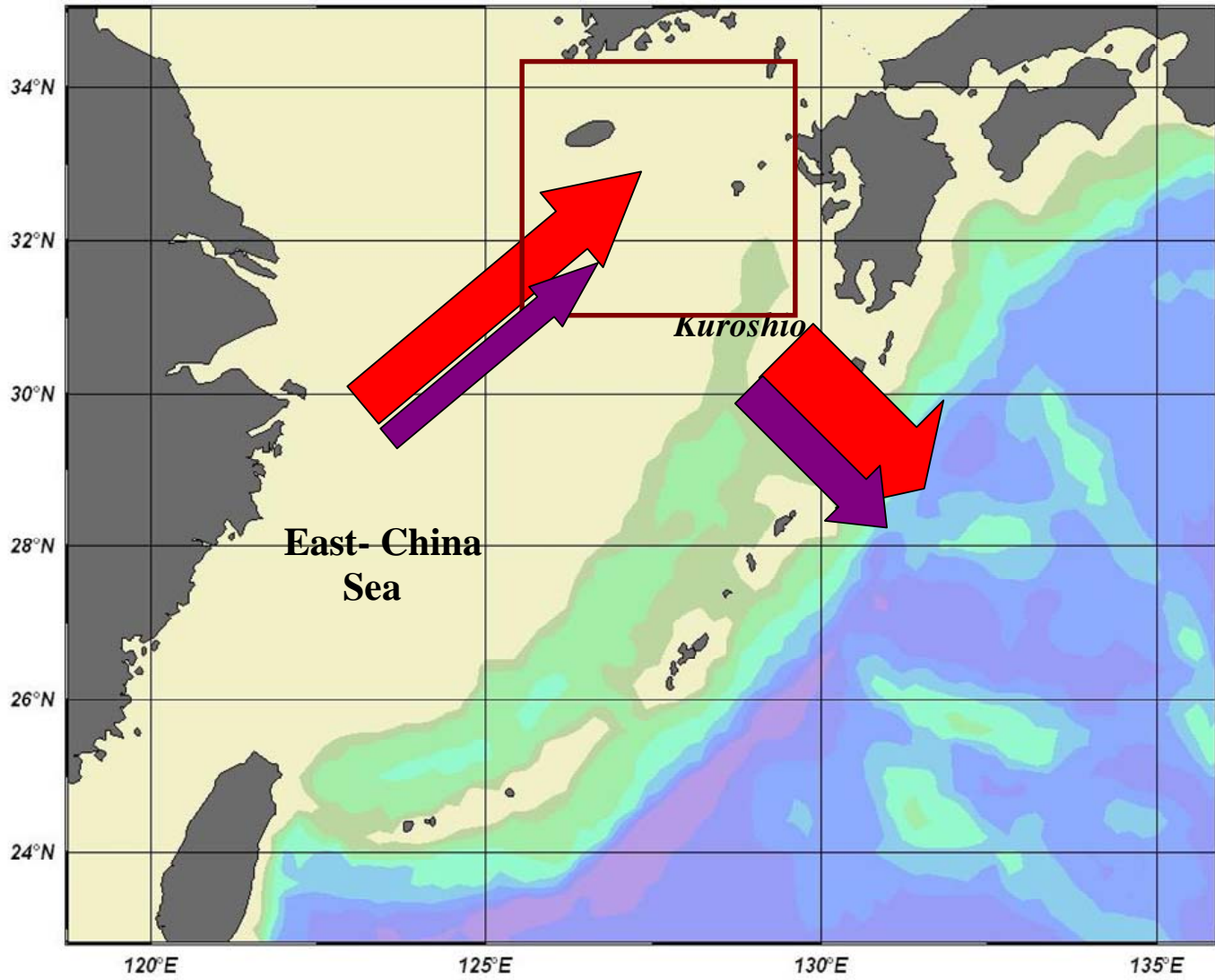


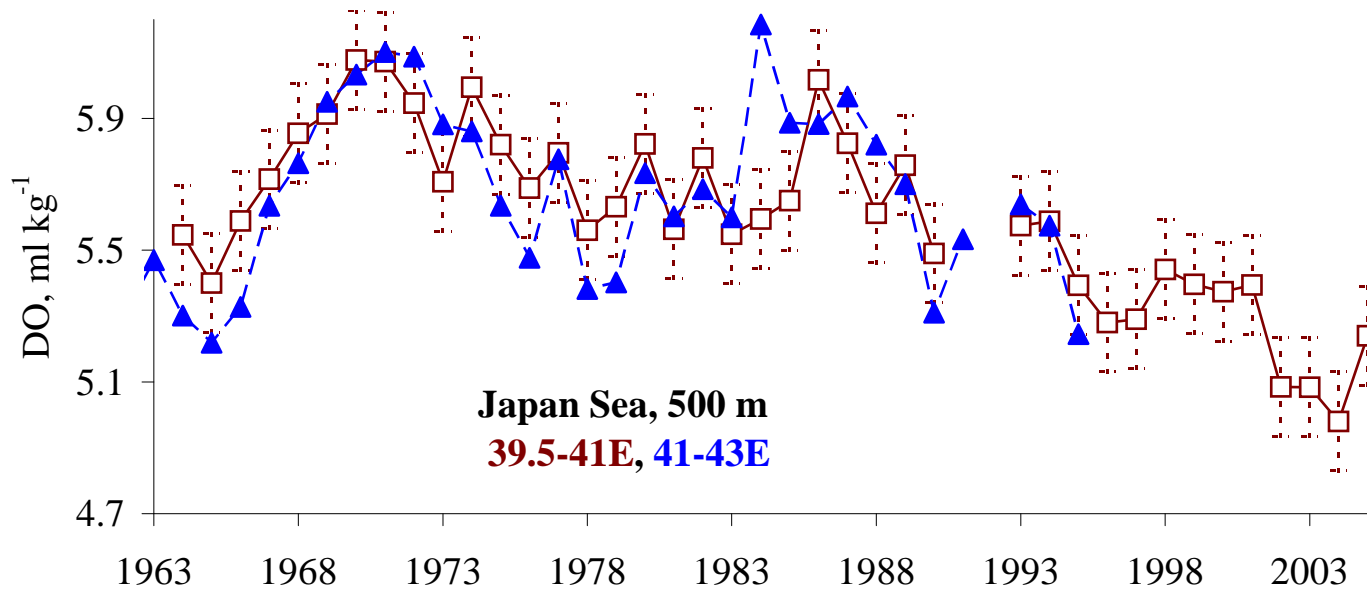
