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Physics of Stratocumulus Top: properties of the Turbulent Inversion Sub-Layer

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Region of the top of stratocumulus topped boundary layer is a place where mass and energy is exchanged between free atmosphere and the top of the cloud. It is called an Entrainment Interfacial Layer. It can be divided on two sub-layers: cloud top mixing sub-layer (CTMSL) and turbulent inversion sub-layer (TISL). The second sub-layer will be the subject of present analysis.
TISL is localised in between the top of the stratocumulus cloud and free troposphere. Based on the measurements taken during Physics of Stratocumulus Top (POST) field campaign it was found that this region is turbulent. Turbulence in TISL is highly anisotropic due to horizontal stretching by wind shear and vertical damping by static stability. The turbulence kinetic energy in TISL is transported downward and the dry air form free troposphere is slowly entrained to the cloud across this sub-layer.
It was also found that the overall depth of TISL adjusts such to keep the Richardson number close to the critical value. Further analysis of TISL properties reviled that the distribution of TISL depth is bimodal, with two separated maxima centred around values: $\sim$8m and $\sim$40m. High-resolution (2.5m in vertical) Large Eddy Simulations (LES) of flight TO13 from POST confirmed such distribution and are in agreement with the other findings. Thus, simulation results should help to answer the questions: Does bimodality of deph distribuion mean tha that two different states of TISL are possible? Or maybe turbulence in TISL is intermittent? The present analysis will answer these questions and indicate mechanisms controlling TISL properties.