# ROMS代码阅读

ROMS\_AGRIF (IND, France)与ROMS\_v3.5(Rutgers Univ., USA)不一样。

https://www.croco-ocean.org/download/roms\_agrif-project/

## ROMS\_AGRIF编译方式

见jobcomp

（1）设置编译器、NETCDF路径、MPI路径

（2）拷贝AGRIF下的所有代码（使用cp命令）：

/bin/cp -f ${SOURCE}/\*.F $SCRDIR

/bin/cp -f ${SOURCE}/\*.h $SCRDIR

（3）拷贝其他路径下的模型代码：

/bin/cp -f ${SOURCE}/PISCES/\* $SCRDIR

（4）设置编译参数

（5）是否需要编译AGRIF？如果需要，设置编译参数FLAGS

（6）make mpc

（7）编译AGRIF库

## ROMS\_AGRIF预处理命令

预处理命令有：

REGIONAL ! 区域模拟

OA\_MCT

OA\_COUPLING ！ OASIS Couplin

FLOATS ！ 浮标

STATIONS

AGRIF

MPI

WKB\_WWAVE

AUTOTILING

CR

SOLVE3D

PISCES

SEDIMENT ! 就没有使用

ANA\_GRID

ANA\_INITIAL

#if defined BIOLOGY && defined PISCES

#if defined SOLVE3D || defined WET\_DRY

#if defined TNUDGING || defined ZNUDGING || defined SPONGE \

|| (defined BBL && defined ANA\_BSEDIM)\

|| (defined SEDIMENT && defined ANA\_SEDIMENT)\

|| (defined TCLIMATOLOGY)\

|| (defined ZCLIMATOLOGY && defined ANA\_SSH)

