Overview of the time-line for actions expected by the end of the year

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2019 actions

NEMO System Team is responsible for NEMO development

2019 work that I will not described later on:

- Nemo 4.0 release (January 2019)
- Intense debugging which continued first semester 2019 (SI3…)
- On line documentation
- 4.0.1 intermediate release announced yesterday
- Work to answer questions (NEMO forums, mail…)
- Activities in the NEMO Working groups (growing importance)

General timeline for development actions: a yearly cycle

- Merge Party at end of the year
- Workflow for development (preview, validation, test case, review)

A task not completed by end of the year is often lost, or at least needs large re-implementation, especially this year

2019 actions

2019 workplan includes 55 actions, listed by streams. These streams mostly align with chapters of Developement Strategy, and the NEMO Working Groups:

- Kernel
- SI3
- TOP
- Air-Sea interactions
- AGRIF
- Enhancements
- HPC
- Validation
- Publications

019 workplan is made up of shared actions which are the development priorities for all consortium's institutions.

Staff
Specific actions

Kernel update! *(dynamical core)* `2019WP/KERNEL-*`	*SI3* *(sea-ice)* `2019WP/SI3-*`	*TOP* *(tracers and biogeochemistry)* `2019WP/TOP-*`	*Air-Sea interactions* `2019WP/ASINTER-*`	*AGRIF* *(nesting tools and zooms)* `2019WP/AGRIF-*`	*Enhancements* `2019WP/ENHANCE-*`	*HPC* update! `2019WP/HPC-*`	*Validation* `2019WP/VALID-*`
KERNEL-01_Mike Bell_newHPGscheme KERNEL-02_Dave Storkey_RK3Preparation KERNEL-02_Storkey_Coward_IMMERSE_first_steps KERNEL-03_jchanut_TILDE	• SI3-01_mvancoppenolle_topografic_meltponds • SI3-02_crousset_validation_rheology • SI3-03_crousset_validation_landfast • SI3-04_crousset_evaluation_UM5vsPRATHER • SI3-05_VP_rheology • SI3-07_tsamados_drags • SI3-08_lagrangian_drifters • SI3-09_TEOS10_phase_diagram	• TOP-01_CEthe_PISCES_LBC • TOP-02_emalod_TOP_OASIS	• ASINTER-01_Guillaume_ABL1D • ASINTER-02_Clementi_wave-mixing • ASINTER-03_Masson_Current Feedback • ASINTER-04_Madec_waves • ASINTER-05_Brodeau_Advanced_Bulk • ASINTER-06_Brodeau_Wave_Bulk	• AGRIF-01_cbricaud-EWand NorthBC(2017WP) • AGRIF-01_jchanut_small_jpi_jpj • AGRIF-02_CMEMS_improve_global • AGRIF-05_jchanut_vert_coord_interp	• ENHANCE-01_Romain_massfluxconvection(WP2018) • ENHANCE-02_Pierre Mathiot_ISF • ENHANCE-03_Pierre Mathiot_Domcfg Tools • ENHANCE-04_AndrewC-reporting • ENHANCE-05_SimonM-Harmonic_Analysis • ENHANCE-06_Nicolas-Repository Cleaning • ENHANCE-07_JamesH-sigma_under_ISF • ENHANCE-09_Jerome_freesurface • ENHANCE-10_Jerome_ztilde • ENHANCE-11_CEthe_Shaconemo_diags • ENHANCE-11_Nicolas-Trusting Sette Cooperation • ENHANCE-12_SimonM-Tides	• HPC-01_Mike Bell_OpenMP • HPC-02_Epicoco_Single Core Performance • HPC-03_Fiore_Epicoco_HPDAonline Diag • HPC-04_MCastrillo_HPDAonline DiagGPU • HPC-05_Mirek Andrejczuk_IOdev • HPC-06_SimonM-extendedhaloes • HPC-07_Epicoco_AGRIF_Load Balancing • HPC-08_Mirek Andrejczuk_fldread_with_XIOS • HPC-09_Mireck_OpenACC • HPC-10_Mike_Tiling • HPC-11_Mirek_Andrejczuk_IO_with_XIOS • HPC-12_Mocavero_mpi3	• VALID-01_clevy-AGRI • VALID-02_GeorgeN-evalOSMOSIS • VALID-03_smasson_regional • VALID-04_CEthe_TOP_OFF

