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Variability of a large-scale atmospheric circulation over the Arctic in the impact of Arctic intermediate waters on the Laptev Sea shelf

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The main part of the Arctic Ocean intermediate layer is the Atlantic water (AW) that enters in the Arctic Ocean through Fram Strait and the Barentz Sea as a relatively warm (with temperatures above zero) and salty flow. The flow of this warm water along the continental slope of the Arctic Basin is the major heat source affecting Siberian Arctic. The heat exchange of AW with the cold and fresh shelf waters forms the relatively warmer water masses at the outer shelves. Large-scale atmospheric interactions can further drive these masses into the shelf area, increasing the temperature of the bottom layer inshore. Offshore winds associated with cyclonic atmospheric circulation over the Western Arctic seems to be the most probable factor pushing these waters onto the shelves. A combination of considerable increase of AW heat content during last decade of the Arctic and the recent large-scale wind pattern shift over the Arctic should result in significant changes to the rate of Atlantic water heat release. It would strongly affect all components of the Arctic climate system including the shelf regions in the near future. Data from more than 6500 summer and almost 3000 winter oceanographic stations over the Laptev shelf since 1950 were analyzed in order to correlate the bottom shelf water temperature and salinity response to the large-scale atmospheric regime. This has revealed pronounced differences of bottom water properties associated with the AW expansion into the shelves. These differences are directly connected to the wind-forcing direction and mostly inclined to submarine

river paleovalley troughs in the region. In addition the correlation of sea level pressures and water flows over the Laptev Sea continental slope was estimated based on last years mooring stations data.