

This is a list of possible solutions to known crashes with ROCKE-3D  
<created by mway 2017/06>

### 1.) Stopped in aadvtx

First check the velocity fields, but otherwise try lowering the dynamical timestep (lowering the timestep will cause the model to run more slowly). This can be done by:

- a.) lowering DTsrc from 1800. to 900. [Never go below 900] BUT **do NOT change this quantity after your run has begun. If you want to change it then start a new run.**
- b.) lowering DT\_XUfilter=DT\_XVfilter from 450. to 225. or 112.5

Normally one also changes DT to the same value chosen for DT\_XUfilter=DT\_XVfilter

NOTE: Igor A. says: "In some cases I was able to pass through the "Stopped in aadvtx" error by increasing the number of iterations in QUS\_DRV.f, subroutine aadvtx. But Max doesn't like this approach. He thinks that velocities got already crazy, if the solution requires so many iterations."

### 2.) In run\_status: "11 Stopped in aadvtx"

In PRT file you may also find:

```
AADVQ0: ncyc>2 6
AADVQ0: ncyc>2 6DT
aadvtx: j,l,courmax= 3 20 5.31296429315107
```

This type of crash was happening for slowly rotating aquaplanet runs on an older version of Planet\_1.0. The solution was to add this line to the rundeck:

```
initial_psurf_from_topo=1
```

And this preprocessor directive:

```
#define PBL_USES_GCM_TENDENCIES
```

You can use the default AIC file (AIC.RES\_M20A.D771201.nc) to utilize initial\_psurf\_from\_topo=1 with the 20L model (only!), but I also created an AIC file that can be used with the 40L model which can be found on discover:  
AIC=/home/mway/mway\_input\_files/AIC.RES\_M20A.D771201\_40L.nc

To avoid similar crash messages that may or may not crash the run it is recommended that you lower the timestep as in 1a and 1b above. You can also add this line for the 20L model: rtau=300000.,200000.,100000.

If you are running the 40 layer model use:

```
rtau=320000.,270000.,220000.,170000.,120000.,70000.
```

Note that with rtau, the smaller the numbers are the stronger is the drag. I.e. with smaller numbers you get a more stable atmosphere, but you may add artificial heating to the top of the atmosphere (Igor Aleinov)

You may also consider adding:

mincolmass=1000.

maxcolmass=20000000000.

In extreme cases when you think it really can run farther then try these specific values, but in general we do NOT recommend changing the DT (timestep) related quantities as they may influence your results. Do NOT change DTsrc after your run has begun. If you want to change it you will need to restart your run. Also, DT,DT\_XUfilter,DT\_XVfilter must only be changed by factors of 2.

mincolmass=0.

maxcolmass=1800.

DTsrc=900.

DT=112.5

DT\_XUfilter=225.

DT\_XVfilter=225.

DT\_YVfilter=0. ! Shapiro filter on V in N-S direction

DT\_YUfilter=0. ! Shapiro filter on U in N-S direction

Nlsurf=1 ! increase as layer 1 gets thinner

nrad=1

### 3.) RESET\_SURF\_FLUXES: INCORRECT RESET

This is caused by some instability in OCNDYN. Try using Max's fix found in Mike's version on discover: /home/mway/planet10/model/OCNDYN\_icesubsurf\_mk2.f

Or use this link:

[https://drive.google.com/file/d/1HSAY0Gq-xKqwQqIVFQIGA\\_3itPyUfnj7/view?usp=sharing](https://drive.google.com/file/d/1HSAY0Gq-xKqwQqIVFQIGA_3itPyUfnj7/view?usp=sharing)

NOTE: The changes were put in around line 5826 of OCNDYN.f on 2017/09/16

And hence those changes begin on line 5826 in OCNDYN\_icesubsurf\_mk2.f

The OCNDYN.f file has changed in the past year, so be careful when making changes.

You may not be able to simply grab my version at the path above.

### 4.) Stopped in ATMDYN::SDRAG or >>> ADVECM: Mass diagnostic error <<<

a.) First try putting this in your rundeck: maxcolmass=20000000000.

The default values of mincolmass & maxcolmass correspond to Earth's histogram of topography according to Max.

b.) if that doesn't work and you are running the 20 layer atm model then try:

rtau=300000.,200000.,100000.

If you are running the 40 layer model use (see above for note on this):

rtau=320000.,270000.,220000.,170000.,120000.,70000.