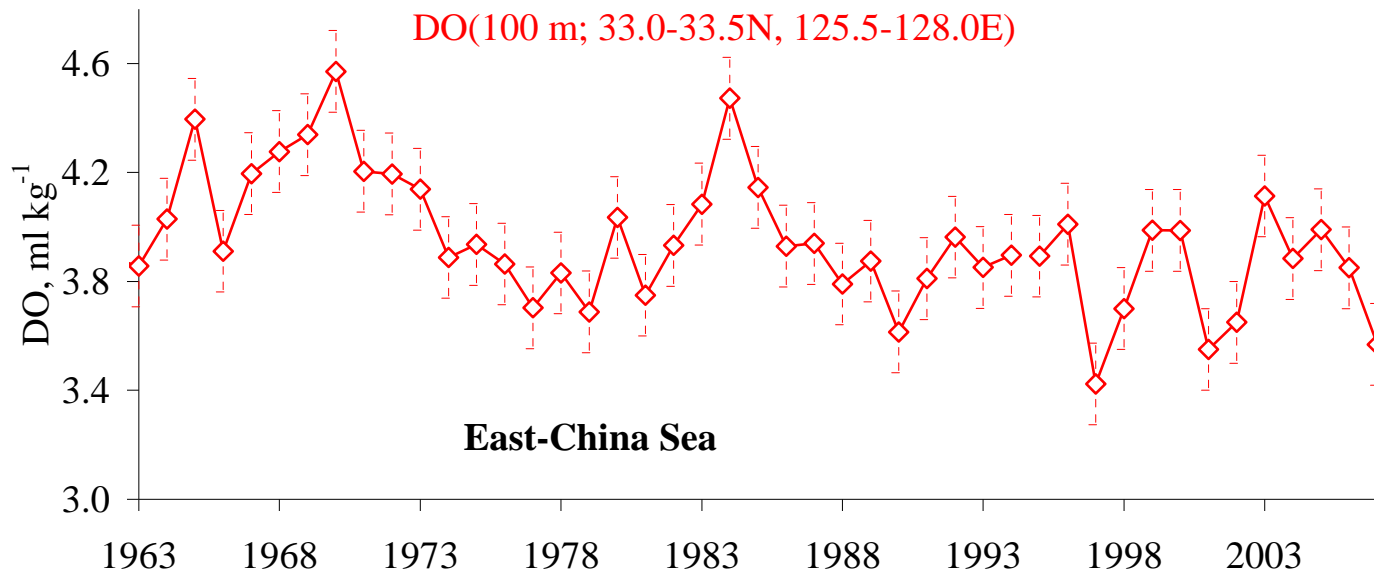
### East-China Sea

