Scientist:

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Model Name and History:
UK Met Office Large Eddy Model version 2.4
UKMO_LEM
No generic predecessor

Model Type: 3D, CRMs(case A)/LES(case B)

case	A1	A2	A3	B1	B2	B3
Domain size in x-direction (km):	64	64	64	6.4	6.4	6.4
Domain size in y-direction (km):	64	64	64	6.4	6.4	6.4
Domain size in z-direction (km):	16	16	16	4	4	4
Number of grid points in x-direction:	128	128	128	128	128	128
Number of grid points in y-direction:	128	128	128	128	128	128
Number of grid points in z-direction:	45	45	81	81	81	161
Grid size in x-direction (m):	500	500	500	50	50	50
Grid size in y-direction (m):	500	500	500	50	50	50
Grid size in z-direction (m):	(*)	(*)	(**)	50	50	25
Time step (s): Variable timestep max:	2	2	2	2	2	2

note:
Vertical grid for Period A simulations is stretched as follows:
(*) from 100m in boundary layer increasing to 429m above 3.5km with a further increase to 500m above 12km
(**) from 50m in boundary layer increasing to 222m above 3.5km with a further increase to 500m above 12km

Numerical Technique:
- Finite-difference using Arakawa C grid with stretched vertical and uniform horizontal grids;
- Advection uses a second-order accurate Piascek-Williams scheme for momentum and the second-order accurate total variance diminishing scheme for scalars, centered in time
- Analastic dynamical equations
- Robert/Asselin time filter
- Biperiodic boundary conditions
- Newtonian damping layer above 13km for period A and 3km for period B.
- Reference frame uses Gallilean translation with variable velocity chosen to maximise timestep permitted by CFL restriction.

Physical parametrizations:

- Monin-Obukhov similarity used for surface fluxes
- Two stream Edwards-Slingo radiation scheme including fluxes computed above the domain up to TOA using climatological soundings.
- Explicit 3-phase bulk microphysics with single moment cloud water/rain (mass mixing ratio) and double moment ice/graupel/snow (mass mixing ratio and number concentration).
- Smagorinsky-Lilly subgrid model

Documentation:

- Shutts, G.J. and Gray, M.E.B., 1994, 'A numerical modelling study of geostrophic adjustment process following deep convection', Q. J. R. Meteorol. Soc., (120),1145-1178

- Petch,J.C.,2006, 'Sensitivity studies of developing convection in a cloud-resolving model.', Q. J. R. Meteorol. Soc., (132), 345-358