

DIR	FILE	ROUTINE	GLOBAL COMM	NOTES ON GLOBAL COMM	CONFIG – ROUTINE RUNTIME (%)
OPA_SRC	stpctl.F90	stp_ctl	mpp_min mpp_minloc mpp_max mpp_maxloc mpp_sum	<u>Analysed by Tim.</u> Removing the global communications only has a very small effect on stpctl runtime in control run	ORCA12 (2396 procs) - 1.28%

OPA_SRC/DOM	closea.F90	sbc_clo	mpp_sum	Used only for closed seas	None of the SETTE configs tests it
	domngb.F90	dom_ngb	mpp_minloc	Used to find the closest grid point from a given lon/lat position. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0.02%
	domvvl.F90	dom_vvl_sf_nxt	mpp_max mpp_min mpp_maxloc mpp_minloc	Used only if not free linear surface, twice for each time step, to control the maximum deformation. Null effect on the execution time	ORCA2LIM3 (16 procs on 4 compute nodes, 1000 time steps) - ~5%

OPA_SRC/DYN	wet_dry.F90	wad_lmt_bt	mpp_max	Used only for wetting and drying	None of the SETTE configs tests it
		wad_lmt			

OPA_SRC/DIA	diadct.F90	dia_dct	mpp_sum	Used only if diagnostics is activated by using key_diadct	An error occurs when testing the diagnostics with SETTE configs
	diafwb.F90	dia_fwb		Used to compute at each time step the 'Net freshwater budget' (a_fwf), printed only at the last time step. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0%
	diaptr.F90	ptr_sj_3d		Used only if diagnostics is activated by using the ln_diaptr namelist parameter. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0.1%
		ptr_sj_2d			
diar5.F90	dia_ar5	Used only if diagnostics is activated by using key_diar5	An error occurs when testing the diagnostics with SETTE configs		

OPA_SRC/FLO	floblk.F90	flo_blk	mpp_sum	Used only if diagnostics is activated by using key_floats. In flo_wri, the computation is performed at each time step even if the computed values are written only at floats write time steps	None of the SETTE configs tests it
	flowri.F90	flo_wri			

OPA_SRC/ICB	icbdia.F90	icb_dia	mpp_sum	Used to compute the iceberg floats, conditioned to ln_icebergs. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0.0%
OPA_SRC/SBC	sbcfwb.F90	sbc_fwb	glob_sum	Used to compute the fresh water budget (if nn_fwb/=0). Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0%
	sbcapr.F90	sbc_apr		Used to update the reference atmospheric pressure, conditioned to ln_ref_apr and ln_apr_dyn	None of the SETTE configs tests it
OPA_SRC/TRD	trdglo.F90	glo_dyn_wri	mpp_sum	Used only if diagnostics of the dynamic trend is activated. Print in ocean.output, conditioned to ln_glo_trd	An error occurs when testing the diagnostics with SETTE configs
		glo_tra_wri		Used only if diagnostics of the global T trend is activated. Print in ocean.output, conditioned to ln_glo_trd	
TOP_SRC	trcrst.F90	trc_rst_stat	mpp_max mpp_min	Used only at restart writing time steps for statistics writing	-

			glob_sum	in ocean.output	
TOP_SRC/PISCE S/P4Z	p4zsink.F90	p4z_sink	mpp_max glob_sum	mpp_max called only if nitermax for POC or GOC is greater than 1 if the kriest sinking parametrization is used, glob_sum is used to compute the MolC/s only at the last time step. For standard sinking parametrization, glob_sum is used to compute the total carbon export, which is not used after the computation. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) – ~3.7
	p4zflx.F90	p4z_flx	glob_sum	Used to compute the total and cumulative flux of carbon. It is computed at each time step even if it is used only at output and restart writing time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0.3%
	p4zsms.F90	p4z_dmp	glob_sum	Used to compute the relaxation of some tracers (the overhead depends on the relaxation frequency). Evaluated by activating the relaxation at each time step. The glob_sum spends ~18% of the routine	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) – ~0.7

