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Comparison of marine cloud brightening in large eddy simulations

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Modelling of marine cloud brightening (MCB), a form of solar radiation modification, has thus far proven challenging due to the incongruous nature of the scales required. The microphysics of the cloud droplets and aerosols can only be resolved at really small scales, but just as important are the large-scale impacts on circulation and radiation. Large eddy simulations (LES) seem best placed to deal with this problem; they can resolve circulation and turbulence, but also have small enough grid boxes that useful parametrisation of microphysics can be made. When coupled to parcel models their representation of microphysical processes can be improved even further, although at a computational cost. There have been multiple studies of MCB in LES so far, but with wide-ranging background conditions and experimental designs. This leads to varying results that are challenging to compare. The aim of this study is to directly compare the results of at least two LES models, MONC and DALES, for an MCB experiment. They will first be compared with a historic data set, before being configured to run the MCB experiment. It is hoped that MONC can also be coupled to a parcel model to improve its representation of cloud microphysics.