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*Supplement of*

## **Tidal influences on a future evolution of the Filchner–Ronne Ice Shelf cavity in the Weddell Sea, Antarctica**

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Supplement:

ROMS Model Paramter selection Physical Parameters, Grid: 01

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3153600	ntimes	Number of timesteps for 3-D equations.
200	dt	Timestep size (s) for 3-D equations.
30	ndtfast	Number of timesteps for 2-D equations between each 3D timestep.
1	ERstr	Starting ensemble/perturbation run number.
1	ERend	Ending ensemble/perturbation run number.
0	nrrec	Number of restart records to read from disk.
T	LcycleRST	Switch to recycle time-records in restart file.
12960	nRST	Number of timesteps between the writing of data into restart fields.
40	ninfo	Number of timesteps between print of information to standard output.
T	ldefout	Switch to create a new output NetCDF file(s).
157680	nHIS	Number of timesteps between the writing fields into history file.
1	ntsAVG	Starting timestep for the accumulation of output time-averaged data.
12960	nAVG	Number of timesteps between the writing of time-averaged data into averages file.
157680	ndefAVG	Number of timesteps between creation of new time-averaged file.
2000000	ntsDIA	Starting timestep for the accumulation of output time-averaged diagnostics data.
2000000	nDIA	Number of timesteps between the writing of time-averaged data into diagnostics file.
1.00E+00	nl_tnu2(01)	NLM Horizontal, harmonic mixing coefficient (m <sup>2</sup> /s) for tracer 01: temp
1.00E+00	nl_tnu2(02)	NLM Horizontal, harmonic mixing coefficient (m <sup>2</sup> /s) for tracer 02: salt
5.00E+00	nl_visc2	NLM Horizontal, harmonic mixing coefficient (m <sup>2</sup> /s) for momentum.
1.00E-05	Akt_bak(01)	Background vertical mixing coefficient (m <sup>2</sup> /s) for tracer 01: temp
1.00E-05	Akt_bak(02)	Background vertical mixing coefficient (m <sup>2</sup> /s) for tracer 02: salt
5.00E-05	Akv_bak	Background vertical mixing coefficient (m <sup>2</sup> /s) for momentum.
3.00E-04	rdrq	Linear bottom drag coefficient (m/s).
2.50E-03	rdrq2	Quadratic bottom drag coefficient.

2.00E-02	Zob	Bottom roughness (m).
1	lmd_jwt	Jerlov water type.
2	Vtransform	S-coordinate transformation equation.
4	Vstretching	S-coordinate stretching function.
1.00E-01	theta_s	S-coordinate surface control parameter.
1.00E+00	theta_b	S-coordinate bottom control parameter.
1000	Tcline	S-coordinate surface/bottom layer width (m) used in vertical coordinate stretching.
1025	rho0	Mean density (kg/m <sup>3</sup> ) for Boussinesq approximation.
0	dstart	Time-stamp assigned to model initialization (days).
0	tide_start	Reference time origin for tidal forcing (days).
19900101	time_ref	Reference time for units attribute (yyyymmdd.dd)
2.00E+01	Tnudg(01)	Nudging/relaxation time scale (days) for tracer 01: temp
2.00E+01	Tnudg(02)	Nudging/relaxation time scale (days) for tracer 02: salt
0.00E+00	Znudg	Nudging/relaxation time scale (days) for free-surface.
0.00E+00	M2nudg	Nudging/relaxation time scale (days) for 2D momentum.
1.00E+02	M3nudg	Nudging/relaxation time scale (days) for 3D momentum.
1.00E+01	obcfac	Factor between passive and active open boundary conditions.
F	VolCons(1)	NLM western edge boundary volume conservation.
F	VolCons(2)	NLM southern edge boundary volume conservation.
F	VolCons(3)	NLM eastern edge boundary volume conservation.
F	VolCons(4)	NLM northern edge boundary volume conservation.
-1.9	T0	Background potential temperature (C) constant.
34.65	S0	Background salinity (PSU) constant.
1	gamma2	Slipperiness variable: free-slip (1.0) or no-slip (-1.0).