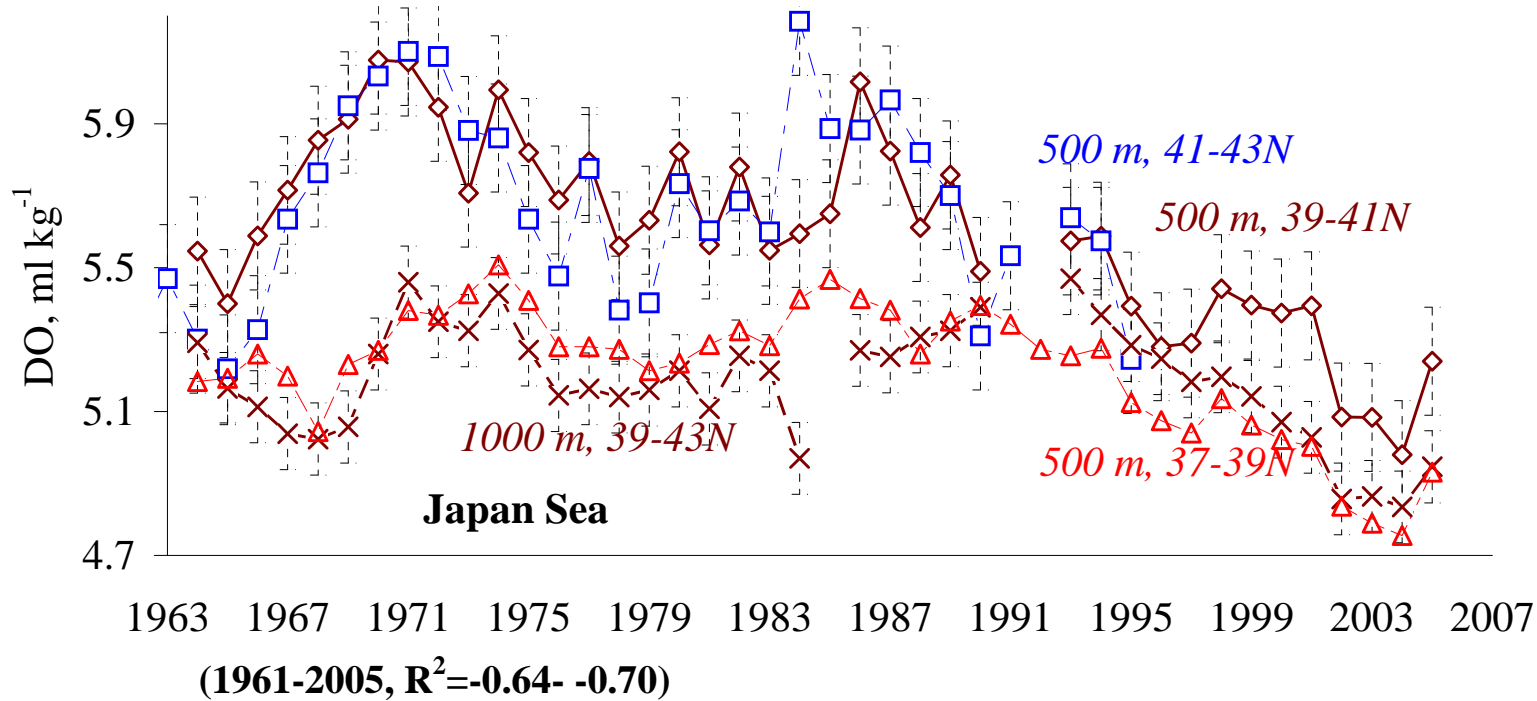
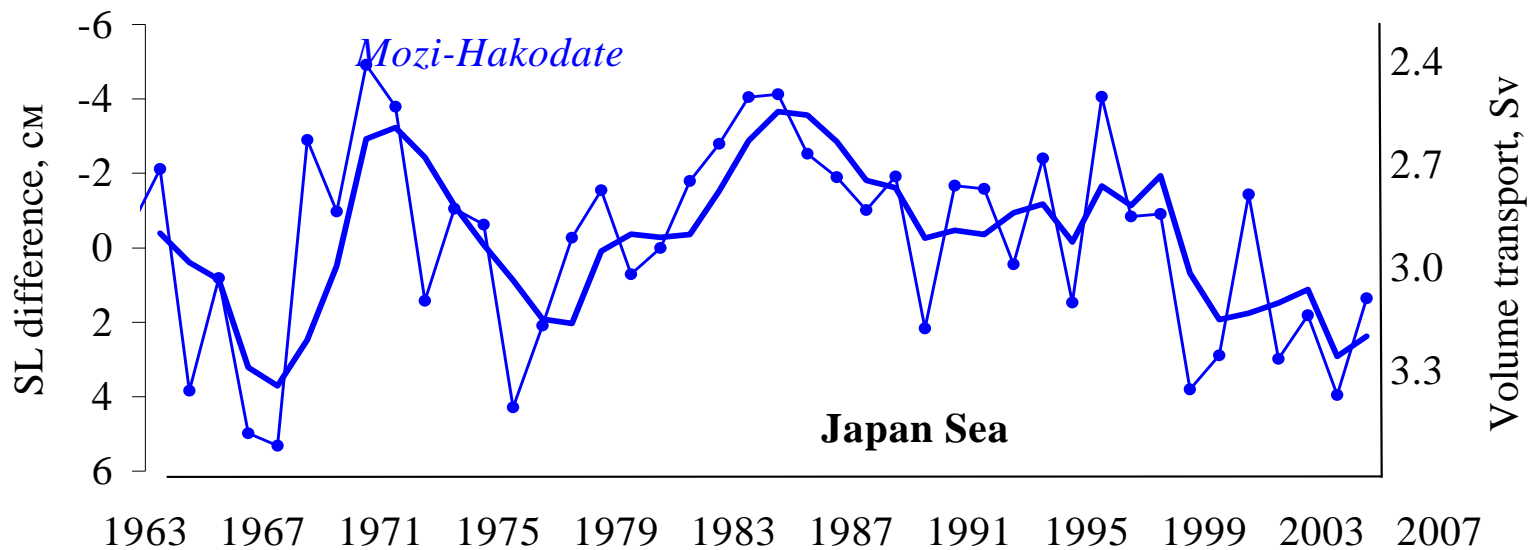




