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# Stochastic parametrisation of unresolved scales

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Recently it has been recognized that the inclusion of stochastic parametrisations in addition to conventional bulk parameterizations influences the distribution of states in atmospheric models. This can manifest itself as change in the mean state or lead to an increase in variance and occurrence of atmospheric states.

Ideally a stochastic representation would capture the correct spatio-temporal characteristics of unresolved processes at the near-grid scale that cannot be captured by conventional bulk-parametrisations.

In the examples presented here this is accomplished by utilizing cellular automata that produce coherent structures with spacial correlations and temporal memory.

It is shown that the implementation of a stochastic backscatter scheme into the ECMWF model leads to a reduction in the systematic error over the North Pacific by changing the frequency of atmospheric states in different regimes.

We also present results from a multi-scale cellular automaton (CA) for convective organization, that is developed with the aim of improving the representation of variability associated with the Madden-Julian Oscillation. The multi-scale CA is able to capture the eastward motion of organized cloud-clusters, while individual convective cells travel westward.