				execution time	
	p4zsms.F90	p4z_chk_mass	glob_sum	Used at the end of the simulation or if the PISCES scalar are activated, for checking the mass conservation	ORCA2LIM_PISCES (16 procs on 4 compute nodes, 1000 time steps) - ~0.0%
	p4zprod.F90	p4z_prod	glob_sum	Executed to compute the total integrated primary production per year at the end of the simulation or if the tintpp PISCES scalar is activated (one global communication within a high computational intensive routine, just a limited impact)	ORCA2LIM_PISCES (16 procs on 4 compute nodes, 1000 time steps) - ~2.9%
	p4zsed.F90	p4z_sed	glob_sum	Used to compute the loss of biogenic silicon, Caco3 organic carbon in the sediments. One of the 3 glob_sum could be safely removed, since the result is not used (two global communications within a high computational intensive routine, just a limited impact)	ORCA2LIM_PISCES (16 procs on 4 compute nodes, 1000 time steps) - ~0.6%
TOP_SRC/TRP	trcrad.F90	trc_rad_sms	glob_sum	4 global communications to compute the correction to the	ORCA2LIM_PISCES (16 procs on 4

				artificial negative concentrations due to isopycnal scheme. Global communications spend 40% of the total routine execution time	compute nodes, 1000 time steps) - ~4%
--	--	--	--	---	---------------------------------------

LIM_SRC_2	limrhg_2.F90	lim_rhg_2	mpp_max	Used for convergence test when the relaxation is computed (the frequency of the convergence test could be reduced)	None of the SETTE configs tests it
	limtrp_2.F90	lim_trp_2	mpp_max	Used for CFL test. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0.3%
	limthd_2.F90	lim_thd_2	mpp_sum	Used if Fram Strait sea-ice transport is activated. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0.0%
	limhdf_2.F90	lim_hdf_2	mpp_max	Used to compute the horizontal diffusion. Null effect on the execution time	ORCA2LIM_PISCE S (16 procs on 4 compute nodes, 1000 time steps) - ~0.1%
	limrhg.F90	lim_rhg	mpp_max	Used to compute the residual	ORCA2LIM_PISCE

				during the convergence test, only if the trends control print is activated. Null effect on the execution time	S (16 procs on 4 compute nodes, 1000 time steps) – ~1.2
--	--	--	--	---	---

LIM_SRC_3	limitd_me.F90	lim_itd_me	mpp_max	Used for convergence test while computing the mechanical redistribution of ice thickness. Null effect on the execution time	ORCA2LIM3 (16 procs on 4 compute nodes, 1000 time steps) - ~3.9%
	limitd_th.F90	lim_itd_th_reb	mpp_max	Two mpp_max used to identify thicknesses that are too big/small. Null effect on the execution time	ORCA2LIM3 (16 procs on 4 compute nodes, 1000 time steps) - ~0.2%
	limthd_dif.F90	lim_thd_dif	mpp_max	Used to compute the maximal error in temperature. Null effect on the execution time	ORCA2LIM3 (16 procs on 4 compute nodes, 1000 time steps) - ~0.3%
	limtrp.F90	lim_trp	mpp_max	Used to test CFL during the sea-ice advection process. Null effect on the execution time	ORCA2LIM3 (16 procs on 4 compute nodes, 1000 time steps) - ~7.5%
	limctl.F90	lim_ctl	mpp_sum	Used to count the number of alert in case of model crash. Null effect on the execution time	ORCA2LIM3 (16 procs on 4 compute nodes, 1000 time steps) - ~0.0

	lim_hdf.F90	lim_hdf	mpp_max_multiple	Used for convergence test and still optimized by BSC to be performed every nn_convfrq iterations. Null effect on the execution time	ORCA2LIM3 (16 procs on 4 compute nodes, 1000 time steps) - ~4.7%
--	-------------	---------	------------------	---	--