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iGen 0.1: the automated generation of a parameterisation of entrainment in marine stratocumulus

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Abstract. In a previous paper we described a new technique for automatically generating parameterisations using a program called iGen. iGen generates parameterisations by analysing the source code of a~high resolution model that resolves the physics to be parameterised. In order to demonstrate that this technique scales up to deal with models of realistic complexity we have used iGen to generate a parameterisation of entrainment in marine stratocumulus. We describe how iGen was used to analyse the source code of an eddy resolving model (ERM) and generate a parameterisation of entrainment velocity in marine stratocumulus in terms of the large-scale state of the boundary layer. The parameterisation was tested against results from the DYCOMS-II intercomparison of ERM models and iGen's parameterisation of mean entrainment velocity was found to be $5.27 \times 10^{-3} \pm 0.62 \times 10^{-3}$ m s^{-1} compared to $5.2 \times 10^{-3} \pm 0.8 \times 10^{-3}$ m s^{-1} for the DYCOMS-II ensemble of large eddy simulation (LES) models.

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