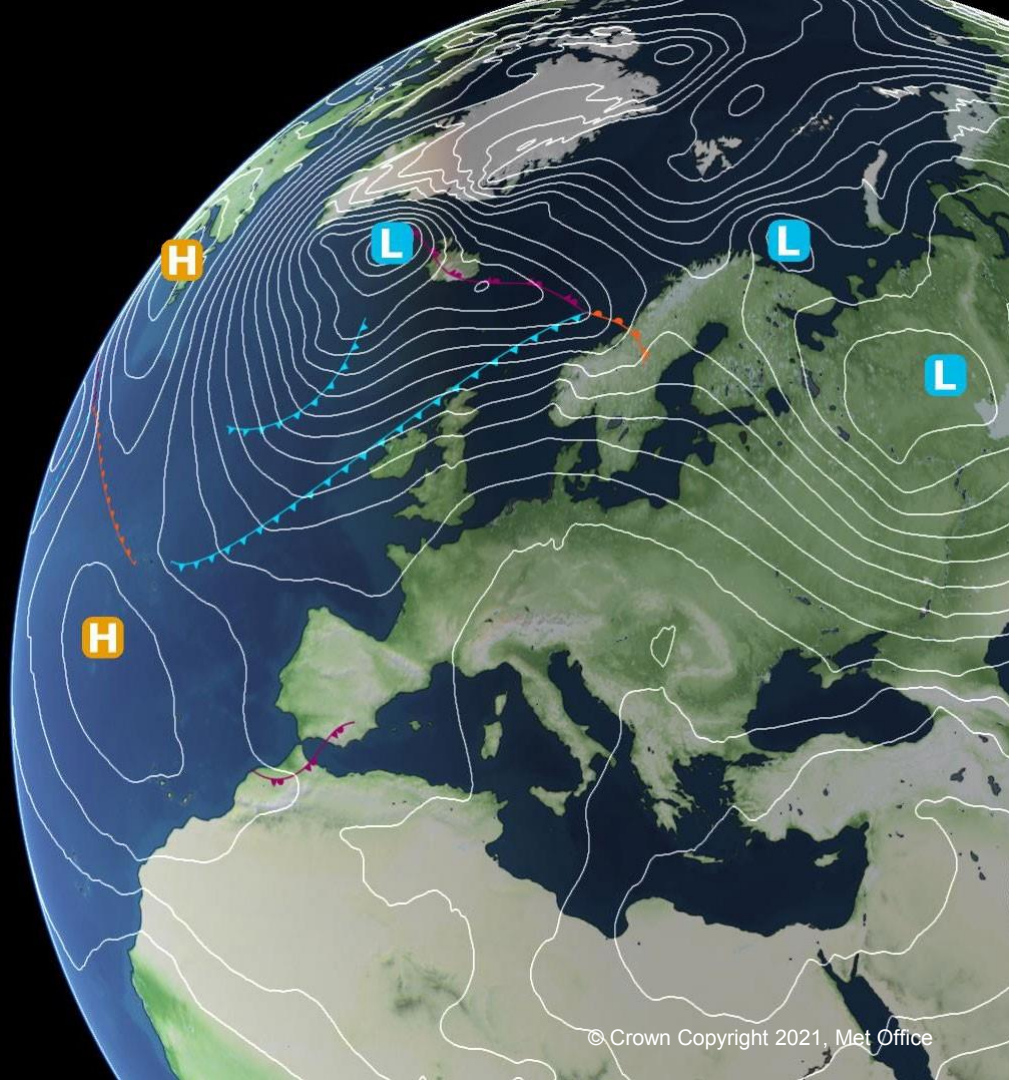# Coupled Initialisation

Tim Graham, WGNE
Julie Deshayes, OMDP
Baylor Fox-Kemper, OMDP
Andy Moore, DAOS

Members of OceanPredict & S2S

Background

- At WGNE35 all groups expressed an interest in some form of joint project on coupled model initialisation

- Initial action to hold a scoping meeting to suggest possibilities to look into.
  - Held in January
  - Presentations from each of the interested groups followed by discussion

- Follow up meetings have been held since

- Also reached out to S2S and TPOS2020 communities.

Challenges

- Different timescales present different problems
  - Tending towards shorter timescales (up to seasonal) at the moment. Can we learn something about model spin-up using the DA?

- Few centres currently have any sort of coupled DA system. Will need to design a project that is easy for centres to buy into.

- Probably too early for a comparison of strongly coupled DA.

Potential ideas: Nudging

- Ask centres to (strongly) nudge coupled models towards a common analysis as a simple form of DA

- Carry out a comparison between the increments and the forecasts from different models

- Simple to setup & relatively cheap

- What would we learn from it?
  - Probably similar to DIMOSIC but for coupled models

- What analysis would we use?

Potential ideas: TPOS

- We could limit the scope of the project to the tropical Pacific
- There is already a Modelling & Data Assimilation task team within TPOS so there may be overlap here.
- S2S has already run an OSE in the area.
- TPOS are interested in the impact of different types of observations on forecasts (e.g. gliders vs buoys).
- Possibility of some synthetic observation system experiments.

Proposed Ocean Decade programmes

- **GOOS: Ocean Observing Co-Design:**
  - https://www.goosocean.org/index.php?option=com_content&view=article&id=298&Itemid=411&Itemid=428
  - Aims to evaluate current ocean observing systems and to propose an optimal designs for various purposes, including earth system predictions
  - Considers that WMO is a big stake-holder and contributor to this project since WMO is now aiming to progress toward earth system predictions.
  - They are keen to collaborate with operational centres

Met Office

Proposed Ocean Decade programmes

- **OceanPredict: ForeSea**
  - https://oceanpredict.org/focus/foresea
  - Aims to
    1. improve the science, capacity, efficacy, use, and impact of ocean prediction systems and
    2. build a seamless ocean information value chain, from observations to end users, for economic and societal benefit.
  - Call for projects states that they are looking for projects that "Advance the science behind ocean prediction and its connection to the other components of the earth system, including the atmosphere, land, cryosphere, continental hydrology, etc."

SynObs: A proposed ForeSea project

- https://oceanpredict.org/science/task-team-activities/observing-system-evaluation/#section-projects
- Proposed by the OceanPredict Observing System Evaluation Task Team
- The project aims evaluate, design, and optimally use ocean observation network in Ocean and earth system predictions.
- Chair of the task team (Yosuke Fujii) has said he would be very interested in performing multi-system coupled observing system experiments as part of this project

Summary

- Various ideas have been suggested for possible projects

- Also options to join/extend existing projects under Ocean Decade

- Challenging to converge on a single project

- Any suggestions would be welcomed.