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Reduced stochastic aggregation of convection conditioned by large scale dynamics in the atmosphere

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The presented work contains an investigation of the stochastic aggregation of convective structures on different scales in the atmosphere. A
computational framework is applied that provides highly scalable identification of reduced Bayesian models. The deterministic large scale
flow variables are reduced into latent states, whereas the stochastic small scale convective structures are affiliated to these. The analysis of
the latent states in number and maximization reduction improves the understanding for the large scale forcing of convective processes. The
convective structures are determined by vertical velocities. Different variables of the large-scale flow, such as the convective available
potential energy, available moisture, vertical windshear and the Dynamic State Index (DSI), a diabaticity indicator, are investigated. Our approach
does not require a distributional assumption but works instead with a discretised and categorised state vector.