The moisture updrafts on the cold pool captured by the continuously radiosonde observation passing through the marginal ice zone in Laptev Sea

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In summer 2013, we conducted 6 hourly radiosonde observation between off-ice and on-ice by Russian icebreaker “Akademik Fedorov” passing through the marginal ice-zone in Laptev Sea during NABOS project (Nansen and Amundsen Basins Obsevational System). During observation period, the warmer and humid air mass was advected by southeasterly wind from Siberia to Laptev sea because the low-pressure system was passing The temperature profiles bellow 600 m was maintaining the cold pool associated with a sea ice and the inversion layer formed above it. The humidity profiles were, however, not trapped until the height of inversion layer, they reached at higher levels (< 5000 m). These observational evidences implied that the humid air from Siberia was lifted on the cold pool maintained by sea ice and this process could transport the moisture to upper level in the arctic region. To verify these processes and examine the impact of the existence of sea ice, we conducted the numerical experiment by WRF. Three boundary conditions were adopted to simulation; present sea ice, removed all sea ice, and increased sea ice area. As primary results, the trajectories of air parcel from Siberia was rising to upper level with released the latent heat due to the condensation of humid air. The case of present sea ice transported much moisture vertically in the arctic region than other two cases. More detail results will be reported on the day. The process of the vertical moisture lifting due to the cold pool could contribute to the heat transport from the mid-latitude surface to the upper level in the arctic.