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Supplement of

Turbulence-permitting air pollution simulation for the Stuttgart metropolitan area

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```
&time_control
 run_days                            = 0,
 run_hours                           = 0,
 run_minutes                         = 0,
 run_seconds                         = 0,
 start_year                          = 2019, 2019, 2019,
 start_month                         =   01,   01,   01,
 start_day                           =   21,   21,   21,
 start_hour                          =   00,   00,   00,
 end_year                            = 2019, 2019, 2019,
 end_month                           =   01,   01,   01,
 end_day                             =   22,   22,   22,
 end_hour                            =   00,   00,   00,
 interval_seconds                    = 21600,
 input_from_file                     = .true.,.true.,.true.
 history_interval                    = 60,  30,   5,
 frames_per_outfile                  =  1,   1,   1,
 restart                             = .false.,
 restart_interval                    = 120
 io_form_history                     = 11,
 io_form_restart                     = 102,
 io_form_input                       = 11,
 io_form_boundary                    = 11,
  io_form_auxinput5                  = 2,
 io_form_auxinput7                   = 2,
 io_form_auxinput8                   = 2,
 auxinput5_inname                    = 'wrfchemi_d<domain>_<date>',
 auxinput5_interval_m                = 60,  60, 60,
 diag_print=2,
 io_form_auxinput4                   = 11
 auxinput4_inname                    = "wrflowinp_d<domain>"
 auxinput4_interval                  = 360
 auxhist7_outname='surface_d<domain>_<date>'
 io_form_auxhist7 = 11
 auxhist7_interval = 60,15,5
 auxhist7_interval_s = 1
 frames_per_auxhist7 = 1,1,1
 override_restart_timers=.true.
 adjust_output_times = .true.
 debug_level = 0
 nocolons=.true.
 use_netcdf_classic=.true.
/

&diags
 p_lev_diags                         = 0
 num_press_levels                    = 9
 press_levels                        = 100000, 92500, 85000, 70000, 60000, 50000, 40000, 30000, 20000
 use_tot_or_hyd_p                    = 2
/

&domains
 time_step                           = 5,
 time_step_fract_num                 = 0,
 time_step_fract_den                 = 1,
 max_dom                             = 3,
 e_we                                = 800, 601, 601,
 e_sn                                = 800, 601, 601,
 eta_levels                          = 1.000, 0.9964, 0.9928, 0.9893, 0.9857,
              0.9822, 0.9787, 0.975, 0.9713, 0.9674,
              0.9633, 0.9592, 0.9548, 0.9503, 0.9456,
              0.9407, 0.9356, 0.9302, 0.9246, 0.9187,
```

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              0.9125, 0.906, 0.8992, 0.892, 0.8844,
              0.8764, 0.868, 0.8592, 0.8499, 0.84,
              0.8297, 0.8188, 0.8073, 0.7952, 0.7826,
              0.7693, 0.7554, 0.7408, 0.7256, 0.7097,
              0.6932, 0.6761, 0.6583, 0.6399, 0.621,
              0.6016, 0.5816, 0.5612, 0.5404, 0.5193,
              0.498, 0.4764, 0.4548, 0.4331, 0.4114,
              0.3899, 0.3685, 0.3475, 0.3268, 0.3065,
              0.2867, 0.2674, 0.2488, 0.2307, 0.2111,
              0.1945, 0.1789, 0.1642, 0.1505, 0.1376,
              0.1256, 0.1144, 0.1041, 0.0945, 0.0856,
              0.0774, 0.0699, 0.0629, 0.0565, 0.0507,
              0.0453, 0.0404, 0.0359, 0.0319, 0.0281,
              0.0248, 0.0217, 0.0189, 0.0164, 0.0141,
              0.012, 0.0101, 0.0083, 0.0068, 0.0054,
              0.0041, 0.0029, 0.0018, 0.0009, 0.000,
 e_vert                             = 100,100,100
 p_top_requested                    = 5000.
 num_metgrid_levels                 = 138,
 num_metgrid_soil_levels            = 4,
 dx                                 = 1250, 250, 50,
 dy                                 = 1250, 250, 50,
 grid_id                            = 1,     2,   3,
 parent_id                          = 0,     1,   2,
 i_parent_start                     = 1,   330, 285,
 j_parent_start                     = 1,   355, 208,
 parent_grid_ratio                  = 1,     5,   5,
 parent_time_step_ratio             = 1,     5,   5,
 feedback                           = 0,
 smooth_option                      = 0
 use_adaptive_time_step             = .true.
 step_to_output_time                = .true.
 max_step_increase_pct      = 5,51,51
 starting_time_step         = 500,100,50
 starting_time_step_den     = 100,100,100
 max_time_step              = 1500,300,200
 max_time_step_den          = 100,100,100
 min_time_step              = 400,50,40
 min_time_step_den          = 100,100,100
/
 &physics
 sst_update                         = 0,
 mp_physics                         = 8, 8, 8,
 use_aero_icbc = .true.
 ra_lw_physics                      = 4, 4, 4,
 ra_sw_physics                      = 4, 4, 4,
 radt                               = 1, 1, 1,
 o3input                            = 2,
 sf_sfclay_physics                  = 1, 1, 1,
 sf_surface_physics                 = 4, 4, 4,
 bl_pbl_physics                     = 1, 0, 0,
 bldt                               = 0, 0, 0,
 topo_wind                          = 2,2,2
 cu_physics                         = 0, 0, 0,
 cudt                               = 5, 0, 0,
 isfflx                             = 1,
 ifsnow                             = 1,
 icloud                             = 1,
 surface_input_source               = 3,
 num_soil_layers                    = 4,
 mp_zero_out                        = 0,
 sf_urban_physics                   = 1,1,1
```

