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## Impact of radiation, water vapour and ice clouds on the tropopause region

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In the tropopause region, the thermal structure is strongly influenced by the interaction of radiation, ice clouds and water vapour. Features as the tropopause inversion layer as well as potentially unstable layers are suspected to be (partly) driven by radiative effects in connection with the frequently occurring large concentrations of water vapour (i.e. supersaturations with respect to ice) and ice clouds. Since there is a high variability of water vapour and ice clouds in terms of microphysical properties and vertical layers, it is still unclear under which conditions clouds and their precursor (i.e. water vapour) lead to a stronger or a weaker stratification, respectively.

In this study we investigate the interaction of radiation and clouds within an idealized framework of a combined cloud-radiation scheme within a vertical column. Using different environmental conditions in terms of water vapour concentrations, ice cloud properties, and thermal stratification we investigate the temporal evolution of the thermodynamic properties of the tropopause region. The results are statistically investigated for characterizing dominant impacts and feedbacks.