



# Report on NEMO kernel WG

## Mike Bell

- Group & sub-groups
- Progress against strategy

Successes, Issues

# Group & sub-groups

- **Group meetings** – opportunities for presentations; open to all
  - **Two year hiatus (Oct 2018 – Oct 2020)** – started up again
- **Sub-groups** (coordinating specific tasks)
  - **Immerse large-scale changes** (IMMERSE WP3 & WP4) (2019)
  - **RK3 time-step implementation**: Dave, Andrew C, Florian, Gurban, Jerome, Nicolas, Sibylle, Mike (2020)
  - **More generic ALE coordinate**: Alex, Amy, Andrew Shao, Diego, Florian, Gurban, Jerome, Laurent, Mike, Sybille (started Oct 2020)

# Progress against strategy

- Runge-Kutta time-stepping schemes
  - Main calls & variables re-organised (Andrew Coward, Dave, Gurvan)
  - Suitable RK algorithms, particularly for external mode sub-steps, found (Nicolas Ducouso, Florian)
  - Suitable Coriolis & momentum advection scheme found (Dave S, Gurvan)
  - Implementation is in progress (Sibylle, Gurvan)
  - Application to AGRIF and OBC still to do (Jerome, Dave Storkey)

# Progress against strategy

- ALE algorithm
  - NDS 2018: “initial planning stage should complete **March 2018**”
  - Well behind this – target unrealistic or sub-group set up too late?
  - $\tilde{z}$  made more robust and impact assessed (Alex, Jerome, Dave Storkey)
  - Development of hpg schemes in progress (Mike, Amy)
  - Sub-group on ALE coordinates set up Oct 2020:
    - First meeting on Griffies et al primer – very useful
    - Two more meetings on key papers being organised
  - Work is planned for the last 2 years of IMMERSE

# Progress against strategy

- Watching brief on unstructured grids
  - COMMODORE meetings very helpful (2018, 2020)
  - FESOM2 and MPAS Ocean
- **Conditionally implicit & compact implicit vertical advection schemes** (Andrew, Gurvan, Florian, Laurent)
- **Wetting & drying implemented**: Enda & Mike
- **Implicit drags & projections between baroclinic & barotropic modes**: Jerome

# Summary

- Very good progress on RK3 – difficult task
- Work on ALE coordinates just starting up: behind schedule but good start
- Watching brief on unstructured grids is quite low key
- Progress on other smaller items
- Discussions/presentations in wider group have started up again