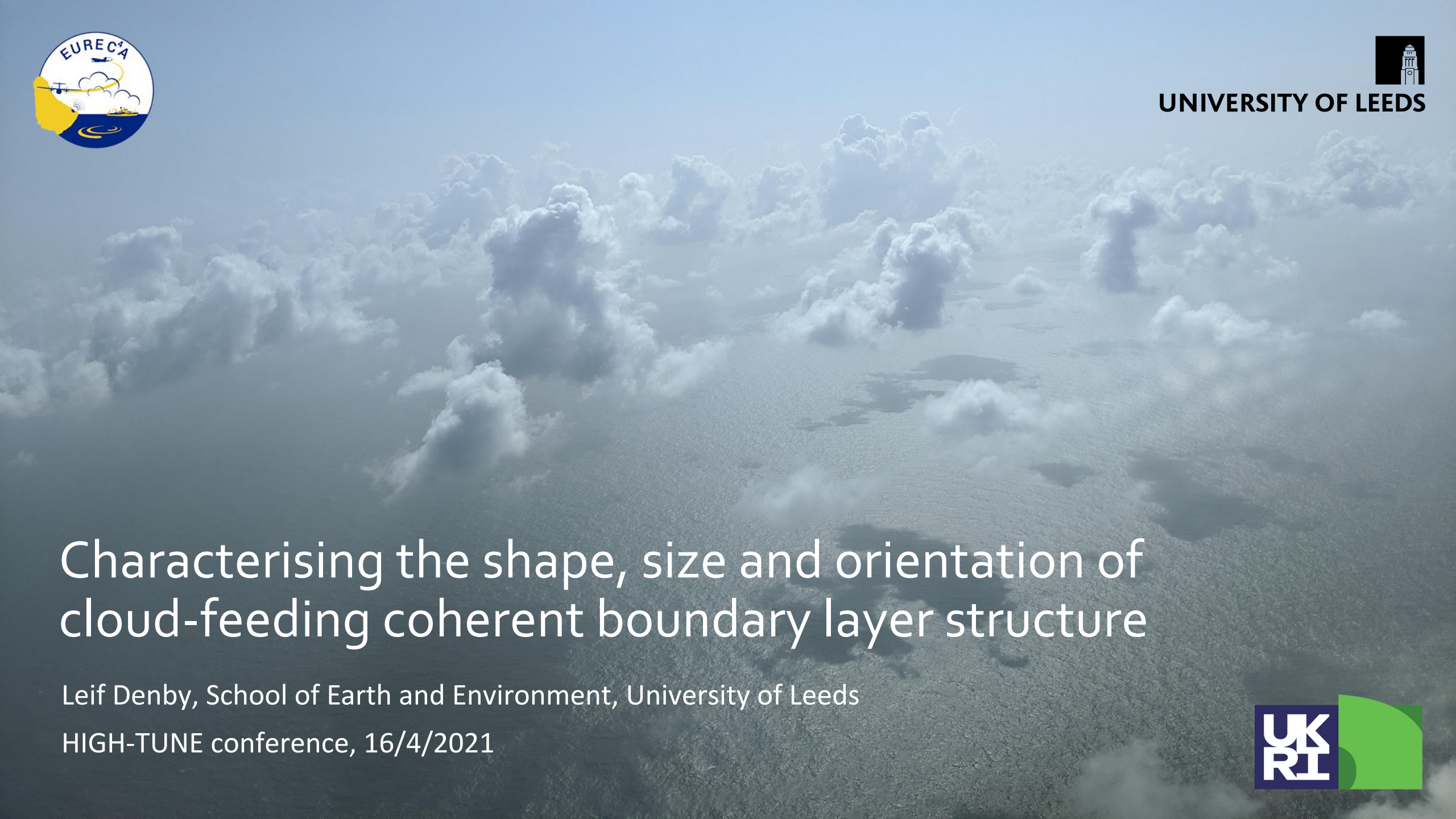
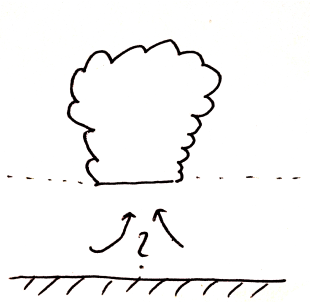