Each stream should cover : New features, Efficiency, Reliability Visibility and Preparing Future

2019 actions completed and ongoing

New features

Completed:

- Developments of ice shelf code: coupling with ice-shelf model, split explicit cavity and parametrisation - P. Mathiot
- Create a simple parameterization of the current feedback - S. Masson
- Implementation of a cool-skin/warm-layer parameterization in NEMO & advanced bulk formulae over sea-ice. - L. Brodeau
- Enhance the implementation of tidal forcing - S. Mueller

Ongoing:

- 1D vertical atmospheric boundary layer model to improve air-sea interactions & bulks G. Samson
- Implementation of a mass flux scheme for convection - R. Boudalle-Badie
- New horizontal pressure gradient scheme within NEMO based on the finite volume - M. Bell
- Proper treatment of implicit top, bottom and possibly sea-ice frictions -G. Madec
- Revisit z-tilde coordinate in order to improve its robustness - J. Chanut
- Upgrade the ocean-wave coupling, enhanced ocean mixing due to breaking waves − E. Clementi
- Replace the current tidal harmonic-analysis diagnostics with a generic implementation - S. Mueller

2019 actions completed and ongoing

Efficency (mostly HPC):

Completed: none

Ongoing:

- Optimization of the communications in BDYand DYN - G. Irrmann & S. Masson
- Read all the netcdf input file using XIOS - M. Andrejczuk
- Tiling as a solution to cache blocking: implementation proposal - M. Bell
- Improvement of Agrif for global configurations (periodic, north fold zoom, HPC) - R. Benshila

Reliability:

Completed:

- Cleaning and improve for closed seas to domain tools - P. Mathiot
- Investigate ways of improving the code's reporting facilities - A. Coward
- Transfer CMIP6 diagnostics in NEMO reference - C. Ethé
- Clean AGRIF interface for subdomain size - J. Chanut
- Review lateral boundary conditions for PISCES -C. Ethé

Ongoing:

- OSMOSIS surface boundary layer scheme validation - introduced in 2017 - G. Nurser
- Improve split-explicit free surface - J. Chanut
- Clean the repository tree structure - N. Martin

2019 actions completed and ongoing

Visibility

Completed

- Publish wetting and drying analytic and stand lit test cases - E. O'Dea
- Publication on vertical description in ocean models comparison between both ztilde and multilayers - S. Techene
- Procedure for definition of academic demonstration cases - N. Martin

Ongoing: none

Preparing future

Completed

- Reorganisation of code to prepare for implementation of RK3 timestepping and tiling (IMMERSE WP3 and WP4) - D. Storkey & A. Coward
- Sketch of the implementation of high performance online diagnostics for NEMO in GPUs - M. Castrillo
- Analysis of scalability improvement using MPI3 new communications S. Mocavero

Ongoing

- Investigate NEMO on GPU using OpenACC - M. Andrejczuk
- Improvement of NEMO single-core performance by using alternative approaches to improve the data locality and vectorisation- I. Epicoco

Summary

Successful in 2019:

- Debugging for a reliable nemo 4
- Documentation (usually at very bottom of todo list)
- Preparing future
- New features

Foreseen improvements

- Too many « ongoing » actions
- 22 actions « not started »
- 2019 workplan is not realistic
- HPC: a very large part of exploratory work?
- Sea-ice: too few developers this year?

New roles : each WG leader committed to his section of workplan:

- Within WG, to elaborate priorities with actions on : New features, Efficiency, Reliability Visibility and Preparing Future.
- To report on results and actions of the year, actions should be completed

Questions for discussion

Advices of this Committee hoped on

- Quantity and quality of work done
- Are the proposed changes to reach realistic workplan ok?
- What could be missing in development plan?
- What will make NEMO alive in 10 years?