Tile partition information for Grid 01: 0205x0211x0024 tiling: 008x004

Lateral Boundary Conditions: NLM

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Variable	Grid	West Edge	South Edge	East Edge	North Edge
zeta	1	Chapman	Closed	Chapman	Chapman
ubar	1	Flather	Closed	Flather	Flather
vbar	1	Flather	Closed	Flather	Flather
u	1	Radiation	Closed	Radiation	Radiation
v	1	Radiation	Closed	Radiation	Radiation
temp	1	Rad + Nud	Closed	Rad + Nud	Rad + Nud
salt	1	Rad + Nud	Closed	Rad + Nud	Rad + Nud

Activated C-preprocessing Options:

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WS	ROMS/TOMS 3.6 - WS sub
ADD_FSOBC	Adding tidal elevation to processed OBC data.
ADD_M2OBC	Adding tidal currents to processed OBC data.
ANA_BSFLUX	Analytical kinematic bottom salinity flux.
ANA_BTFLUX	Analytical kinematic bottom temperature flux.
ANA_FSOBC	Analytical free-surface boundary conditions.
ANA_INITIAL	Analytical initial conditions.
ANA_M2OBC	Analytical 2D momentum boundary conditions.
ANA_M3OBC	Analytical 3D momentum boundary conditions.
ANA_SMFLUX	Analytical kinematic surface momentum flux.
ANA_SRFLUX	Analytical kinematic shortwave radiation flux.
ANA_SSFLUX	Analytical kinematic surface salinity flux.
ANA_STFLUX	Analytical kinematic surface temperature flux.
ASSUMED_SHAPE	Using assumed-shape arrays.
AVERAGES	Writing out time-averaged nonlinear model fields.
CURVGRID	Orthogonal curvilinear grid.

DIAGNOSTICS_TS	Computing and writing tracer diagnostic terms.
DJ_GRADPS	Parabolic Splines density Jacobian (Shchepetkin, 2002).
DOUBLE_PRECISION	Double precision arithmetic.
ICESHELF	Include Ice Shelf Cavities.
ICESHELF_3EQ	Include 3eq Ice Shelf Thermodynamics.
LMD_CONVEC	LMD convective mixing due to shear instability.
LMD_MIXING	Large/McWilliams/Doney interior mixing.
LMD_NONLOCAL	LMD convective nonlocal transport.
LMD_RIMIX	LMD diffusivity due to shear instability.
LMD_SKPP	KPP surface boundary layer mixing.
MASKING	Land/Sea masking.
MIX_GEO_TS	Mixing of tracers along geopotential surfaces.
MIX_S_UV	Mixing of momentum along constant S-surfaces.
MPI	MPI distributed-memory configuration.
NONLINEAR	Nonlinear Model.
NONLIN_EOS	Nonlinear Equation of State for seawater.
PERFECT_RESTART	Processing perfect restart variables.
POWER_LAW	Power-law shape time-averaging barotropic filter.
PROFILE	Time profiling activated .
RAMP_TIDES	Ramping tidal forcing for one day.
!RST_SINGLE	Double precision fields in restart NetCDF file.
SALINITY	Using salinity.
SOLVE3D	Solving 3D Primitive Equations.
SPLINES	Conservative parabolic spline reconstruction.
SSH_TIDES	Add tidal elevation to SSH climatology.
TS_U3HADVECTION	Third-order upstream horizontal advection of tracers.
TS_C4VADVECTION	Fourth-order centered vertical advection of tracers.
TS_DIF2	Harmonic mixing of tracers.
UV_ADV	Advection of momentum.
UV_COR	Coriolis term.

UV_U3HADVECTION	Third-order upstream horizontal advection of 3D momentum.
UV_C4VADVECTION	Fourth-order centered vertical advection of momentum.
UV_QDRAG	Quadratic bottom stress.
UV_TIDES	Add tidal currents to 2D momentum climatologies.
UV_VIS2	Harmonic mixing of momentum.
VAR_RHO_2D	Variable density barotropic mode.