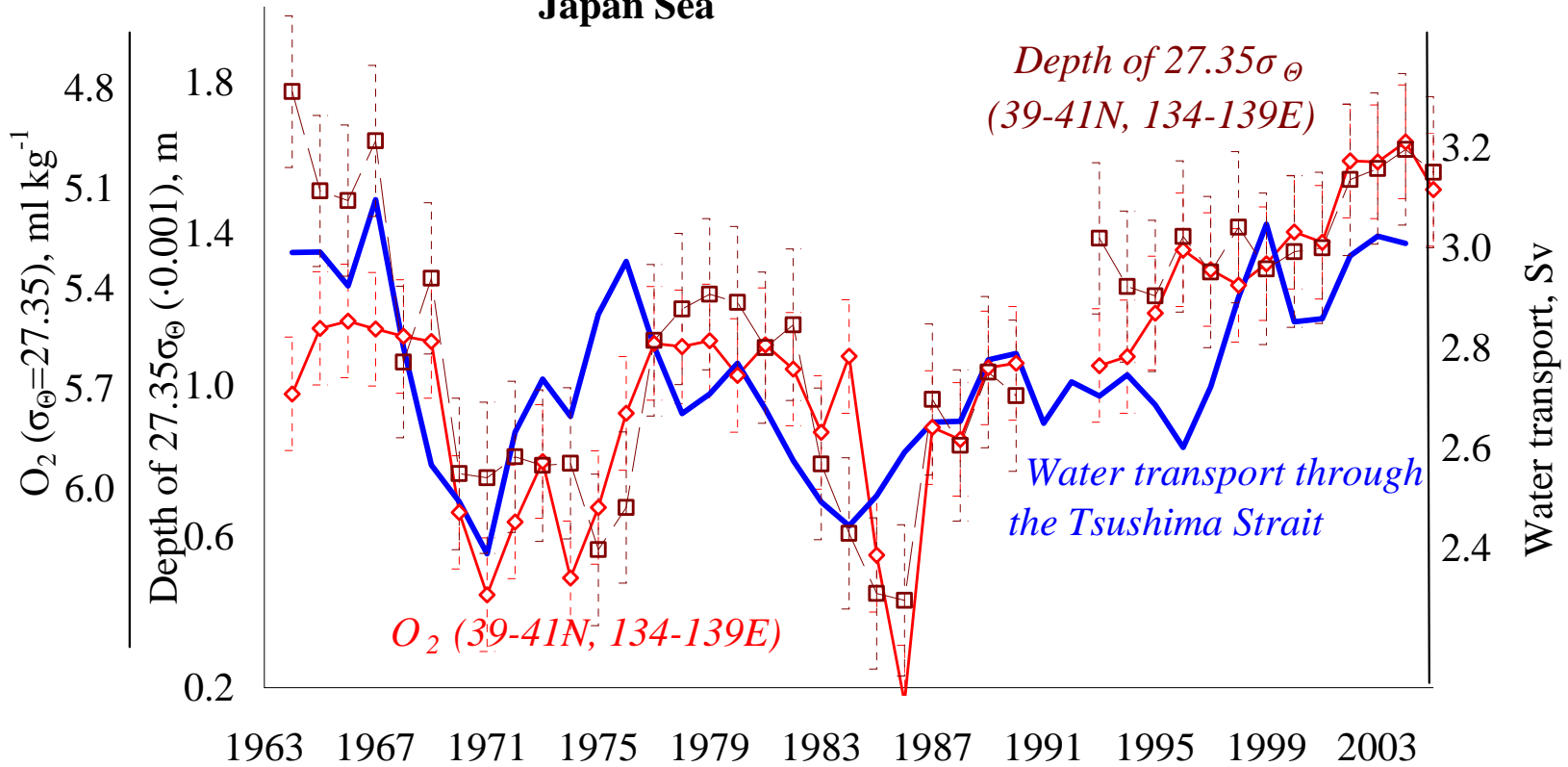




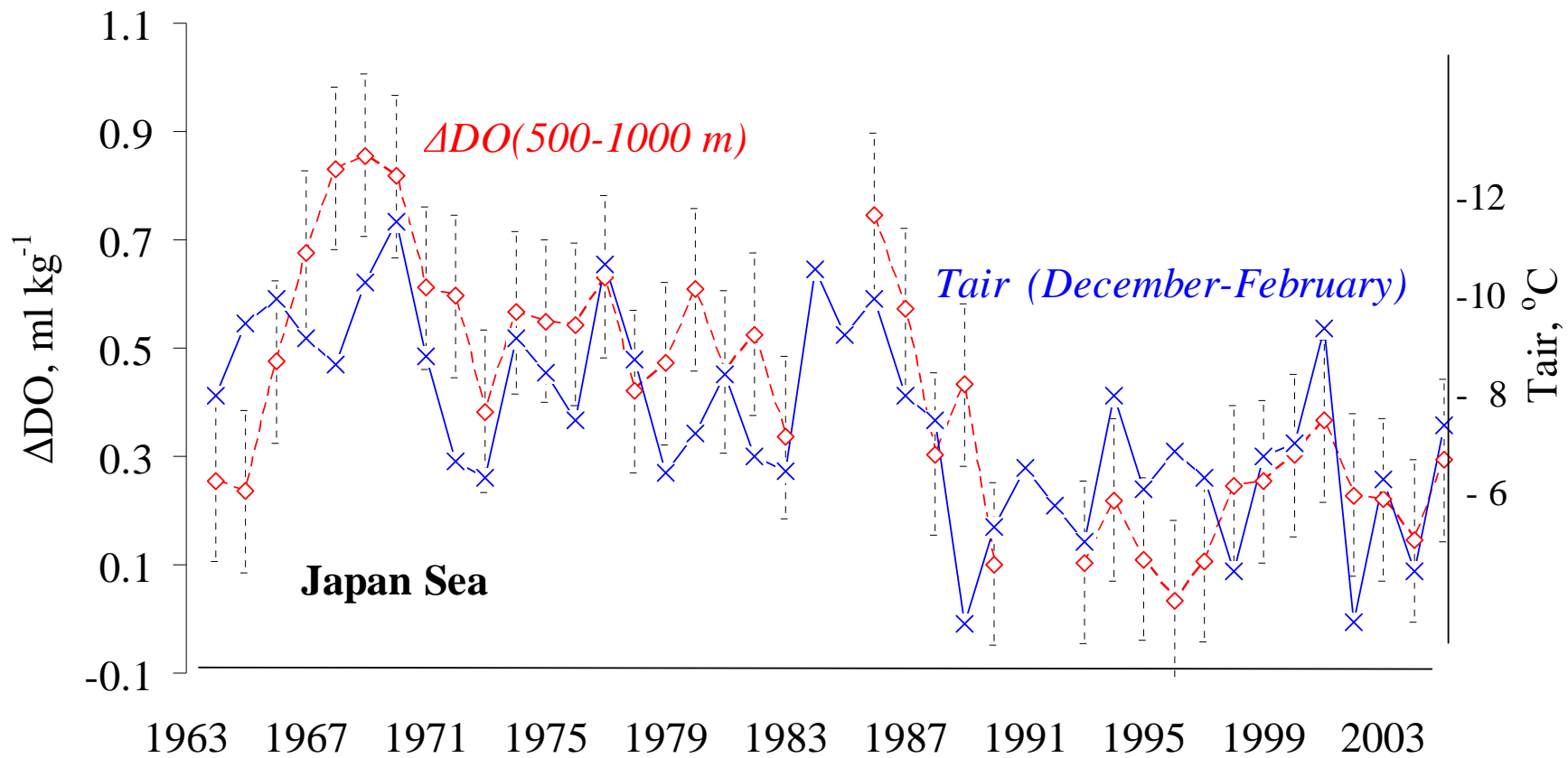


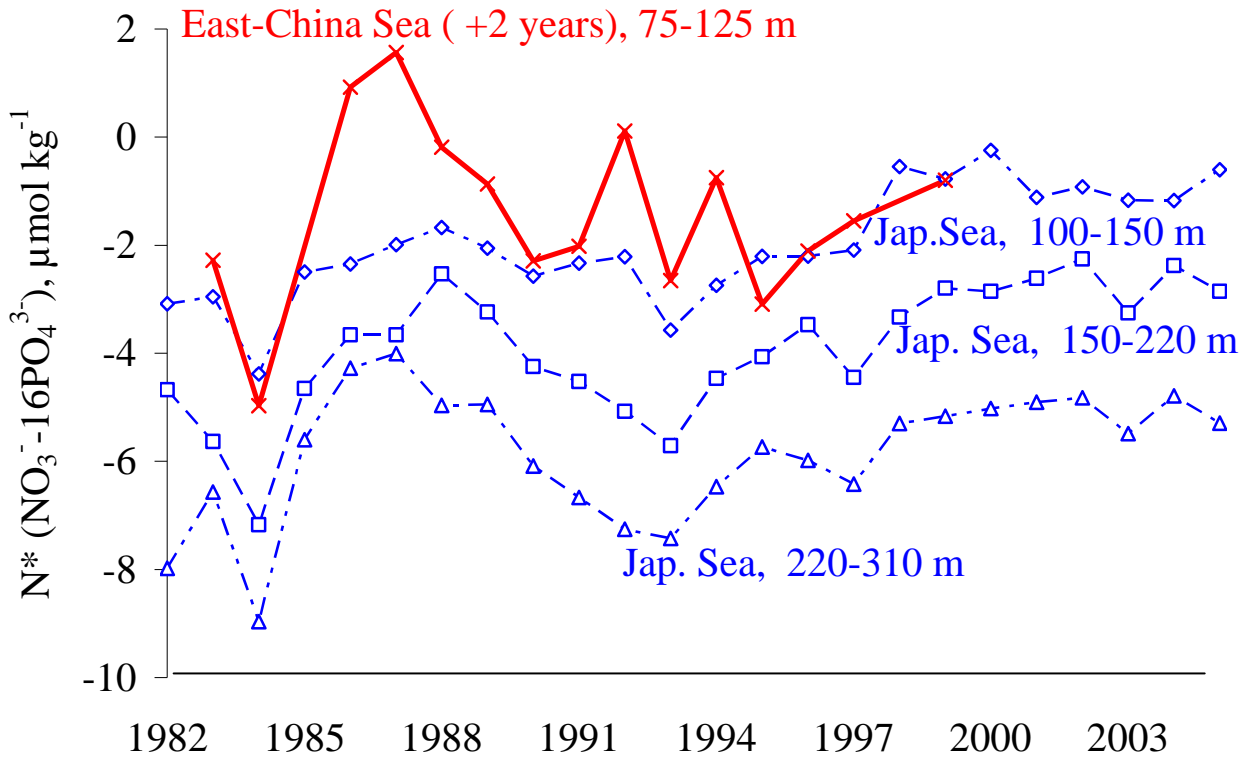


