

Generation of layering in the upper arctic troposphere away from the jet stream

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Ozone sounding databases for two arctic stations were used in order to investigate the generation of layering in the upper and middle troposphere of the Arctic. We concentrated on dry, ozone-rich and stable layers observed below the thermal tropopause under light wind conditions. This condition ensures that the observed layer is not a tropopause fold, a well-known phenomenon that develops within frontal zones near the jet stream. We found that layers could be classified in two groups. Laminae of the first group were observed equatorward of the jet stream and those of second group were observed poleward of the jet. The meteorological situation for the first group resembles that for equatorward stratospheric streamer propagation. A large case-to-case variability in the synoptic situation was observed for the second group of laminae, which were detected northward of the jet stream. Nevertheless, in about the half of the cases, streamers of tropospheric air were found in the vicinity of the stations on the isentropic surfaces just above the detected stratospheric layers. Back trajectory analyses showed that these layers originated in the vicinity of the polar jet stream. Forward-trajectory calculations suggest that, subsequently, a part of the stratospheric layers can mix irreversibly into the troposphere. This work is partly supported by RFFI grants 02-05-64114 and 02-05-79148.