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Initial tendencies of cloud regimes in the Met Office Unified Model

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The Met Office Unified Forecast-Climate Model is used to compare the properties of simulated climatological cloud regimes with those produced in short-range forecasts initialised from operational analyses. In general, the cloud regime properties are found to be similar at all forecast times, including the climatological mean. This suggests that weaknesses in the representation of fast local processes are responsible for errors in the simulation of the cloud regimes. The increased horizontal resolution of the model used for numerical weather prediction generally has little impact on the cloud regimes, although the simulation of tropical shallow cumulus is improved, while the relative frequency of tropical deep convection and cirrus compare less favourably with observations. Analysis of initial temperature tendency profiles for each cloud regime indicates that some of the total temperature tendency which leads to a systematic bias in the model climatology is associated with a particular cloud regime.