NOTE: you may need to use the older of your fort.1.nc and fort.2.nc files when restarting as otherwise the winds will already be too high when you try to use this fix. Meaning, for example, if fort.2.nc is older than fort.1.nc then copy fort.2.nc to fort.1.nc

5.) "Small mo" appears in run\_status and your PRT file contains something like:

```
small mo      71      45      4 0.74922627749292259      10
```

NOTE: This is because the ocean has frozen to the bottom in grid cell [71 45]. We have no solution to this problem that allows you to continue running. You have to edit your ocean topography file (TOPO\_OC) and deepen the ocean at that grid point. Mike Way has several alternative Earth ocean topographies that you can use to avoid this problem.

If it happens for a smaller radius world (like Mars) contact Mike Way. We hope to have a for such cases in planet\_2.0

6.) Running default P1SoM40 rundeck with planetName='notEarth' or other name. One sees:

```
submitting: ./P1SoM40 -cold-restart -np 23
Attempting to use an MPI routine before initializing MPI
Attempting to use an MPI routine before initializing MPI
...
Attempting to use an MPI routine before initializing MPI
Problem encountered while running
>>> INPUT not yet completed <<<
```

This probably means that you have not defined quantizeYearLength='False' or 'True' In the PARAMETERS section of your rundeck. This line is required when planetName is set.

One uses the value of True when one desires a tidally locked world. Otherwise one should always use False.

7.) 255 retp(): bounds exceeded for ground/canopy temperature- see soil\_outw and fort.99

This means the temperature bounds on the soil have been violated. Normally this shows up when things are too hot. One can add this to the rundeck or the I file(make it higher as need be):  
maxGroundTemperature=400.0d0

8.) DEBUG MODE: If you see a segmentation fault or the like in either your PRT, run\_status or the last slurm-XXX file then you might want to run the model in debug mode. Lets pretend your model rundeck name is P1001.R this is how to run in debug mode:

a.) grab an interactive queue (if you are on the discover supercomputer, otherwise ignore this comment):

b.) compile with traps on:

```
% make -j setup RUN=P2SNoM40_test MPI=YES EXTRA_FFLAGS="-g -O0"
EXTRA_LFLAGS="-g -O0" COMPILE_WITH_TRAPS=YES
```

c.) Run it in debug mode:

```
% DEBUG_COMMAND="gdb --args" ../exec/runE P2SNoM40_test -cold-restart -np 1 -d
gdb> run
```

Hopefully you'll find which source file and line number is causing the problem.

8.) 11 ADVECM: Mass diagnostic error  
Pressure diagnostic error...

Try to set to a higher (multiple of 2) value: e.g. Nlsurf=1->2

9.) 255 Seaice too cold after ADDICE

This is because sea ice temperatures are lower than allowed for the Earth model. It's not a big deal, the temperature bounds simply need to be increased. You can download the file called SEAICE\_DRVLOWTEMP.f and place it in the model/ directory. Then replace SEAICE\_DRV with SEAICE\_DRVLOWTEMP in your rundeck. Recompile the model, but DO NOT run the setup hour (--cold-restart). Then you should be able to run the model from where it died. Again, you do not need to do a cold-restart.

You can also create your own SEAICE\_DRVLOWTEMP.f, e.g.

```
% diff SEAICE_DRV.f SEAICE_DRVLOWTEMP.f
966,967c966,967
<     if (TSIL(1).lt.-100.) then
<         write(6,*) "Seaice: T < -100. i,j,TSI = ",i,j,TSIL(1:LMI)
---
>     if (TSIL(1).lt.-273.) then
>         write(6,*) "Seaice: T < -273. i,j,TSI = ",i,j,TSIL(1:LMI)
```

10.) For particularly 'hot' runs: In Radia NaN errors/crashes that look like:

```
In Radia: Time,I,J,L,TL    397104    44    29    1 NaN
```

There are two possible fixes for this crash. You should use both:

Appears to be a radiation crash, but it is a clouds/convection issue.

a.) **#define CLOUDS\_BUGFIX\_2015**

In CLOUDS2.F90

<https://simplex.giss.nasa.gov/cgi-bin/gitweb.cgi?p=modelE.git;a=commit;h=d7775ac6a9d52e51a8f73ad1371433a0dba5424e>

Corrected the order of calculations of downdraft detrainment of momentum above ldmn.

b.) **#define CLOUDS\_LIMIT\_ETADN**

In CLOUDS2.F90

<http://simplex.giss.nasa.gov/cgi-bin/gitweb.cgi?p=modelE.git;a=commitdiff;h=74a2d514abafb85159b5ef13b7e346d12339f6d3>

Should prevent unrealistically high FENTRA values which were messing up the velocity field on warm planets.