

The aim of the <<communication cleanup>> work is to remove unnecessary communications within routines. This work is preparatory to the application of optimizations such as tiling and loop fusion optimizations. Thanks to the use of halo 2, in some cases the communications inside the routines can be shifted at the beginning of the routine or even outside, before the routine call. This implies a suitable enlarging of the subdomain size on which the calculations are carried out. In this phase, in order to maintain the compatibility with the halo 1 case, the communications inside the routines haven't been removed, but they have been embedded in an IF statement in order to select the case of halo=1 or halo=2. They will be definitely removed when the model will use only halo 2.

BEFORE	AFTER
<pre>DO_2D(0, 1, 0, 1) zfu = (ff_f(ji,jj) + ff_f(ji,jj-1)) * 0.5_wp zfv = (ff_f(ji,jj) + ff_f(ji-1,jj)) * 0.5_wp rfu(ji,jj) = SQRT(zfu * zfu + z1_t2) rfv(ji,jj) = SQRT(zfv * zfv + z1_t2) END_2D CALL lbc_lnk_multi('tramle', rfu, 'U', 1.0_wp , rfv, 'V', 1.0_wp)</pre>	<pre>DO_2D(nn_hls-1, nn_hls, nn_hls-1, nn_hls) zfu = (ff_f(ji,jj) + ff_f(ji,jj-1)) * 0.5_wp zfv = (ff_f(ji,jj) + ff_f(ji-1,jj)) * 0.5_wp rfu(ji,jj) = SQRT(zfu * zfu + z1_t2) rfv(ji,jj) = SQRT(zfv * zfv + z1_t2) END_2D IF (nn_hls.EQ.1) CALL lbc_lnk_multi('tramle', rfu, 'U', 1.0_wp , rfv, 'V', 1.0_wp)</pre>

The following TRA modules has been modified in accordance with the previous indications:

- OCE/TRA/trabbl.F90 (lbc_lnk just need for outputs– removed)
- OCE/TRA/trabbc.F90 (lbc_lnk need for trd_tra diagnostic – removed)
- OCE/TRA/trazdf.F90 (lbc_lnk need for trd_tra diagnostic – removed)

- OCE/TRA/traadv_cen.F90 (IF statement for all the lbc_lnk - halo 1)
- OCE/TRA/traadv_ubs.F90 (IF statement for all the lbc_lnk - halo 1)
- OCE/TRA/traadv_mus.F90 (IF statement for all the lbc_lnk - halo 1)
- OCE/TRA/traadv_fct.F90 (lbc_lnk for paa, pbb and zwz can be removed for halo 1 case, too;
 - IF statement for some lbc_lnk – halo 1;
 - need halo 3 or higher – it's impossible to remove the remaining zwi communication)
- OCE/TRA/traadv_qck.F90 (IF statement for all the lbc_lnk - halo 1)
- OCE/TRA/traadv.F90 (lbc_lnk for halo 2 added, before the adv scheme choice)
- OCE/TRA/TRA/trcadv.F90 (lbc_lnk for halo 2 added, before the adv scheme choice)

- OCE/TRA/traldf_lap_blp.F90 (IF statement for lbc_lnk - halo 1)
- OCE/TRA/traldf.F90 (lbc_lnk for halo 2 added, before tra_ldf_blp call)
- OCE/TRA/TRA/trcldf.F90 (lbc_lnk for halo 2 added, before tra_ldf_blp call)

- OCE/TRA/tramle.F90 (IF statement for lbc_lnk in init - halo 1)

- OCE/TRA/tranpc.F90 (lbc_lnk removed for halo 1 case, too; implies OCE/TRA/eosbn2.F90 modification)
- OCE/TRA/eosbn2.F90 (2D/3D macro modifications)

- OCE/TRA/traatf.F90 (lbc_lnk removed for halo 1 case, too; implies macro modification in traatf.F90 and trasbc.F90)
- OCE/TRA/trasbc.F90 (2D/3D macro modifications)

- OCE/TRA/traatf_qco.F90 (lbc_lnk removed for halo 1 case, too; implies macro modification)

- OCE/TRA/traqsr.F90 (lbc_lnk removed for halo 1 case, too; implies macro modification)

- OCE/TRA/zpshde.F90 (IF statement for lbc_lnk - halo 1; lbc_lnk for halo 2 added at the beginning of the routine)

SETTE tests demonstrate that previous modifications don't affect restartability and reproducibility of the results with both halo 1 and 2 (Problems of halo 2 runs with AGRIF_DEMO_ST, OVERFLOW and LOCK_EXCHANGE remain). The check of the results with trunk@r13438 is ok, too.