

# Activity 1 - Run an idealized ocean basin

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## 1. Get the model

- Download from <https://mesharou.github.io/gula.com/ModNum/croco.tar.gz> or from [/forums/public/pub/Data/croco.tar.gz](#)
- Put it in a folder of your choice: [for example `~/ModNum/`]
- untar it: `tar xf croco.tar.gz`
- the croco source code is in the folder `~/ModNum/croco/OCEAN`

## 2. Compile the model

- Create a folder where you will run the model [for example `~/ModNum/case1`]
- we need to edit the following files: `jobcomp`, `cppdefs.h`, `param.h`, `croco.in` so copy them into the folder you just created:

```
cp ~/ModNum/croco/OCEAN/jobcomp ~/ModNum/case1/  
cp ~/ModNum/croco/OCEAN/cppdefs.h ~/ModNum/case1/  
cp ~/ModNum/croco/OCEAN/param.h ~/ModNum/case1/  
cp ~/ModNum/croco/TEST_CASES/croco.in.Basin ~/ModNum/case1/croco.in
```

- the model needs a fortran compiler and compatible netcdf libraries, so we will
  1. unload everything: `module purge`
  2. then load intel compilers and netcdf library  
`module load intel/12.1 netcdf/4.1.3-intel12`

- edit the `jobcomp` to specify the location of the source code:

```
SOURCE=../croco/OCEAN
```

- edit the `cppdefs.h` and choose the predefined test case **Basin**:

```
#define BASIN  
  
...  
  
#undef REGIONAL
```

- Compile the code: `./jobcomp`

### 3. Run the model

- run the model: `./croco croco.in`
- look at the output: `ncview basin_his.nc`

### 4. Modify the namelist (croco.in)

- Modify the namelist (`croco.in`) to:
  - make the model run for 20 years (*you can approximate 1 year = 360 days*)
  - output of history files every 30 days
  - outputs of variables averaged over 5 years

### 5. Run the model using openMP

- we need to edit the file `cppdefs.h`,
- find the part of the file where the BASIN case is defined (`#elif defined BASIN`) and change `# undef OPENMP` into `# define OPENMP`

```
#elif defined BASIN  
/*  
!               Basin      Example  
!               =====  
*/  
# define OPENMP  
# undef MPI
```

- edit the `param.h` file to choose the number of processors (NPP) you want to use:

```
#elif defined OPENMP
    parameter (NPP=8)
```

- reCompile the code: `./jobcomp`  
- define the number of threads to use for your computer (the number should be the same than NPP defined in the `param.h` file), type in your terminal:

- in bash: `export OMP_NUM_THREADS=8`
- in csh/tcsh: `setenv OMP_NUM_THREADS 8`

- run the model: `./croco croco.in`

- What can you tell about the configuration? What is the forcing? What is the Coriolis parameter? What is the boundary condition? What is the bottom condition?

- What can you tell about the circulation? Is it similar to Stommel's gyre?  
(<https://mesharou.github.io/gula.com/ModNum/Stommel48.pdf>)