Working group on Circulation experiments (conveners: Karcher and Aksenov)

The group met at the sessions during the FAMOS 2013 workshop and discussed (i) progress during 2012-2013 and (ii) major goals and objectives 2013-2014.

The tracer experiments from 2012-2013 were presented and discussed, focusing on the model diagnostics and model validation. The group agreed to undertake validation of the model results, starting from comparing volume and heat transports though Fram and Barents Sea Opening (BSO). The next step is to compare position of the AW core in the models and observations using a set of criteria, the maximum temperature of the intermediate waters vs. maximum concentration of the FS branch AW tracer. Michael Karcher suggested density class analysis for the FS and BSO branches of the Atlantic inflow specifically in the area of their confluence along the Northern shelf of the Barents-Kara Seas. The group decided to examine downstream changes of the AW inflow along the Siberian shelf in the models and compare the simulations with the observations. It was suggested to perform companion AW tracer releases in FS and BSO in the idealised models and compare the results to those from the OGCMs (Mike Spall). The application of Walin-type watermass transformation diagnostics was discussed on the pilot study done for NEMO_NOCS model and it was agreed to try this approach in the other participating models. It was also acknowledge that diagnosing heat exchange through surfaces of constant density in the level models is technically not a trivial task and needs further investigation.

Part of the discussion was on the mechanisms of the Atlantic water (AW) inflow via Fram Strait (FS) and through the Barents Sea. Pål Isachsen and Mike Spall suggested assessing the impact of wind and topographic influences in the idealised models and compare the analysis with the full-scale complex OGCMs. The group considered comparing experiments with winds switched off in the OGCMs and idealised models and analysing dynamical balance in the Boundary current and the Beaufort Gyre. This will help understanding of the AW dynamics in the Beaufort Gyre and compliment the Beaufort Gyre theme of the FAMOS.

As the result of the discussion the group formulated the following three themes for the Circulation experiments for 2013-2014.

T1. Atlantic Water tracer experiment (carried on), coordinators: Aksenov (NOC, UK) and Karcher (AWI, Germany)

T2. Dynamics of the Fram Strait Inflow, coordinator: Mike Spall (WHOI, USA)

T3. Dynamical balance of the Boundary Current and the Beaufort Gyre, coordinators: Camille Lique (Uni. Oxford, UK), Pål Isachsen (NMI, Norway).

The group discussed the data storage requirement and decided that there is not special requirement for the storage; data archiving will be done by the participating institutions.

Regarding planned publications, T1 is to prepare the draft of the paper in about 18 month; the other two themes are only about to start planning the experiments and do not have immediate plans for publications.