

# Cold water upwelling and entrainment near the Anadyr Strait: Implications to the North Pacific-Arctic interaction

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The Anadyr Strait, located at the northernmost in the Bering Sea region, is quite important so that it may control the interaction between the North Pacific and the Arctic Oceans. Satellite-based observations of sea surface temperature manifests a tongue-shaped patches of cold water that occasionally appears during summer in the Chirikov Basin, located between the Anadyr and Bering Straits (Fig. 1a). To reveal its characteristics and implications to the arctic/subarctic climate, we performed shipboard onsite observations in the neighbors during successive summers of 2017 and 2018, respectively with vessels of RV Mirai (JAMSTEC, Japan) and Prof. Multanovskiy (FEHRI, Russia). In the surveys, microstructure measurements showed signatures of elevations in turbulent diffusivity and water entrainment over the narrow straits, where the maxima appear at the top and bottom (Fig. 1b). The northward current across the Anadyr Strait coincides with the upwelling at Russian-side flank, so that the underlying cold water is brought up to the surface. The feature of outcropped cold water widely extends downstream to form the tongue-like patch in the Chirikov Basin. Also, the cold-water upwelling and outcropping are well reproduced by a 3D ocean simulation. With regard to the generation mechanism, the internal Kelvin wave, which propagates along the northern wall and against the barotropic coastal current from the Anadyr Gulf, may generate the specific upwelling features through the hydraulic control (Mitsudera et al. 2011).

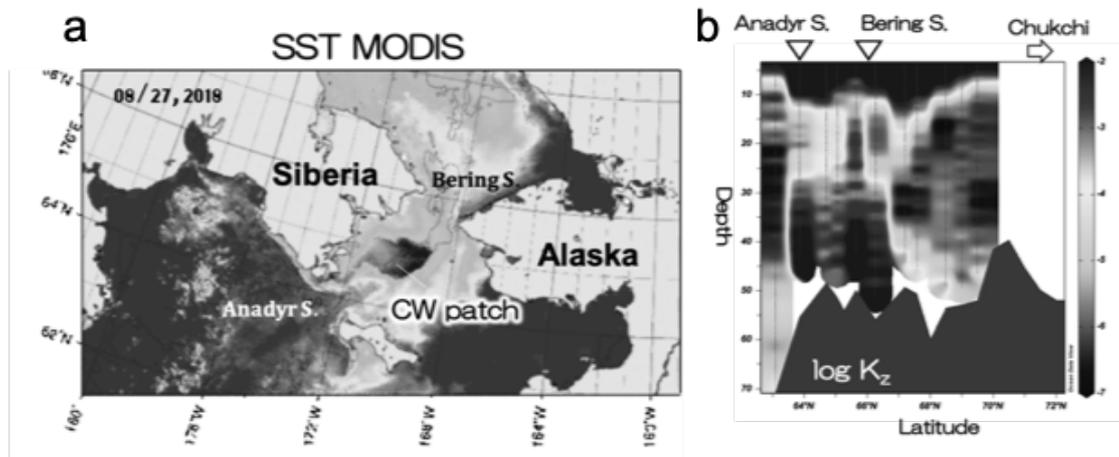


Figure 1. (a) Satellite-based SST and (b) traverse section across the Anadyr and Bering Straits for turbulent diffusivity from shipboard microstructure measurements.

## References

Mitsudera, H., K. Uchimoto, T. Nakamura, “Rotated stratified barotropic flow over topography Rotating Stratified Barotropic Flow over Topography: Mechanisms of the Cold Belt Formation off the Soya Warm Current along the Northeastern Coast of Hokkaido”, *J. Phys. Oceanogr.* **41**, 2120-2136, DOI: 10.1175/2011JPO4598.1, 2011.