NEMO NDC Meeting Part 2

Zoom –Fri 2nd July 2021

Participants (25):

Olivier Aumont	Italo Epicoco	Jean-Marc Molines
Mike Bell	Helene Hewitt	Paolo Oddo
Rachid Benshila	Dorotea Iovino	Guillaume Samson
Ed Blockley	Daniel Lea	Bablu Sinha
Momme Butenschon	Julien Le Sommer	Joanna Staneva (HEREON)
Miguel Castrillo	Claire Lévy	Martin Vancoppenolle
Jérôme Chanut	Tomas Lovato (CMCC)	Amy Young
Stefania Ciliberti	Gurvan Madec	
Andrew Coward	Nicolas Martin	
Fred Dupont	Sebastien Masson	

Apologies: Julien le Sommer, David Marshall

Notes (see slides linked on the agenda page for full details – the notes below only include the subsequent discussions/comments/questions not covered in the slides):

1. **Continuing presentations from WG leads**:
    a. Air Sea Interactions (Guillaume S) – The group has a wide-ranging remit including: Bulk formulations, surface related parameterisations and vertical physics. On-line interest has been encouraging and the first meeting will be organised for September
        i. Q – What is the ambition for the scope of wave model interaction? There are already many (too many?) choices for linking information from wave models with the ocean physics. Wave interactions are missing from the Flux form formulation and there is work continuing on the interaction of waves and sea-ice.
        ii. Q – Given the range of processes covered, does the WG have all the experts needed? TBD. The date for the first meeting will be set soon (before the Summer lull)
    b. Dynamics (Julien Le S reported by Mike B)- Another WG with a wide-ranging remit. This is made manageable by Sub-group activities. Fred Dupont is leading a Tides sub-group which has met regularly. A proposal has been accepted for an eddy closure sub-group to be co-lead by Andrew Shao and Chris Wilson
    c. Kernel (Mike B). Very active RK3 sub-group; on track to deliver by end of year. Also sub-group on generalised vertical coordinates is exploring options.
2. **NEMO Development Strategy structure presentation and discussion** (Mike B.)
Proposed structure based partly on previous structure, partly on WG discussions and partly on the ideas of the NDCPT. DevComm is asked to comment on: important topics that are missing; additional authors; awkward overlaps between topics and recommendations for grouping topics into chapters.
    a. (Seb.): User support is missing from the proposed structure; strategy should include creation of user training material.

b. (Andrew): Meaningful generic training is difficult due to significant variations in HPC environments but containerisation may offer opportunities to provide standardised environments and should be considered for the strategy.
c. (Seb): I/O should be considered alongside HPC performance and form part of the same chapter. Seconded by (Italo).
d. (Seb): Clement has been a major contributor to SI3 and must be involved in related strategy decisions.
e. (Tomas): Asked for clarification on the abbreviations used: I/F = Interface; RSEI: Requirements, Science, Engineering, Interface. Agreement that grouping sections into chapters on Science and Engineering is undesirable.
f. (Italo) Offered to contribute to the Carbon footprint sections.
g. (Jerome): Succession planning may suggest finding alternative authors for some chapters. He, for example, is planning to pass on the AGRIF WG lead well within the period covered by the new strategy. (Mike) suggested that the new lead (e.g. Adam Blaker) would need to co-author the section in the Strategy.
h. Capturing the stakeholder requirements may require broader input than just consortium members. Involvement of ECMWF, Canadian and German groups was suggested. (Helene) confirmed that consortium needs would still have to be prioritised. (Stefania) offered help in finding the requirements from the forecasting and operational users at CMCC and Mercator.
i. (Amy) will stakeholder requirements be clairied first? Writing subsequent chapters would be easier if that were done. But the requirements might also be refined once the main technical issues have been tabled. The questions for consortium members on requirements need to be clarified quickly. **[Action: Helene and Mike]**
j. (Ed) Commented that a list of requirements will inevitably lead to conflicting priorities. Sea-ice modellers, for example, have more interest in adding complexity by adding more processes, whereas, pressure from operational use will be for higher resolution.
k. (Seb) The strategy needs to clearly distinguish work that definitely needs to be done from more ambitious goals that need further scoping and preparation.

3. Strategy ideas from the WG's

a. HPC: Use of Domain Specific Languages (DSLs) such as the PSyclone pre-processor to improve flexibility of deployment. Fuller implementation of tiling; Possibly investigation of parallel in time techniques. (Seb): Important to note that there is still significant work to be done to fully utilise AND TEST all the HPC changes done recently. Despite best efforts, supporting wider haloes and tiling complicates things in unexpected ways and a robust code will take time to achieve - possibly several years. The new strategy needs to be realistic about this.
b. Kernel: Moving towards Generalised vertical coordinates with remapping techniques from Hycom and MOM6. Brinkman penalisation method.
c. AGRIF: Is it time to explore multi-resolution adapting models? Promote AGRIF as a method of reducing storage by adding resolution only where needed. Investigate Brinkman penalisation techniques for linking nested grids. Need to emphasise that all NEMO developers should be AGRIF-aware to avoid future complications (more training required?)
d. Dynamics Will be driven by sub-groups (e.g. the eddy closure WG). Use of Machine Learning methods to improve parameterisations and algorithms.

e. Sea-Ice SI3 strategy is already being refreshed (IMMERSE deliverable), Emphasis will be on evolution not revolution and documentation
f. TOP options/interface to be added for biology within sea-ice. Support for FABM was queried. (Momme) stated that TOP was already sufficiently compatible with FABM and that using NEMO with a FABM-enabled BGC did not require significant effort. [It was not clear if that statement is true for the current trunk/4.2_RC?]
g. OBS Possible investigation into JEDI support. Activities and requirements need to be captured better. (Dorotea) CMCC use the OBS code. Dorotea to provide CMCC contact name for OBS to Dan. **[Action: Dorotea]**
h. V&V Need to decide what level of Continuous Integration is needed for robust testing and what type of unit testing is appropriate for NEMO.

4. Timetable

The proposed timetable was agreed

- July 2021: Firm up on sections, authors & chapters
- July 2021: Agree approach/questions on requirements
- October 2021: First draft identifying main issues in each section
- November 2021: Review of first draft by SAC
- May 2022: First full draft of sections
- June 2022: Meeting to discuss the first full draft (SAC members invited)
- July 2022: Feedback from the SAC
- November 2022: Final version