SEA STATE DRI PAPER TOPICS (preliminary post cruise coordination)

**OVERVIEW**

Eos overview article

Lead: Jim T.

Supporting: all

Descriptive paper for “pancakes in 5 m waves” (wave experiment #3).

Jim T., Martin D., Peter W, Erick R., Ben H., Allison K., Maddie S.

Concept: Describe event and the measurements made without getting into the weeds on physics, analysis, etc., for a journal like BAMS or TOS magazine.

Option: Break into Part 1 and Part 2, one about in situ, another about remote sensing (add Johannes G. for latter)

Note: Marine radar wave results can add to this story, would fit in Part 1 and/or Part 2 – Björn L.

Development and evolution of ice types in the autumn ice edge (frazil to pancake to cemented pancake)

Leads: Steve A (if willing), Peter W, Sharon S,…

Support: Ted M, Jim T, most others

Competing processes producing an ice edge advance hiatus at the continental shelf break in the Beaufort Sea (racetrack analysis)

Role of waves during freezeup in the Beaufort Sea

Lead: Peter W

**WAVE ANALYSIS**

Data analysis of pancake wave attenuation, directionality (wave arrays #2-7)

Lead(s): Martin D, Peter W, Hayley S.

Supporting: Jim T, Maddie S, Erick R., Mike M., Alison K.

Needs: Ice type from SAR – Ben H. and IceCam (Blake)

Note: Directional distribution of wave energy and ice coverage, possibly type, from marine radar – Björn L.

Wave scattering & reflection

Lead: Peter W.,

Supporting: Jim T., Erich R, Mike M, Alison K, Martin D.

Needs Ice types from Ben H

Needs: shapes of ice edges from marine radar images- Bjorn

Wave dispersion relation inside ice from radar

Björn L., Erick R., Hayley S.

Spoiler: no change found

Wave-driven mixing and release of ocean heat during pancake event (waves #3)

Lead: Maddie S.

Supporting: Jim T., Sharon S., Luc R.

Comment (Ola): If surface heat fluxes are to be part of this paper, I can provide those

Comparison of wave directional methods in ice (including WaMos)

Leads: Martin D., Björn L.

Supporting: Jim T., Johannes G. , Mike M. Peter W

Phase resolved pancake motion (stereo)

Lead: Maddie S.

Supporting: Jim T.

The high-frequency motion of pancake ice in waves

Lead: Martin D.

combine with stereo??

**WAVE MODELING**

Modeling peak wave enhancement (growth) under wind forcing in pancakes

Lead: Erick R.

Supporting: Jim T, Ola P, Byron B, Peter G., Martin D, Peter W.

Need: wind stress forcing

Modeling pancake wave attenuation (wave arrays #3, 6, & 7)

Lead(s): Hayley S, Erick R.

Supporting: Martin D, Peter W, Jim T, Maddie S, Erick R. , Alison K.

Comparing viscoelastic/viscous/eddy viscosity theories with data (all wave arrays except #1)

Lead(s): Vernon S., Hayley S., Erick R., Jim T., Maddie S.

Supporting: Martin D., Alison K, Ben H.…….

Collisions, divergence, and HF horizontal accelerations from buoys in ice

Leads: Martin D., Hayley S.

Probably merge with HF motion paper in previous section

Ice cover fracture events under waves (ice cam and bow LIDAR at met station)

Lead: Vernon S.

Supporting: Chris F., Byron B., Ola J. Steve A., Blake W…….

Modeling scattering and reflection

Lead(s): Mike M., Peter W.

Supporting: Martin D, Peter W, Jim T, Maddie S, Erick R.

**METEOROLOGY**

Surface turbulent fluxes during Arctic sea-ice freezeup
 -examine both covariance and bulk fluxes
 - spatial & temporal variation of momentum fluxes
 - linkages to ice types and ice/ocean characteristics

Note: Ice coverage, possibly type, from marine radar – Björn L.
 - Byron, Chris, Andrey, Ola, Peter G., others?

Turbulence spectra and atmospheric eddy structure in unstable, off-ice wind conditions
 - A. Grachev, Chris F, Peter G., Byron, Ola?

Surface energy fluxes during Arctic autumn freezeup: a) quantify timing, spatial distribution and magnitudes; near the ice edge; within thin first-year ice; b) forcing by atmospheric phenomena (off-ice advection, ice-edge jets); c) impacts on upper-ocean thermal structure and ice freezeup
 - Ola lead, Sharon, Peter G., others?

