Lead Author e-mail: *gleb@iarc.uaf.edu*

Title: *Thermal regimes in the Chukchi Sea defined through eof decomposition of the hydrophysical observations since 1941-present and 4dvar data assimilation*

Vladimir Luchin[1], Gleb Panteleev[2]
[1]***V.I.Il'ichev Pacific Oceanological Institute, Far Eastern Branch, Russian Academy of Sciences***
[2]*International Arctic Research Center, University of Alaska, Faribanks*

The summer (June-October) temperature observations in the surface (0-20m) and subsurface (20-bottom) layers in the Chukchi Sea collected since 1941-present have been analyzed through the self-consistent data recovering procedure based on correlation analysis and iterative EOF decomposition. The analysis of the surface (0-20) and subsurface (20-bottom) EOF allowed to identify the typical thermal states (â€œcoldâ€ , â€œnormalâ€ , â€œwarmâ€) and typical periods of the inter-annual variability which are approximately 7-8 and 2-4 years. We found the water temperature of the Chukchi Sea gradually increase since 1941. The warming in the surface layer is minimal in the Bering Strait (0.8C) and has a strong maximum in the Long Strait (2-2.4C). In the subsurface layer, the increase of the temperature is almost twice as smaller. It is minimal (0.2-0.5C) in the Long Strait and pretty uniform (0.7-1C) for the remaining part of the Chukchi Sea. The analysis of the satellite sea surface height anomaly data show that during the â€œwarmâ€ periods there is a stronger flow through the Bering Strait and intensification of the northwestward current up to 15-20 cm/s along the Siberian coast towards the Long Strait. The extensive correlation analysis and reconstruction of the circulation using 4Dvar data assimilation show that thermal state of the Chukchi Sea is strongly controlled by flow of the Pacific Water through the Bering Strait and by an increase of the global atmospheric temperature. The reconstructed circulations regimes provide accurate estimates of the volume, heat and salt transports through the Chukchi Sea boundaries.