



The water vapour distribution in the Arctic lowermost stratosphere during LAUTLOS campaign and related transport processes including stratosphere-troposphere exchange

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LAUTLOS balloon campaign, which took place in February 2004, provided a data set of high-accuracy water vapour measurements. Here the focus is on the water vapour in the tropopause region. Different vertical coordinates are used to study characteristic features of the water vapour distribution. Mixing of the tropospheric and stratospheric air masses is also studied by the cross-correlation analysis of observed ozone and water vapour. Special attention is given to laminae of enhanced water vapour mixing ratios which were sampled during several flights. Meteorological analysis and backward trajectory calculations demonstrate that these features are related to filaments developed along flanks of upper-level cut-off anticyclones. Evolutions of these filaments were clearly visible in water vapour fields from the high-resolution ECMWF operational analysis but not in PV. In order to resolve such small-scale features in PV fields, the RDF calculations are needed. Cross-tropopause air mass fluxes calculated by using Wei-method are used to identify regions of the stratosphere-troposphere exchange (STE) during the campaign and also to provide quantitative estimations of the STE.