# Japan Sea



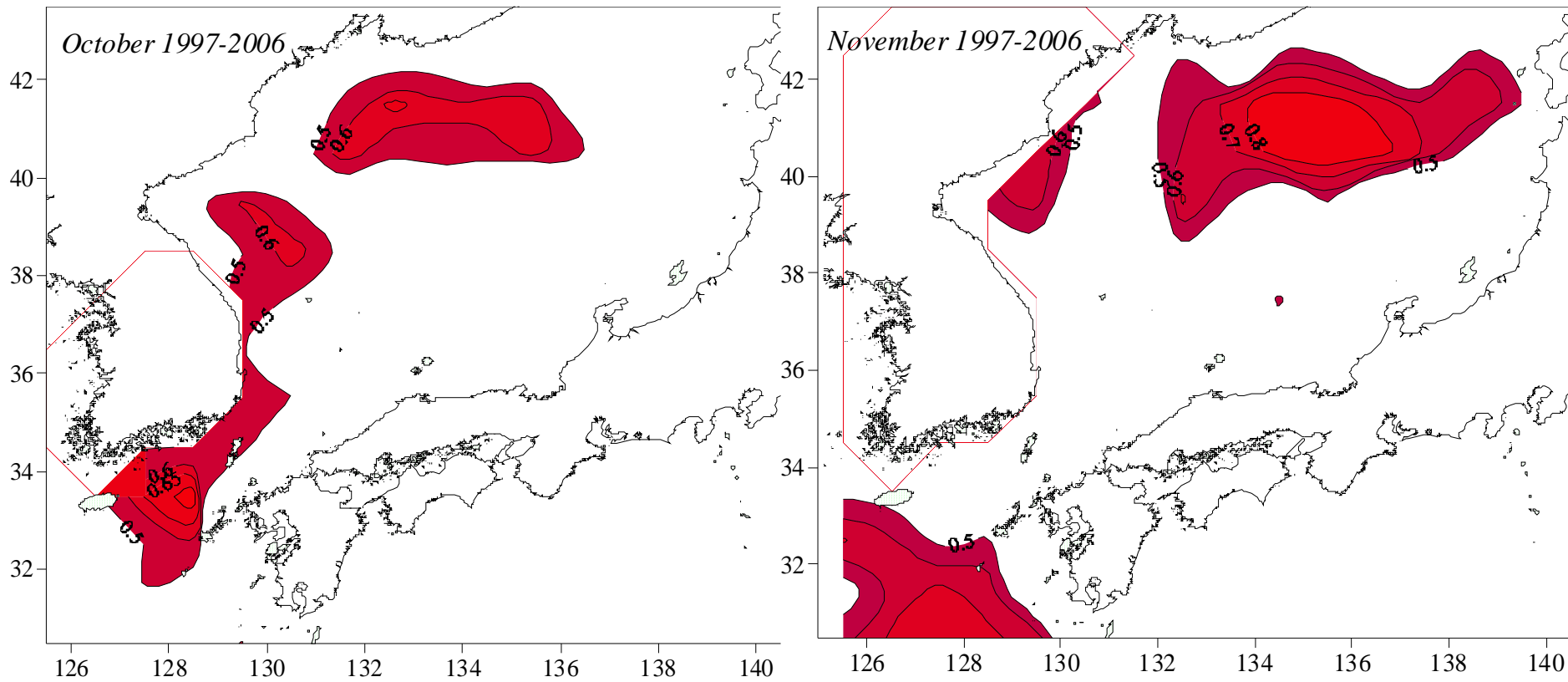
(1964-2005,  $R^2=0.57$ ,  $R^2= -0.63$ )



