

# GAME Handbook

GAME Development Team

## 1 Running the model

All physical quantities in this document are to be multiplied with their respective SI units.

Listing 1: Example input file.

```
#!/bin/bash
operator=Boss
overwrite_run_id=1
run_id=jw_perturbed_moist
run_span=3600
write_out_interval=900
grid_props_file=/home/max/compiled/game/grids/B4L26T30000_M2_O2_OL17.nc
init_state_filename=test_4_B4L26T30000_M2_O2_OL17.grb2
init_state_file=/home/max/compiled/game/input/$init_state_filename
output_dir_base=/home/max/compiled/game/output
cfl_margin=0.2
diffusion_on=1
dissipation_on=1
tracers_on=1
rad_on=0
radiation_delta_t=3600
tracers_dynamics_delta_t_ratio=3
write_out_mass_dry_integral=0
write_out_entropy_gas_integral=0
write_out_energy_integral=0
source run.sh
```

Listing 1 is an example of an input file. Table 1 explains the meanings of the variables.

## 2 Grid generation procedure

A grid is determined by the following four properties:

- the resolution, specified via the parameter RES\_ID
- the orography, specified via the parameter ORO\_ID
- the height of the top of the atmosphere, specified via the parameter TOA
- the number of layers, specified via the parameter NUMBER\_OF\_LAYERS

The grid generator needs to be recompiled for every specific resolution, therefore change the constant RES\_ID in the source file `grid_generator.c` and execute the bash script `compile.sh`

## 3 Test state generation procedure

name	domain	meaning
operator	string	Operator of the model, for example Company XYZ, Inc.
overwrite_run_id	0, 1	if 0: use auto-generated run_id, if 1: use manually set run_id (see next line)
run_id	string (optional)	run_id to be used if overwrite_run_id is set to 1
run_span	integer	How long the model shall run into the future.
write_out_interval	integer $\geq 900$	Every how many seconds output shall be generated.
grid_props_file	string	File name of the grid properties file.
init_state_filename	string	File name of the initialization state file.
init_state_file	string	Full path of the initialization state file.
output_dir_base	string	The directory to which output shall be written.
cfl_margin	double	Manual reduction of the time step below the CFL criterion: $\Delta t = (1 - \text{cfl\_margin})\Delta t^{(\text{CFL})}$ .
diffusion_on	0, 1	diffusion switch
dissipation_on	10, 1	dissipation switch
tracers_on	0, 1	tracers switch
rad_on	0, 1	radiation switch
radiation_delta_t	double $\geq \Delta t$	Every how many seconds the radiation flux densities shall be updated.
write_out_mass_dry_integral	0, 1	Switch to decide whether a global integral of dry mass shall be written out at every time step.
write_out_entropy_gas_integral	0, 1	Switch to decide whether a global integral of the entropy shall be written out at every time step.
write_out_energy_integral	0, 1	Switch to decide whether a global integral of the energy shall be written out at every time step.

Table 1: Input file explanation.