Arctic Ocean summer melt and autumn freezeup: A surface energy budget perspective
 - use data from ACSE, Mirai, ArcticMix and Sea State
 - AMSR2 evolution, measured fluxes & upper-ocean changes validate ECMWF reanalyses, & coupled model output; use fluxes to project upper-ocean energy state and new ice formation,
 - Ola lead, A. Solomon, Sharon, many others involved

Ice-edge low-level atmospheric jets: characterization, formation, and impacts-Ola & Peter G.

Estimation of the wave-pressure correlation term for turbulent fluxes
 - Chris F, Byron?

Atmospheric boundary-layer structure over newly formed sea ice-Peter G., Ola

Momentum transport at the ice-air and ocean-ice interfaces and implications for ice movement-Peter G., Byron, Ola, Ted, others?

Validation of a coupled atmosphere-ice-upper ocean mesoscale model
 - A. Solomon, C. Cox, O. Persson

**OCEAN**

Large scale patterns and impact of ocean Heat

Lead: Sharon S.

Supporting: Luc R., Ted M., Maddie S., Jim T.

Interested: Guy Williams

Comment (Ola): It seems that surface heat fluxes are important for the impacts part, as is the spatial patterns of surface heat gain and losses during the previous months (e.g. from ArcticMix cruise)

Suppression of surface turbulence in partial ice cover

Lead: Maddie S.

Supporting: Jim T.

Note: buoyancy effects?

**SEA ICE**

Ice thickness distributions from SIMS

Lead(s): Steve A., Blake W.,

Supporting: Peter W., Ted M., Guy W

Ice draft distributions from AUV

Lead(s): Ted M.,

Supporting: Guy W., Jeff A., Toshi M.

Ice topography

Lead(s): Ted M, Blake W.

Supporting: Steve A.

Comment (Ted): Be great to get the downward looking Lidar data (bow mounted) in ice as well.

Sea ice freeze-up and early winter evolution (from IMBs)

Lead: Ted M

Supporting: Steve A., Sharon S.

Advancing “front” of transition between broken and unbroken ice during a wave event.

Björn L., Erick R.

Marine radar ice coverage and type (methods)

Leads: Björn L., Hans G.

Needs: Ice observations, photography, thickness measurements – Blake W., Steve A. Hayley S.; SAR-based ice coverage and type – Ben H., Macarena O., Juan P.

Ice drift with high spatio-temporal resolution from marine radar (methods)

Leads: Björn L., Hans G.

Needs: SAR-based ice drift – Ben H., Alexis D.

**REMOTE SENSING**

TSX wave extraction

Lead: Johannes G.

Supporting: Jim T., Martin D., Ben H.

Note: Comparison with marine radar wave retrieval – Björn L.

Quantify changes in ice type and conditions in relation to wind/wave events and growth/melt rates (nilas, pancakes, FY, MY)

-multiple SAR sensors (satellite and aircraft)

-ice observations

-Better if includes SIMS ice thickness and photography (Steve A and B. Weissling)

-Can be used in other analysis including wave modeling

Lead: Ben H.

Supporting: for Vernon, Hayley, Erick, others

Floe size distributions and evolution

SAR, Landsat, aerial photography, UAS photography, Rutter radar, anything else

Lead: Ben H, Björn L.

Support: Guy W., Ted M.

Deliver to: Vernon, Hayley, others?

Comment (Ola): Our KT15 measurements also show the sizes of the areas of thermal variability along the ship track, which are likely linked to the different floes and can be related to thickness if this would be of interest for this paper (it could perhaps be a paper in itself)

Comment (Ted): also from Ice Cam (Steve A. Bob Z., Blake W.)

Sea Ice motion from SAR? drift rates, possible eddy flow velocities - TBD

Lead: Ben H (hopefully using pending proposal for NASA funding)

To help characterize changing ice conditions and relation to current and wind forcing. (Steve Roberts underway record and the ice ob record at holding stations can be used as ground truth. The lat/lon locations over several hours can be used to estimate the ice drift at ice stations and flux stations. – Hayley S.)

SAR-wave spectral method for extracting pancake ice thickness

Leads: Peter W, Ben H, Flavio P

Supporting: all others interested in ice thickness, other remote sensing partners

Note: Apply methods to and compare with marine radar measurements – Björn L.

Ice ob data can be used as semi-ground truth – Hayley S.