# Characterising the shape, size and orientation of cloud-feeding coherent boundary layer structure

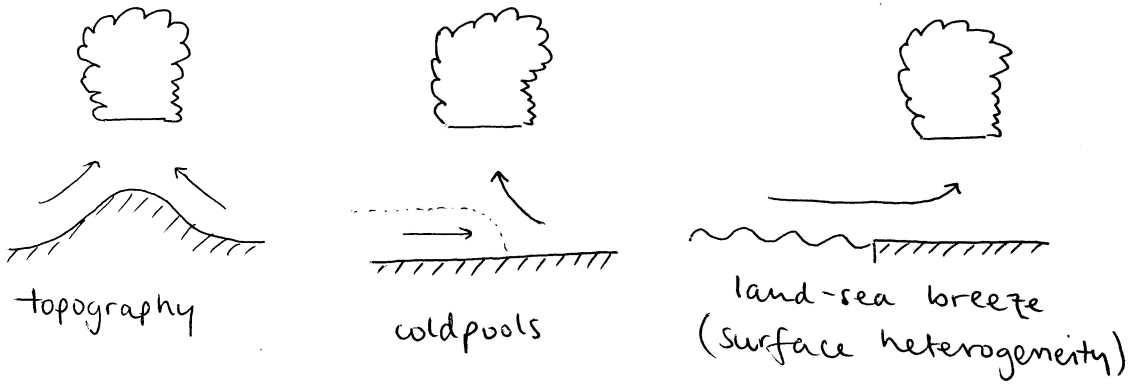
Leif Denby, School of Earth and Environment, University of Leeds

