

Coupling AxiSEM and Specfem3D
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1 Meshfem3D

running Meshfem3D with parameters :

In the directory MESH/

ParFileMeshChunk : parameters for the chunk meshing

iasp91_dsm or prem_dsm : background model used in both AxiSEM and Specfem3D

In the Directory DATA/

CMTSOLUTION : with 0 in order to not use source inside

coeff_poly_deg12 : to generate smooth initial solution

STATIONS : stations files

Par_file : with

SIMULATION_TYPE=1

SAVE_FORWARD = .false.

COUPLE_WITH_EXTERNAL_CODE = .true

EXTERNAL_CODE_TYPE = 2

2 AxiSEM mesher

running AxiSEM mesher

3 AxiSEM solver

copy 2 files produced by meshfem3D in the running AxiSEM directory:

input_box.txt and input_box_sem_cart.txt

add one first line to indicate the number of line to be read

running AxiSEM solver with parameters (differences with *.TEMPLATES provided bny AxiSEM) :

inparam_basic :

ATTENUATION false
SAVE_SNAPSHOTS true

inparam_advanced :

KERNEL_WAVEFIELDS true
KERNEL_IBEG 0
KERNEL_IEND 4

4 Specfem Partitionning

running scotch partitionning

5 Specfem Generate database

running generate database

6 Interface : expand 2D to 3D

mpi run with arbitrary number of processes

parameter file : expand_2D_3D.par (in SOLVER directory)

input_box.txt
input_box_sem_cart.txt
8 # number of AxiSEM mpi processes used in solver
60. 0. # source position (lat lon)
0. 60. # chnuk center (lat lon)
1 # number of axisem simus depends on moment tensor used
8 # number of Specfem3D MPI processes
../run_synth_alps/create_mesh/MESH # Specfem MESH directory
../run_synth_alps/create_mesh/OUTPUT_FILES/DATABASES_MPI # Specfem
TRACTION DIRECTORY

7 Interface : reformat

mpi run with the ****SAME**** number of processes that Specfem3D will use.
One file is created by one process for one Specfem3D partion of domain.

copy input_box.txt and input_box_sem_cart.txt inside the directory where
AxiSEM did the run and add a new parameter file:

```
reformat.par
25. # output sampling in Hz (time step that will use in Specfem3D simu)
650. 700. # begin time and end time (s.)
```

8 Running specfem3D

9 Set up scripts