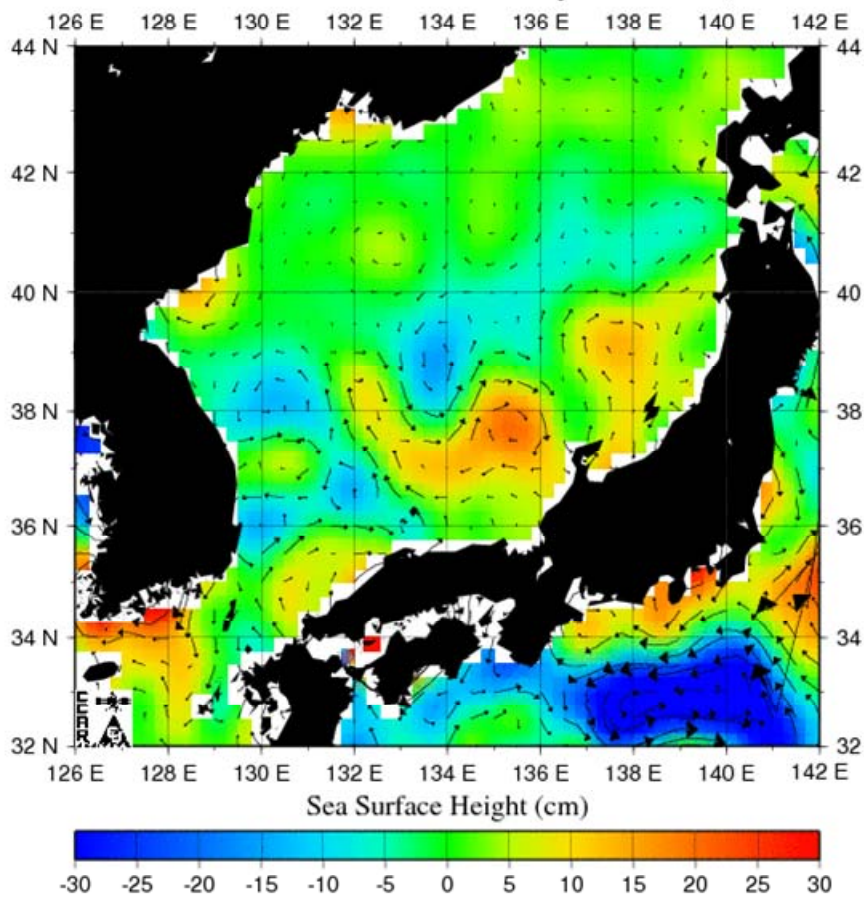


Yangtze River (per year) → dissolved organic carbon ( $1.2 \cdot 10^7$  tones), nitrogen ( $5.4 \cdot 10^5$  tones)  
**(i.e. Zhang et al. 2007)**

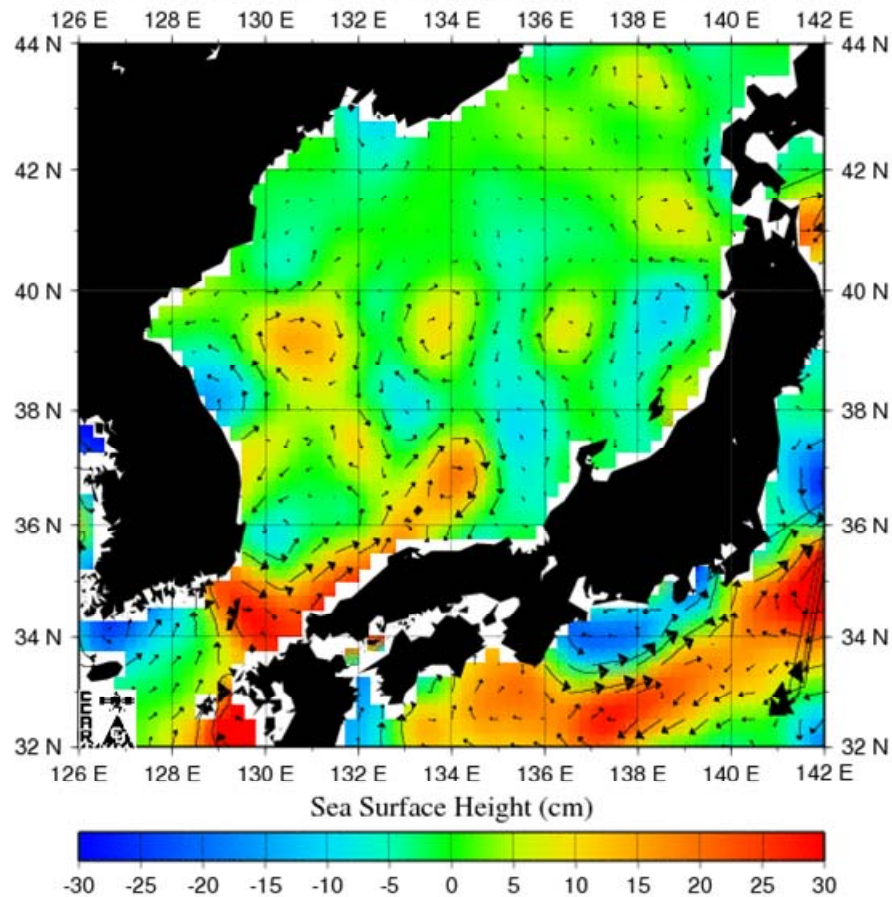
## Correlation between the water transport through the Tsushima/Korea Strait and the chlorophyll-a



