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Title of presentation:
MEASUREMENTS OF TURBULENCE AT STRATOCUMULUS TOP

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Abstract:
We used unprecedented (∼1m resolution) airborne data from POST (Physics of Stratocumulus Top) research campaign to divide stratocumulus top region into layers and to characterize properties of turbulence in each layer. Results indicate, that despite remarkable thermodynamical and microphysical differences of the investigated clouds, noticeable also in the investigated layers, characteristics of turbulence across the layers is universal. Very stably stratified inversion layer capping the cloud top is marginally turbulent in such manner that its thickness adapts keeping Richardson number across the layer close to critical. Turbulence in this layer and in the neurally stratified cloud top layer below is highly anisotropic with reduced vertical fluctuations.
Using estimates of the dissipation rate of Turbulent Kinetic Energy from power spectra and structure functions of velocity fluctuations we show, that Corrsin and Ozmidov scales in the inversion layer are as small as tens of centimeters. This finding explains why modern Large Eddy Simulations of stratocumulus clouds are not able to reproduce entraiment rate of non-turbulent free tropospheric air into turbulent stratocumulus. They are underresolved and not able to reproduce structure of turbulence governing the entrainment process.