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 maxiens                             = 1,
 maxens                              = 3,
 maxens2                             = 3,
 maxens3                             = 16,
 ensdim                              = 144,
 slope_rad                           = 1,1,1
 topo_shading                        = 1,1,1
 num_land_cat                        = 34,
 iz0tlnd                             = 1,
 do_radar_ref                        = 0,
 shcu_physics                        = 3,0,0,
 usemonalb=.false.
 hail_opt = 1
 seaice_threshold = 259.
 seaice_thickness_default= 1.
 rdlai2d = .true.
 hailcast_opt = 0
 haildt=10
/
 &noah_mp
 dveg=9
 opt_crs=1
 opt_sfc=1
 opt_btr=2
 opt_run=3
 opt_frz=1
 opt_inf=2
 opt_rad=3
 opt_alb=2
 opt_snf=1
 opt_tbot=2
 opt_stc=1
 opt_gla=1
/
 &chem
 ne_area                             = 120,
 chem_opt                            = 2,2,2
 emiss_opt                           = 3,3,3
 io_style_emissions                  = 2,
 emiss_inpt_opt                      = 1,1,1
 chem_in_opt                         = 1,1,1
 kemit                               = 1,
 dmsemis_opt                         = 0,
 aer_ra_feedback                     = 1,1,1
 aer_op_opt                          = 1,1,1
 opt_pars_out                        = 0
 gas_drydep_opt                      = 0,0,0
 aer_drydep_opt                      = 1,1,1
 gas_bc_opt                          = 1,1,1
 gas_ic_opt                          = 1,1,1
 aer_bc_opt                          = 1,1,1
 aer_ic_opt                          = 1,1,1
 gaschem_onoff                       = 1,1,1
 aerchem_onoff                       = 1,1,1
 wetscav_onoff                       = 0,0,0
 cldchem_onoff                       = 0,0,0
 vertmix_onoff                       = 1,1,1
 seas_opt                            = 0
 dust_opt                            = 0
 biomass_burn_opt                    = 0,0,0
 bio_emiss_opt                       = 0,0,0
 phot_opt                            = 2,2,2
```

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 have_bcs_chem                 = .true.,.true.,.true.
 chem_conv_tr                  = 0,0,0
 diagnostic_chem               = 0,0,0
 chemdt                        = 2.,1.,0.75
 photdt                        = 5,5,5,
 bioemdt                       = 10.,5.,5.,
/
 &dynamics
 w_damping                     = 1,
 gwd_opt                       = 1,
 diff_opt                      = 2, 2, 2
 km_opt                        = 4, 2, 2
 diff_6th_opt                  = 2,      2,      2,
 diff_6th_factor               = 0.12,   0.12,   0.12,
 base_temp                     = 290.
 damp_opt                      = 3,
 zdamp                         = 5000.,  5000.,  5000.,
 dampcoef                      = 0.2,    0.2,    0.2 ,
 khdif                         = 0,      0,      0,
 kvdif                         = 0,      0,      0,
 non_hydrostatic               = .true., .true., .true.,
 moist_adv_opt                 = 2,      2,      2,
 scalar_adv_opt                = 2,      2,      2,
 chem_adv_opt                  = 2,      2,      2,
 tke_adv_opt                   = 2,      2,      2,
 use_input_w                   = .false.
 epssm                         = 0.9, 0.9, 0.9,
 base_lapse_strat              = -11.
 mix_isotropic                 = 0,      1,      1,
 mix_full_fields               = .true.,.true.,.true.,
 sfs_opt                       = 0, 1, 1
 hybrid_opt = 0
 smdiv = 0.2
 emdiv = 0.02
/
 &bdy_control
 spec_bdy_width                = 10,
 spec_zone                     = 1,
 relax_zone                    = 9,
 spec_exp = 0.33
 specified                     = .true., .false.,.false.,
 nested                        = .false., .true., .true.,
 have_bcs_moist                = .true. ,.true.,.true.
 have_bcs_scalar               = .true.,.true.,.true.
/
 &grib2
 /
&namelist_quilt
 nio_tasks_per_group = 0,
 nio_groups = 1,
 /
&logging
stderr_logging=0
io_servers_silent=.true.
/
```