# if defined SEDIMENT && defined ANA\_SEDIMENT

# if defined ZCLIMATOLOGY && defined ANA\_SSH

#if defined BBL && !defined ANA\_BSEDIM && !defined SEDIMENT

#if defined SSH\_TIDES || defined UV\_TIDES

SPHERICAL

#undef BASIN /\* Basin Example \*/

#undef CANYON\_A /\* Canyon\_A Example \*/

#undef CANYON\_B /\* Canyon\_B Example \*/

#undef EQUATOR /\* Equator Example \*/

#undef GRAV\_ADJ /\* Graviational Adjustment Example \*/

#undef INNERSHELF /\* Inner Shelf Example \*/

#undef RIVER /\* River run-off Example \*/

#undef OVERFLOW /\* Graviational/Overflow Example \*/

#undef SEAMOUNT /\* Seamount Example \*/

#undef SHELFRONT /\* Shelf Front Example \*/

#undef SOLITON /\* Equatorial Rossby Wave Example \*/

#undef UPWELLING /\* Upwelling Example \*/

#undef VORTEX /\* Baroclinic Vortex Example (Test AGRIF)\*/

#undef INTERNAL /\* Internal Tide Example \*/

#undef JET /\* Baroclinic Jet Example \*/

#undef RIP /\* Rip Current Test Case \*/

#undef SHOREFACE /\* Shoreface Test Case on a Planar Beach \*/

#undef THACKER /\* Thacker wetting-drying Example \*/

默认#define REGIONAL

REGIONAL (realistic) Configurations

/\* Configuration Name \*/

# define BENGUELA\_LR

/\* Parallelization \*/

# undef OPENMP

# undef MPI

/\* Nesting \*/

# undef AGRIF

# undef AGRIF\_2WAY

/\* Open Boundary Conditions \*/

# undef TIDES

# define OBC\_EAST

# define OBC\_WEST

# define OBC\_NORTH

# define OBC\_SOUTH

/\* Applications \*/

# undef FLOATS

# undef STATIONS

# undef PASSIVE\_TRACER

# undef SEDIMENT

# undef BBL

!-------------------------------------------------

! PRE-SELECTED OPTIONS

! ADVANCED OPTIONS ARE IN SET\_GLOBAL\_DEFINITIONS.H

!-------------------------------------------------

/\* Parallelization \*/

# ifdef MPI

# undef PARALLEL\_FILES

# endif

# undef AUTOTILING

# undef ETALON\_CHECK

/\* Grid configuration \*/

# define CURVGRID

# define SPHERICAL

# define MASKING

# undef WET\_DRY

# undef NEW\_S\_COORD

/\* Model dynamics \*/

# define SOLVE3D

# define UV\_COR

# define UV\_ADV

/\* Equation of State \*/

# define SALINITY

# define NONLIN\_EOS

# define SPLIT\_EOS

/\* Lateral Explicit Momentum Mixing \*/

# undef UV\_VIS2

# ifdef UV\_VIS2

# define UV\_MIX\_S

# define UV\_VIS\_SMAGO

# endif

/\* Lateral Tracer Advection (default UP3) \*/

# define TS\_HADV\_RSUP3

# undef TS\_HADV\_UP5

# undef TS\_HADV\_C4

# undef TS\_HADV\_WENO5

/\* Lateral Explicit Tracer Mixing \*/

# undef TS\_MIX\_S

# ifdef TS\_HADV\_C4

# define TS\_DIF2

# undef TS\_DIF4

# define TS\_DIF\_SMAGO

# define TS\_MIX\_ISO

# endif

/\* Sponge layers for UV and TS \*/

# define SPONGE

/\* Vertical Mixing \*/

# undef BODYFORCE

# undef BVF\_MIXING

# define LMD\_MIXING

# undef GLS\_MIXING

# ifdef LMD\_MIXING

# define LMD\_SKPP

# define LMD\_BKPP

# define LMD\_RIMIX

# define LMD\_CONVEC

# undef LMD\_DDMIX

# define LMD\_NONLOCAL

# endif

# ifdef GLS\_MIXING

# define GLS\_KKL

# undef GLS\_KOMEGA

# undef GLS\_KEPSILON

# undef GLS\_GEN

# undef KANTHA\_CLAYSON

# undef CRAIG\_BANNER

# undef CANUTO\_A

# undef ZOS\_HSIG

# endif

/\* Surface Forcing \*/

# undef BULK\_FLUX

# ifdef BULK\_FLUX

# define BULK\_FAIRALL

# define BULK\_LW

# define BULK\_EP

# define BULK\_SMFLUX

# undef SST\_SKIN

# undef ANA\_DIURNAL\_SW

# undef ONLINE

# else

# define QCORRECTION

# define SFLX\_CORR

# define ANA\_DIURNAL\_SW

# endif

/\* Lateral Forcing \*/

# define CLIMATOLOGY

# ifdef CLIMATOLOGY

# define ZCLIMATOLOGY

# define M2CLIMATOLOGY

# define M3CLIMATOLOGY

# define TCLIMATOLOGY

# define ZNUDGING

# define M2NUDGING

# define M3NUDGING

# define TNUDGING

# undef ROBUST\_DIAG

# endif

# undef FRC\_BRY

# ifdef FRC\_BRY

# define Z\_FRC\_BRY

# define M2\_FRC\_BRY

# define M3\_FRC\_BRY

# define T\_FRC\_BRY

# endif

/\* Bottom Forcing \*/

# define ANA\_BSFLUX

# define ANA\_BTFLUX

/\* Point Sources - Rivers \*/

# undef PSOURCE

# undef PSOURCE\_NCFILE

# ifdef PSOURCE\_NCFILE

# define PSOURCE\_NCFILE\_TS

# endif

/\* Open Boundary Conditions \*/