HIGH-TUNE conference, 16/4/2021

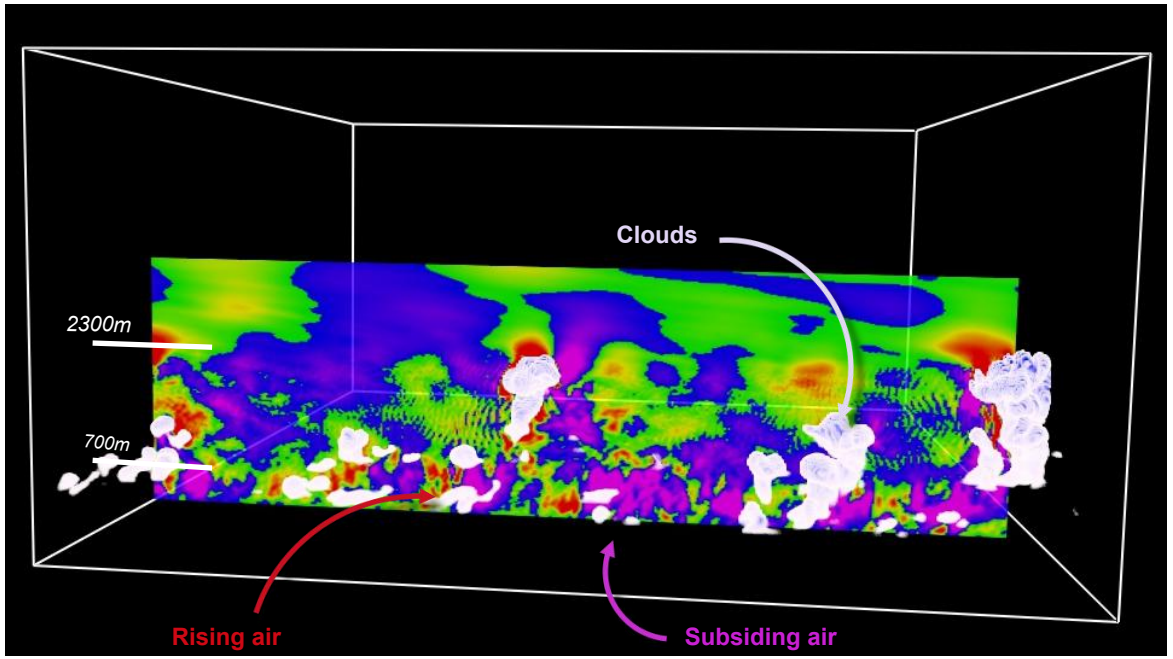
# Aim



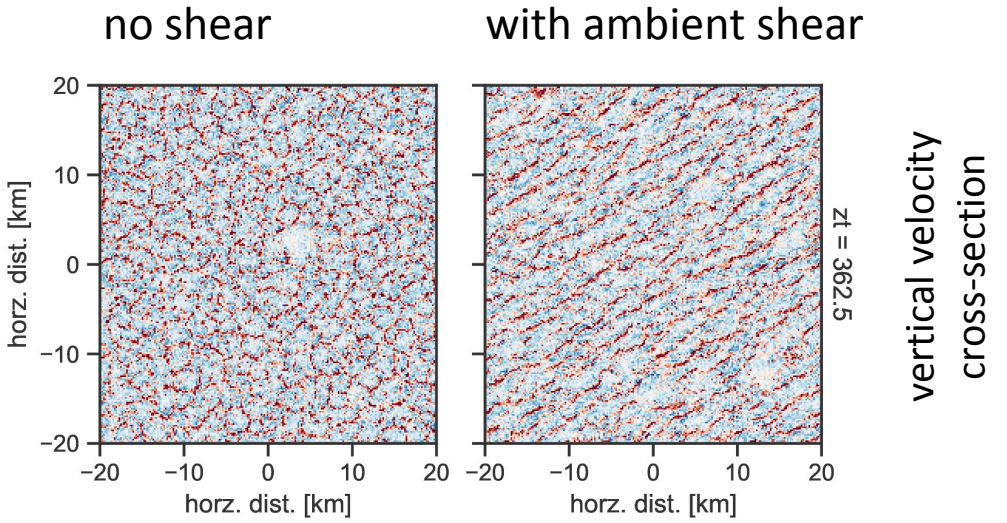
Describe statistics of boundary layer relevant to triggering convection and the sensitivity to presence of different phenomena




- *"What are the length-scales and magnitudes of perturbations which trigger convection?"*




