

# Discussion on the physical processes sub-groups

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# Context and objectives of the discussion

- NEMO **working groups are now aligned** with the different chapters of NEMO Development Strategy (NDS) 2018-2022
- NEMO working groups are going to play a **increasing role in scoping** what should be the priorities for development (workplan)
- NDS **chapter 5 on “Ocean Dynamics”** is not associated with a NEMO WG, so that we don't have a clear discussion and decision process
- This question has been discussed several times during NEMO DevCom without much progress (because **the problem is tricky**).
- Today: building a common **understanding** of the nature of the problem and proposing practical and **realistic steps** to move forward.

# What are we talking about

- Physical processes (or classes of motions) that should be accounted for in OGCMs, either *explicitly* or through *parameterisations*
- Processes in the OSBL are *a priori* discussed in NEMO air-sea interactions WG (true ?)
- “**Parameterized**” processes :
  - mixing in the ocean interior and BBL (inc. overflows)
  - closures for balanced turbulence (meso, submeso, u/v, t/s)
  - ...
- “**Resolved**” processes :
  - (quasi-) balanced turbulence (+ topography)
  - IGW and internal tides (propagation, dissipation)
  - barotropic motions (inc. tides) (propagation, dissipation)
  - ...

# Why a NEMO Working Group is not the solution

- The scope of Chap. 5 is **very large**, so that in practice we cannot set a WG which activity is really motivating for participants.
- Many of the questions to be discussed (and possible solutions) are **open research questions** : difficulty in getting expertise and sharing knowledge.
- To some extent the questions are very **configuration-dependant**, and all the configurations are not supported by NEMO ST.
- Discussions/status/propositions will differ depending on the **target resolution** ( $1^\circ$ ,  $1/4^\circ$ ,  $1/12^\circ$ ,  $1/36^\circ$ ,  $1/60^\circ$ )
- Many of the solutions will actually fall in the scope of NEMO **numerical kernel WG**

# What was proposed in NDS 2018-2022

- targeted working groups for proposing improvements
- using idealised test case for documenting impact of other developments on (resolved) physical processes
- consolidating NEMO online diagnostics as a tool for developing physically consistent closures
- improve the relation with NEMO users community in order to expand the community of process-oriented NEMO users (demonstration cases, endorsement, dev. outside ST)

**Not clear who who is accountable for implementing the above propositions and who should decide what gets into NEMO workplan**

# Proposed practical steps to move forward

- NEMO Developers Committee to scope a number of small topics (clear focus/clear question)
- For each topic, organise a (series of ?) discussion(s) for analysing where NEMO stands with respect to the question
- Example : how are we doing wrt the explicit representation of tides with NEMO ?
- Group discussions will leverage knowledge/work done in the broad NEMO users community.
- Any other idea ? what should be the topics ?