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Interactive comment on "Characteristics of Arctic low-tropospheric humidity inversions based on radio soundings" *by* T. Nygård et al.

T. Nygård et al.

tiina.nygard@fmi.fi

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We admit that this may generate a bias, as the humidity sensor may be wet when rising above the cloud top. We have added a note on this on Section 2.2 in the manuscript. In practice it is, however, impossible to quantitatively estimate the bias in this study. This is because the amount of condensate in the sensor depends on the cloud particle concentration, phase, and size distribution, as well as on the level of turbulence both inside and above the cloud.

Some radiosonde instruments take care of the issue effectively. For example, Vaisala Radiosonde RS92 has two humidity sensors, of which one is pulse heated. The purpose of the heating is to minimize condensation that may occur during the flight. This

results in reliable humidity measurements also when emerging from a cloud. In general, if a radiosonde humidity sensor experiences condensation while emerging from a cloud, the condensate gets fast frozen in freezing temperatures. That leads into unrealistic constant large humidity values for the rest of the flight, which are removed in the quality control of the data. We did not see this type of behavior in our vertical profiles of humidity.

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