

Breakout Group 3: Model Developments

What are the most challenging gaps in high-latitude modeling (physics, numerics, observational data, parameterization, couplers)?

- Parameterizations (vertical mixing, eddies, parameterizations)
- Coupling (shelf-basin exchange and understanding, air-sea-ice exchange/fluxes)
- Scientific knowledge transfer gap (CPT eddies and Arctic community communication, last area to get mesos resolved) - can we get their ear
- Observations: Merge products and identifying metrics (both groups can focus on a few meaningful metrics to work on together; gateway transports, definitions of Atlantic waters, EOF of SSH variability, etc)
- Funding agencies supporting model development, observational data availability, and knowledge transfer

What recent improvements in modeling capabilities have been achieved?

- Resolution (due to computing power and new algorithms)
- Unstructured grids (can focus on Arctic with less cost)
- Sea-ice parameterizations (ridging, land-fast ice, etc)
- Offline tracer models

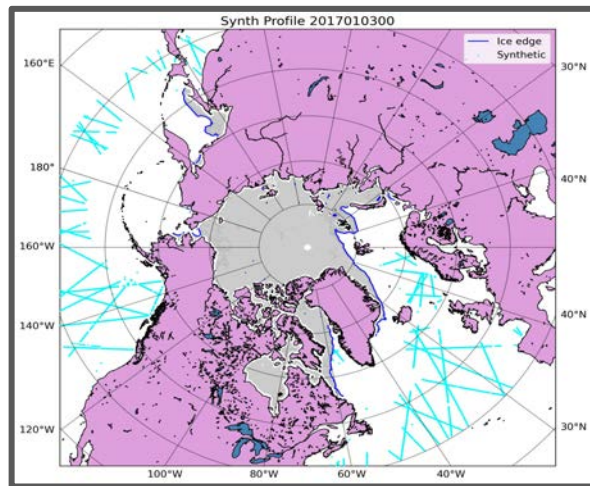
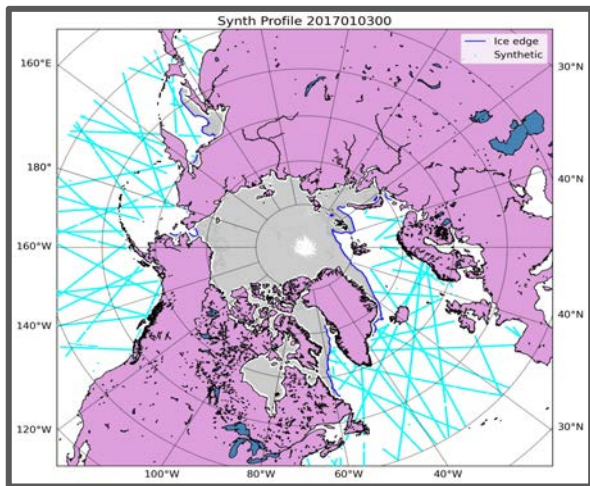
What observational gaps hamper the production of useful Arctic reanalysis or model initialization efforts?

- Sea-level pressure
- Lacking a platform to share the data, different people, measure the same things in the same spot, upload to same place (e.g. DBO program, BCO-DMO for geotracers)

Synthesis of modeling, satellite and in situ observations:

How can modeling and data assimilation provide insights for interpretation of observational data and planning observational campaigns and strategies (e.g., OSSEs, synthetic T/S/U profiles from surface fields, uncertainty estimates)?

- Make better use of data we already have
- Adjoint and cost functions (places we can't go)



Coordinated modeling studies of the Arctic Ocean circulation:

What type of problems and scales (spatial and temporal) can be addressed with a coordinated approach that has not been addressed/failed in previous multi-model experiments?

What kind of models should/can be used (coupled/uncoupled, vertical/horizontal grids, regional/global, type of discretization and PDE algorithms, etc)?

Multi-model vs single-model experiments: What approach is better?

- Shelf processes: synthesize what we know to know what we know and what we don't know...
- All of these tools are useful
- Again, metric packages and maybe another workshop with the community to specifically identify/define these (score card)...
- Arctic Ocean MIP

Other

- Communication in the community (between observationalists and modelers) has improved over the years (formulating issues and discussion around those issues, what it is we need to talk about)