

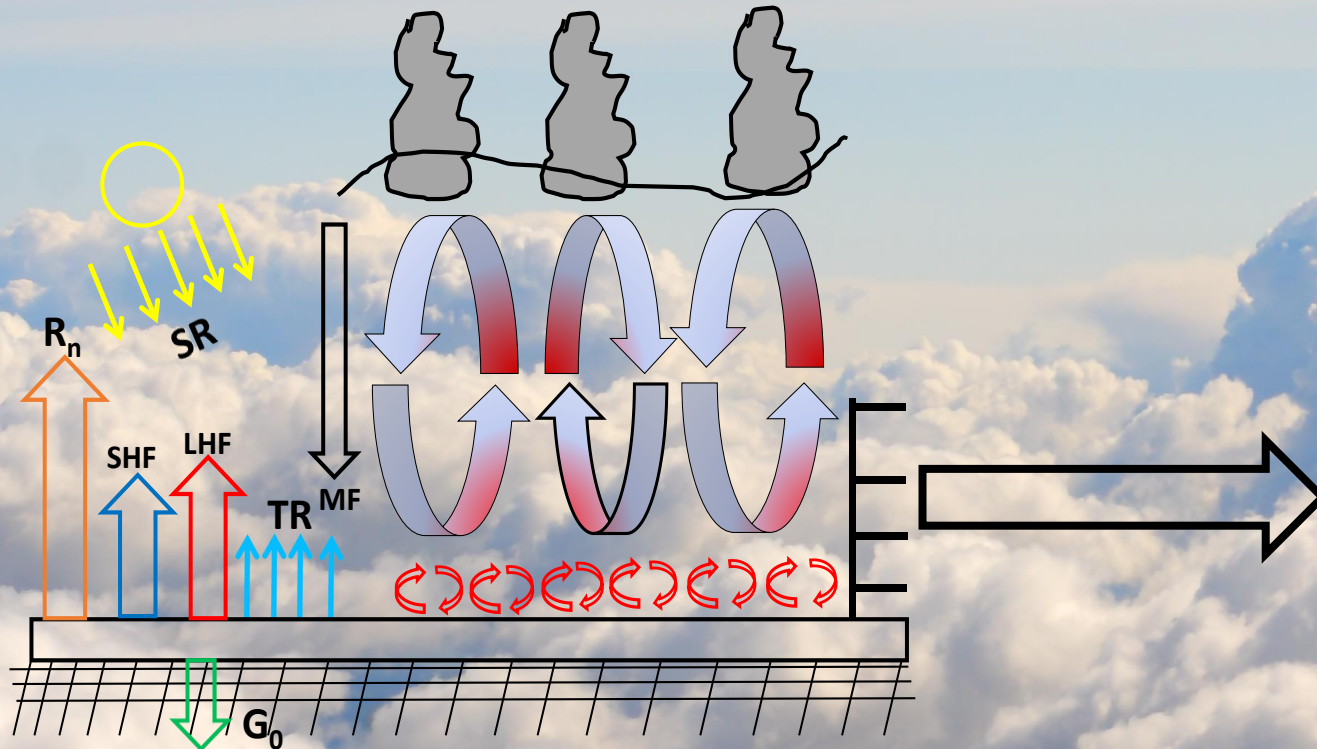
Persistence behaviour of heat and momentum fluxes in convective surface layer turbulence