Δx=25m Large-Eddy Simulation, RICO test-case  Rendered with VAPOR



# The GENESIS toolkit

**Flexible tools[1] for:**

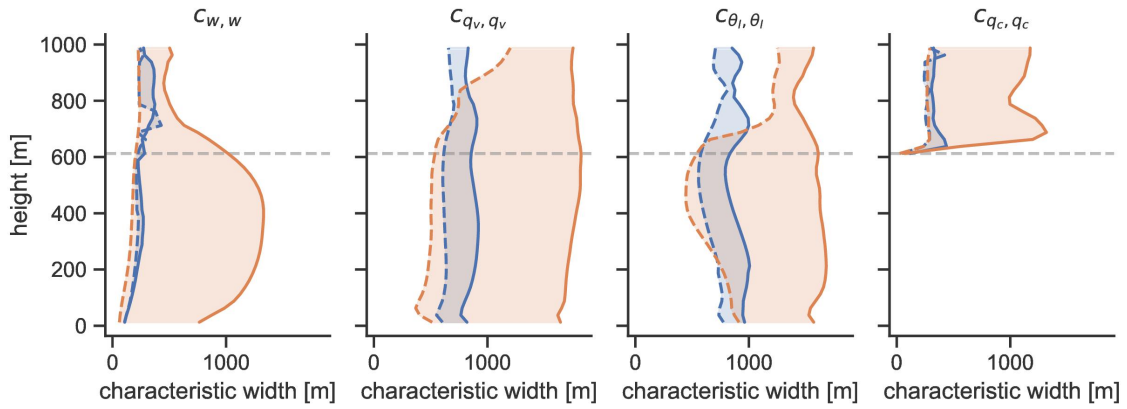
Studying bulk-coherence

- Extract vertical profiles of correlation length-scale and orientation

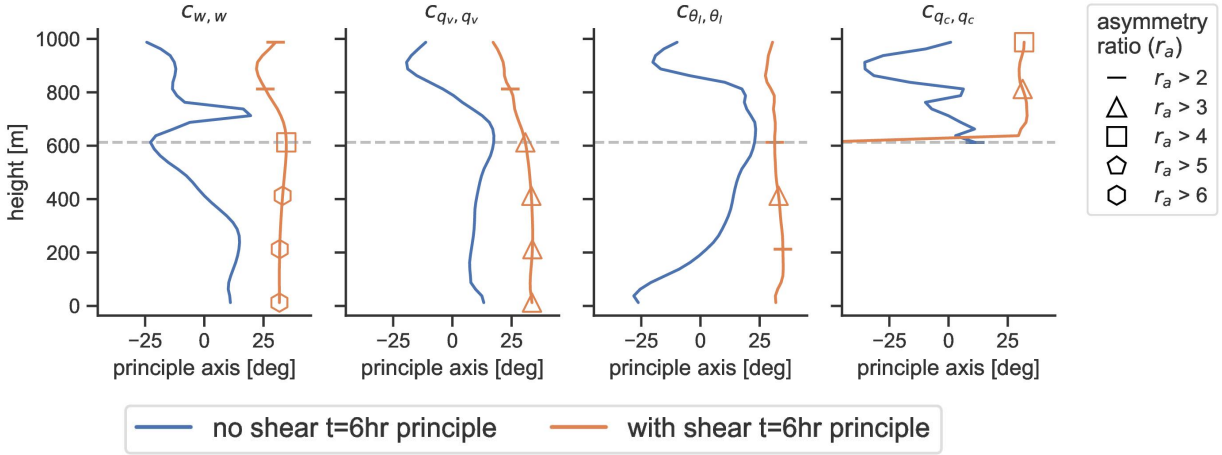
Object-based flux-decomposition

1. Creating masks
2. Splitting mask into objects
3. Characterising object shape, size and orientation
4. Performing flux-decompositiong based on object characteristic

Coherence length-scale (showing elongation by ambient wind-shear)




Coherence elongation (with asymmetry measure)




[1]: currently used with UCLA-LES, MONC and MESO-HH

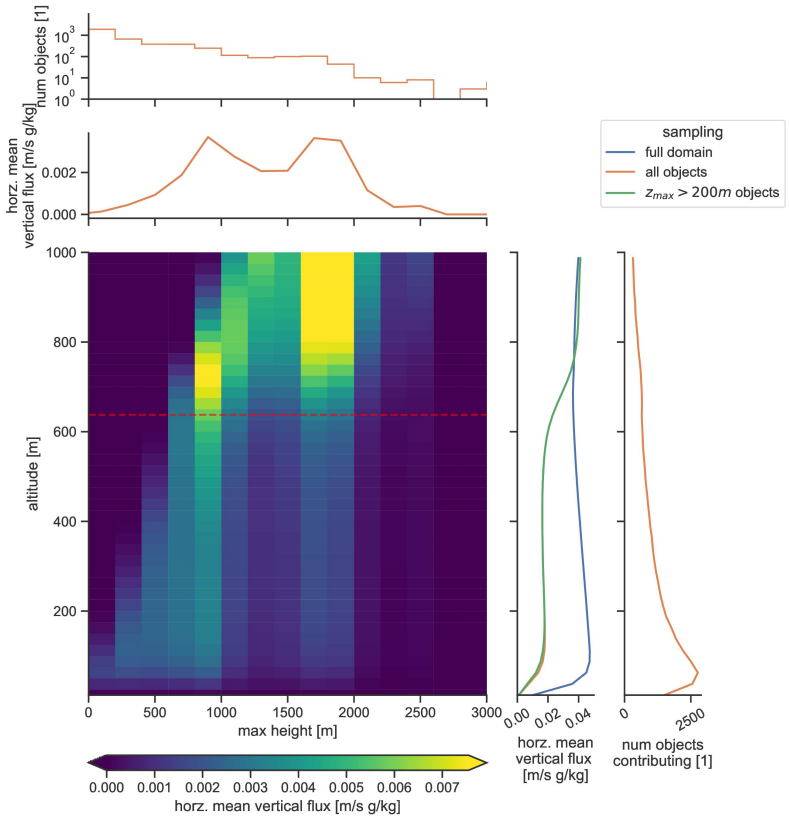
https://github.com/leifdenby/genesis/

Denby et al 2021 QJRMS (in review)

