



## **Better climate modelling with a stratocumulus emulator**

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Clouds are an integral part of the climate system. Due to the importance of small-scale phenomena such as turbulence, cloud processes cannot be resolved in global climate models and need to be parametrised. In their current form, cloud parametrisations are unable to accurately reproduce the effects of clouds, which introduces uncertainties to climate models. A much more accurate description of clouds can be obtained through large eddy simulation (LES) but it comes with a very high computational cost.

To improve the parametrisation of marine stratocumulus clouds in global climate models, we have developed an approach using a statistical emulator. The emulator is based on the binary space partitioning method and was trained using an ensemble of LESs performed using the UCLALES-SALSA model. All of our training simulations concerned marine stratocumulus clouds due to their relative simplicity and their high importance on the global radiative budget. We coupled the emulator with the ECHAM6 global climate model using several different variables such as inversion strength and aerosol concentrations. The emulator was applied in grid boxes where marine stratocumulus clouds were present.