Contribution ID: **46** Type: **Interactive presentation**

# Theory of precipitation probability distributions

*Wednesday, 5 May 2021 16:00 (1h 45m)*

Relatively simple mathematical models derived from climate model equations can yield insight into how the characteristic form of probability distributions arise for different measures of precipitation, including event accumulations, time averaged intensities and spatial clusters. Stochastic differential equations for moisture and energy equations under reasonable approximations yield Fokker-Planck equations for moisture in non-precipitating and precipitating regimes. These theoretical underpinnings can guide analysis of observations and climate models, suggesting diagnostics that bolster confidence in robustness of climate model predictions for changes under global warming. Methods drawn from statistical physics prove highly useful in this pursuit. While current solutions are much more detailed than initial analogies to self-organized criticality, we point out the ways in which those analogies have informed the current state of knowledge.

**Primary authors:** Prof. NEELIN, J. David (University of California, Los Angeles); MARTINEZ-VILLALOBOS, Cristian (University of California, Los Angeles); Dr AHMED, Fiaz (University of California, Los Angeles); KUO, Yi-Huong (University of California, Los Angeles)

**Presenter:** Prof. NEELIN, J. David (University of California, Los Angeles)

**Session Classification:** Modelling and Parameterising Deep Convective Organisation

**Track Classification:** Modelling and Parameterising Deep Convective Organisation