Historical Mesoscale Altimetry - Oct 13, 2000



Historical Mesoscale Altimetry - Oct 13, 2003



**Ohshima, 1994. The flow system in the Japan Sea caused by a sea level difference through the shallow straits.**

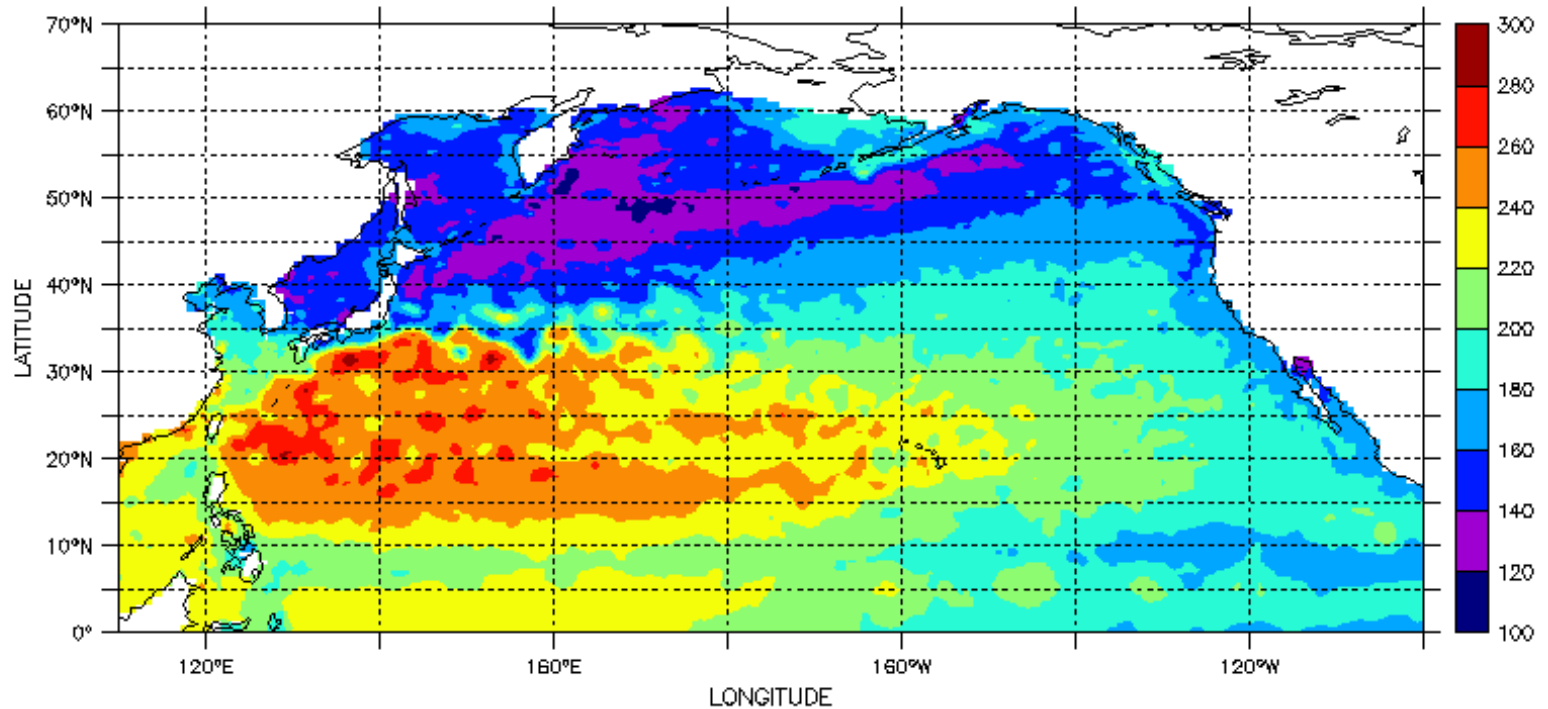
LAS 7.+ / Ferret 6.07 NOAA/PMEL

ODDS URL: <http://opendap.oviso.oceanoobs.com/thredds/dodsC/>

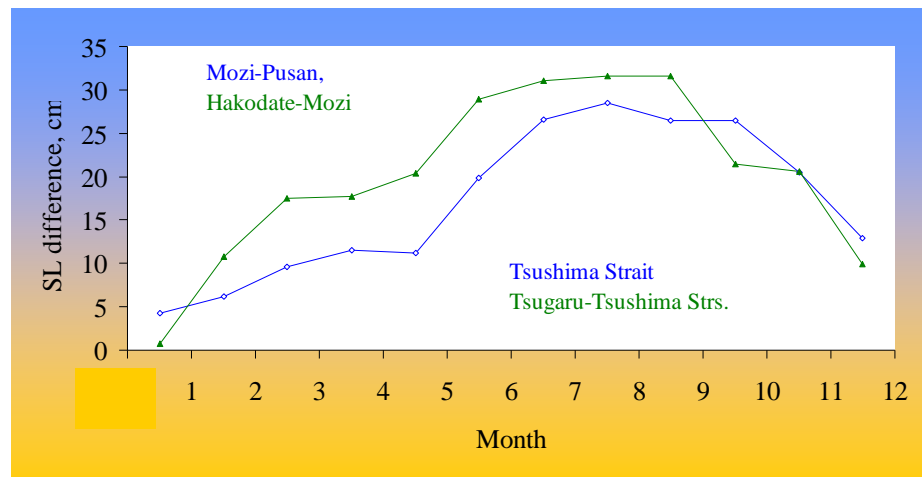
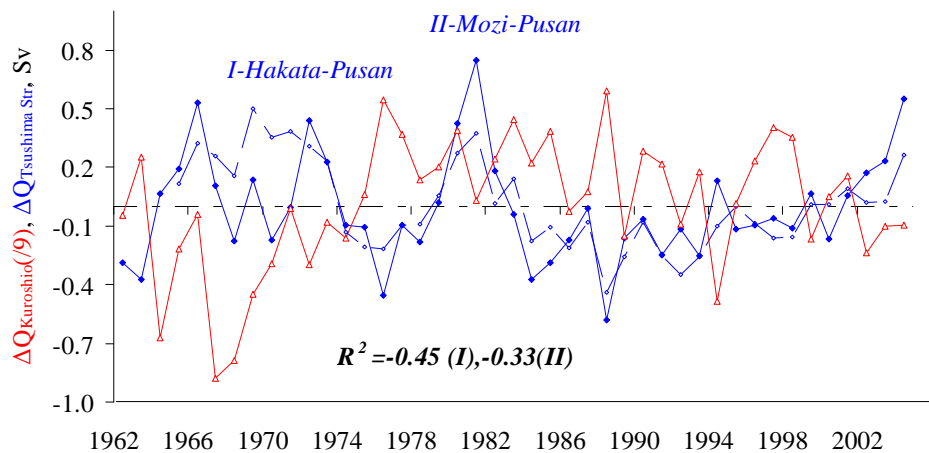
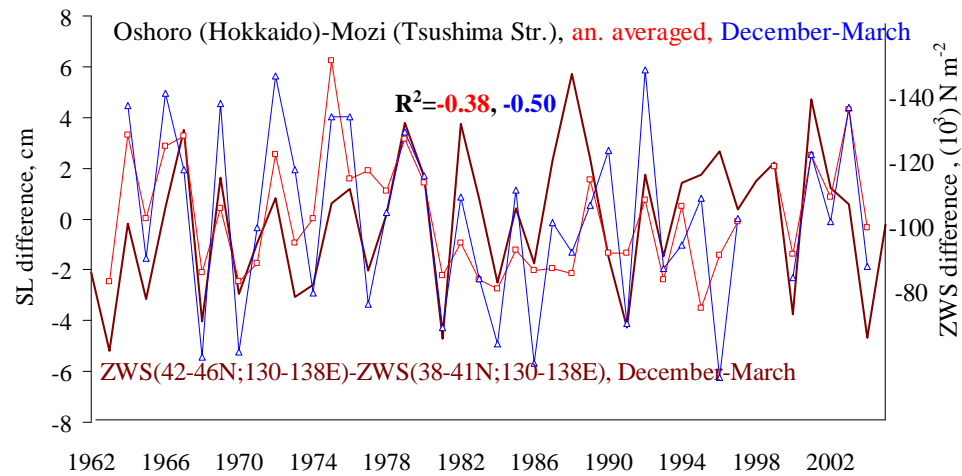
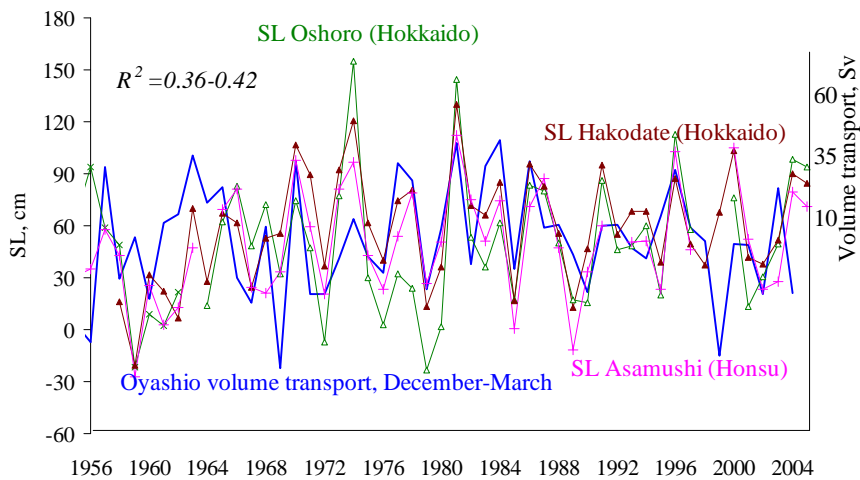
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SSALTO/DUACS - DT MADT - Homogeneous Global Processing



Maps of Absolute Dynamic Topography Merged (cm)



## **Summary**

Interannual changes in the transport rates through the Tsushima/Korea Strait are determined by the Kuroshio (East China Sea) and Oyashio (western subarctic Pacific) transports and the zonal wind stress over Japan/East Sea in winter.

Variations of the East China Sea subsurface waters transport through the Tsushima/Korea Strait are responsible for the observed dissolved oxygen interannual changes in the intermediate and deep waters of the Japan/East Sea.

The human impact on the Yangtze River waters leads to the increased DIN/DIP ratio in the upper (0-300 m) layer of the Japan/East Sea.