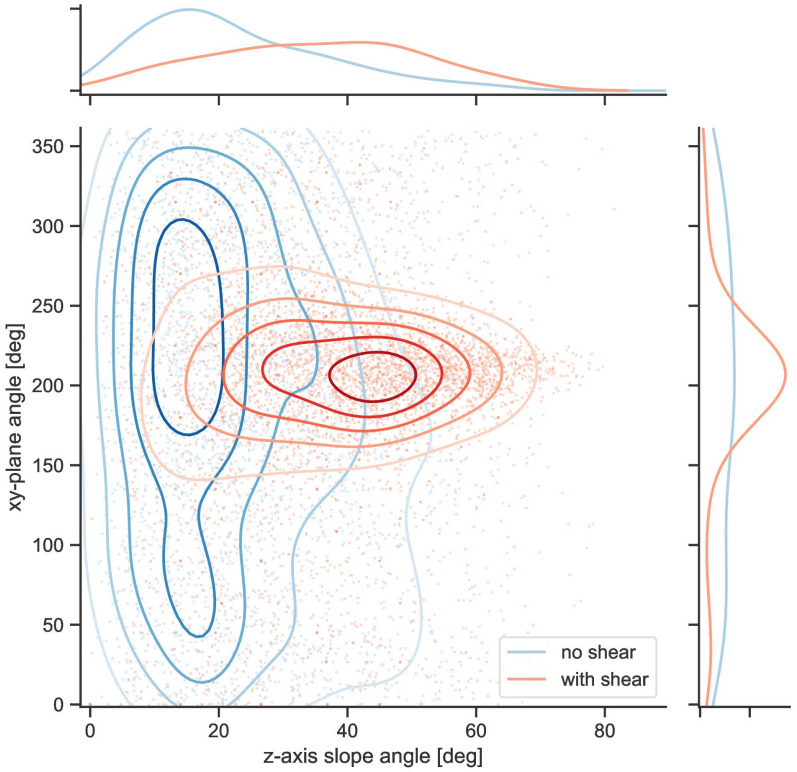
# Flux-dominating coherent structures

Characteristics computed with GENESIS toolkit

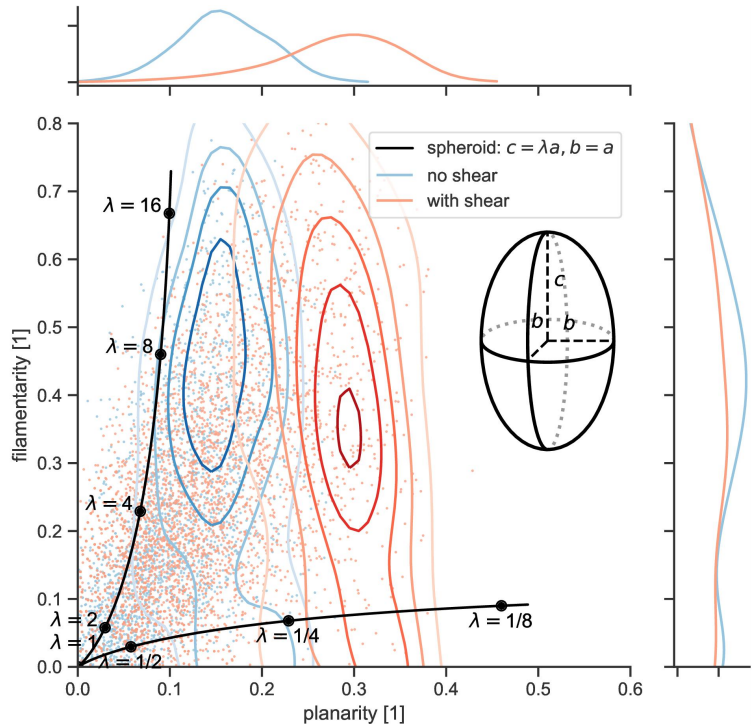
Extend from surface into cloud




Tilt into ambient wind




Are long and thin
(stretched planar by ambient wind)

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