# ifdef TIDES

# define SSH\_TIDES

# define UV\_TIDES

# define TIDERAMP

# define OBC\_M2FLATHER

# else

# undef OBC\_M2SPECIFIED

# undef OBC\_M2FLATHER

# define OBC\_M2CHARACT

# undef OBC\_M2ORLANSKI

# ifdef OBC\_M2ORLANSKI

# define OBC\_VOLCONS

# endif

# endif

# define OBC\_M3ORLANSKI

# define OBC\_TORLANSKI

# undef OBC\_M3SPECIFIED

# undef OBC\_TSPECIFIED

/\* Input/Output & Diagnostics \*/

# define AVERAGES

# define AVERAGES\_K

# undef DIAGNOSTICS\_TS

# undef DIAGNOSTICS\_UV

# ifdef DIAGNOSTICS\_TS

# undef DIAGNOSTICS\_TS\_ADV

# undef DIAGNOSTICS\_TS\_MLD

# endif

总结，预定义中开启的基本预处理命令有：

开边界条件：

# define OBC\_EAST

# define OBC\_WEST

# define OBC\_NORTH

# define OBC\_SOUTH

默认启用的预选命令有：

（1）模型动力学选项：

# define SOLVE3D

# define UV\_COR

# define UV\_ADV

（2）网格设置

# define CURVGRID

# define SPHERICAL

# define MASKING

（3）侧向动量掺混

# define UV\_VIS2

# define MIX\_GP\_UV

（4）侧向标量掺混

# define MIX\_GP\_TS

# define TS\_DIF2

（5）垂向混掺

# define LMD\_MIXING

# ifdef LMD\_MIXING

# define LMD\_SKPP

# undef LMD\_SKPP2005

# define LMD\_BKPP

# define LMD\_RIMIX

# define LMD\_CONVEC

# undef LMD\_DDMIX

# define LMD\_NONLOCAL

# endif

（6）状态方程

# define SALINITY

# define NONLIN\_EOS

# define SPLIT\_EOS

（7）表面驱动

# define QCORRECTION

# define SFLX\_CORR

# define DIURNAL\_SRFLUX

（8）侧向驱动

# define SPONGE

# define CLIMATOLOGY

# ifdef CLIMATOLOGY

# define ZCLIMATOLOGY

# define M2CLIMATOLOGY

# define M3CLIMATOLOGY

# define TCLIMATOLOGY

# define ZNUDGING

# define M2NUDGING

# define M3NUDGING

# define TNUDGING

#endif

（9）底部驱动

# define ANA\_BSFLUX

# define ANA\_BTFLUX

（10）开边界条件

# define OBC\_M3ORLANSKI

# define OBC\_TORLANSKI

（11）IO和诊断

# define AVERAGES

# define AVERAGES\_K

测试AGRIF的算例(Baroclinic VORTEX)

# undef ETALON\_CHECK

# undef OPENMP ! AGRIF还不能MPI并行化?

# undef MPI

# define AGRIF

# define AGRIF\_2WAY

# undef AGRIF\_CONSERV\_VOL

# undef AGRIF\_CONSERV\_TRA

# define MASKING

# define SOLVE3D ! model dynamics

# define UV\_COR

# define UV\_ADV

# define ANA\_STFLUX

# define ANA\_SMFLUX

# define ANA\_BSFLUX ! Bottom Forcing

# define ANA\_BTFLUX

# define ANA\_VMIX ! ???

# define UV\_VIS2

# define MIX\_S\_UV

# define TS\_DIF2

# define MIX\_S\_TS

# define SPONGE ! Sponge Layer

# define ZCLIMATOLOGY ! Lateral Forcing

# define M2CLIMATOLOGY

# define M3CLIMATOLOGY

# define TCLIMATOLOGY

# define ZNUDGING ! Nudging

# define M2NUDGING

# define M3NUDGING

# define TNUDGING

# define OBC\_EAST ! Open Boundary Condition

# define OBC\_WEST

# define OBC\_NORTH

# define OBC\_SOUTH

# define OBC\_M2FLATHER ! #undefined TIDES

# define OBC\_TORLANSKI ! 辐射开边界条件

# define OBC\_M3ORLANSKI

以Upwelling为例(Penven, 2006论文中在Upwelling模拟中使用了AGRIF)

# define ETALON\_CHECK

# undef OPENMP

# undef MPI

# define SOLVE3D

# define UV\_COR

# define UV\_ADV

# define ANA\_GRID

# define ANA\_INITIAL

# define AVERAGES

# define SALINITY

# define NONLIN\_EOS

# define SPLIT\_EOS

# define ANA\_SSFLUX

# define ANA\_SRFLUX

# define ANA\_STFLUX

# define ANA\_BSFLUX

# define ANA\_BTFLUX

# define ANA\_SMFLUX

# define LMD\_MIXING

# define LMD\_SKPP

# define LMD\_BKPP

# define LMD\_RIMIX

# define LMD\_CONVEC

# define EW\_PERIODIC

AUTOTILING

ROMS supports serial, OpenMP, and MPI computations, with the user choosing between them at compile time. The serial code can also take advantage of multiple small tiles which can be sized to fit in cache. All are accomplished through domain decomposition in the horizontal. All of the horizontal operations are explicit with a relatively small footprint, so the tiling is a logical choice.

参考ROMS\_manual的第74页。

## ROMS\_TOOLS

Software tools for pre- and post-processing of oceanic regional simulations. [Environmental Modelling & Software](https://www.sciencedirect.com/science/journal/13648152),23(5), 2008: 660-662

## 数据下载

<https://www.croco-ocean.org/download/datasets/>