Improvement and Calibration of Clouds in Models

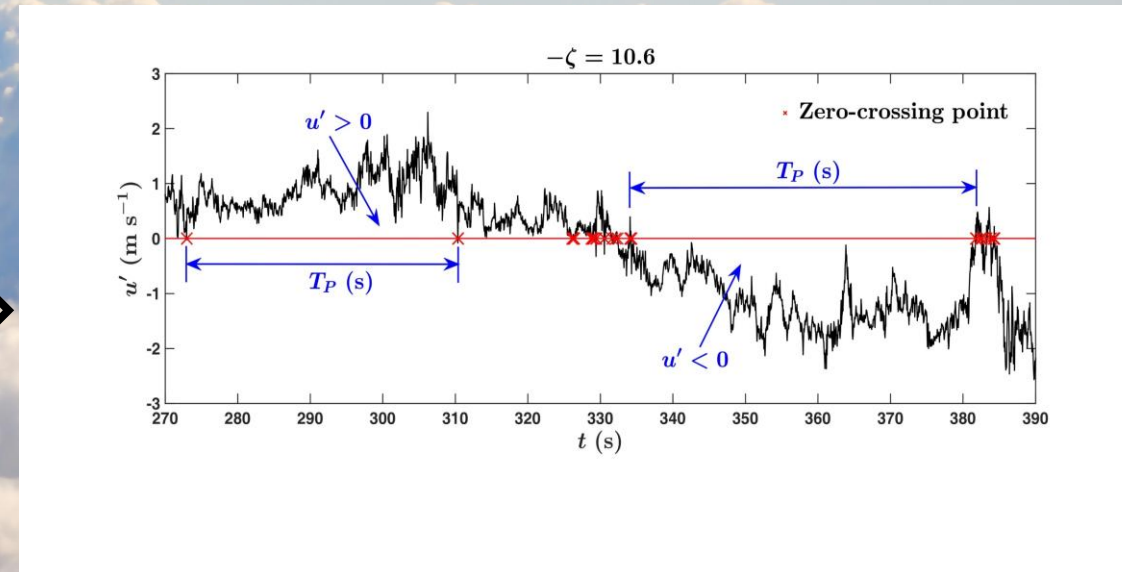
Subharthi Chowdhuri, IITM, Pune, India

Co-Authors: Thara V Prabha, IITM and Tirtha Banerjee, University of California, Irvine, Contact: subharthi.cat@tropmet.res.in

Acknowledgments: Dr. Keith G McNaughton, Director IITM

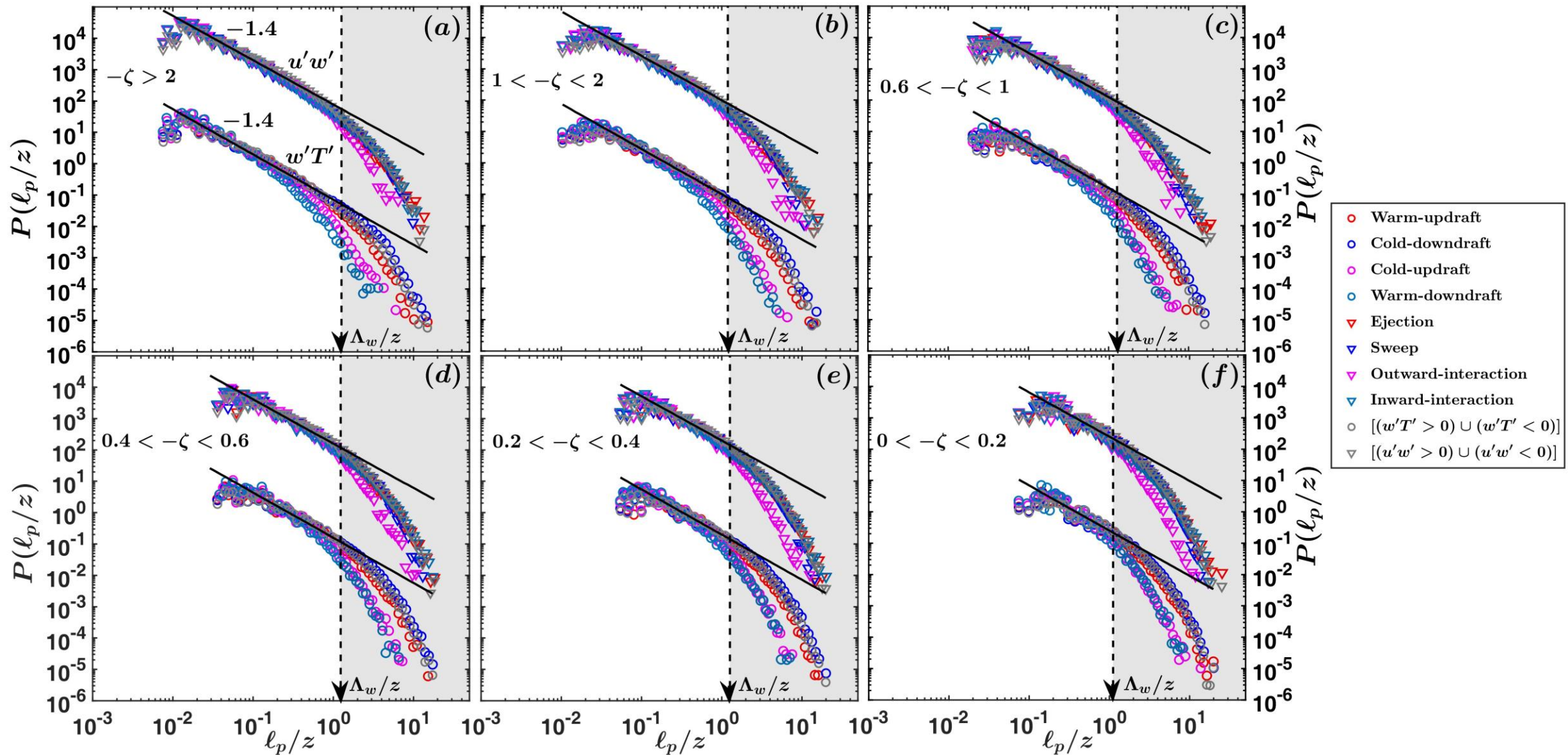


SR= Solar radiation, TR= Terrestrial radiation, R_n = Net radiation, G_0 = Soil heat flux, SHF= Sensible heat flux, LHF= Latent heat flux, MF= Momentum flux.



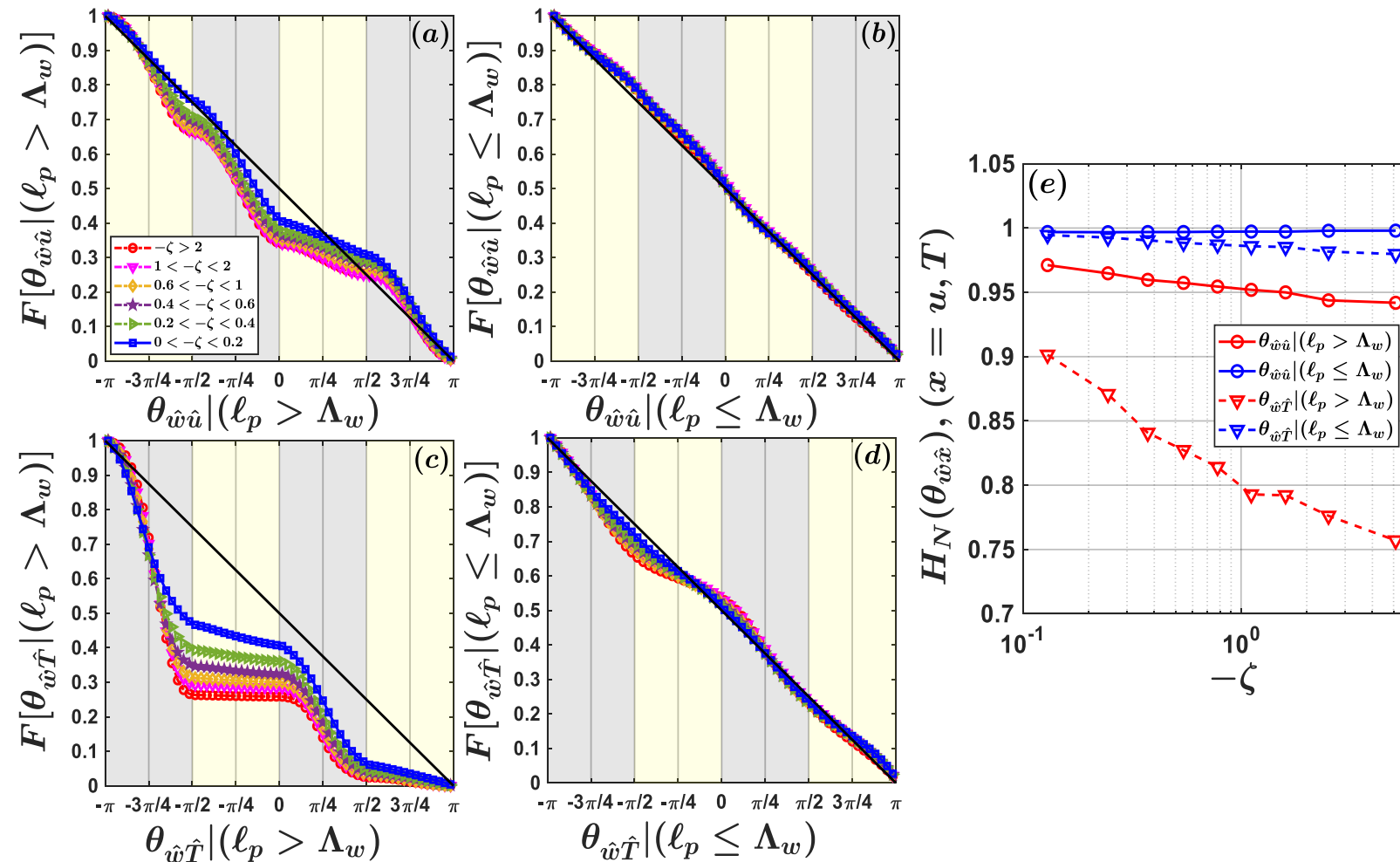
Persistence is defined as the probability that the local value of a fluctuating field remains at a particular state for a certain amount of time, before being switched to another state.

Persistence PDFs of flux-transporting motions



The distribution of time scales of heat- and momentum-transporting motions in a convective atmospheric flow under different stability conditions.

Conclusions



1. The persistence PDFs of flux-transporting motions display a power-law behavior up to a certain threshold scale, punctuated with an exponential cutoff.

2. The power-law behavior is related to scales smaller than the integral scales. Since power-laws are synonymous with scale-invariance, it is consistent with the Richardson cascade model.

3. The heat and momentum transport can be modelled through the phase angle distributions associated with the structures larger than the integral scales.

Chowdhuri, S., Prabha, T., and T. Banerjee, 2020, Persistence behaviour of heat and momentum fluxes in convective surface layer turbulence, Physics of Fluids, 32, 115107.

<https://doi.org/10.1063/5.0027168>