

**Quarterly progress report, July-September 2011**

1) Summary of work performed and progress made during preceding 3 months

A. *Analysis of ice distribution and lead patterns*

The qualitative study of lead patterns in the Chukchi Sea is nearing completion. Some housekeeping matters (i.e. drawing new figures, labeling features and landmarks on the 30+ AVHRR images) remain to be done. In addition there are a few more topics to be completed for inclusion in the discussion and conclusions sections. We're expecting to be able to forward a draft for BOEM review and comments within the next month or so.

The quantitative lead analysis tools have now been rewritten in ImageJ, a Java-based image processing package developed for the National Institutes of Health. This was necessary because the tools used in the previous study (AK-03-06, MMS-71707) were written in ImageJ's predecessor, NIHimage, which was no longer supported. We are now in the process of the confirming the geographic and radiometric calibration of the AVHRR data that we have been supplied by GINA. Once this is confirmed, we will begin generating quantitative lead statistics for both study regions from 1994-2010.

B. *Analysis of landfast ice extent*

SAR data mining and processing

All the SAR imagery have now been received from ASF and mosaics for both study regions have been generated for all seasons except 2005-06. During this season, in both study regions, we have found that imagery from April onwards suffer from georeferencing errors that preclude delineation of SLIEs. ASF personnel were unaware of this problem and it is likely that it would have remained unnoticed if not for the level of data scrutiny that this project requires. As yet, we have been unable to determine the source of the problem and will resort to applying a manual correction if another solution does not present itself before the end of October.

SLIE processing has been continuing on the remaining data and we have now delineated SLIEs in approximately 75% of the data, with just 6 seasons to be completed between the two study regions. Tables 1 and 2 summarized the current status of SLIE data processing. Entries in red indicate updates since the last report.

Analysis of SLIE data

We have redeveloped all the software tools used for analysis of SLIE data in the previous study such that they can be extended to the new Chukchi Sea study region and to include new data up to 2008. These tools are now in place such that when we have acquired the full landfast ice dataset will be able to derive the following data products for both the Chukchi and Beaufort study regions:

1. Monthly landfast sea ice extent maps
2. Cumulative SLIE occurrence maps
3. Key event occurrence dates
4. SLIE water depth distribution

**Table 1: SLIE processing and database status for the Chukchi study region**

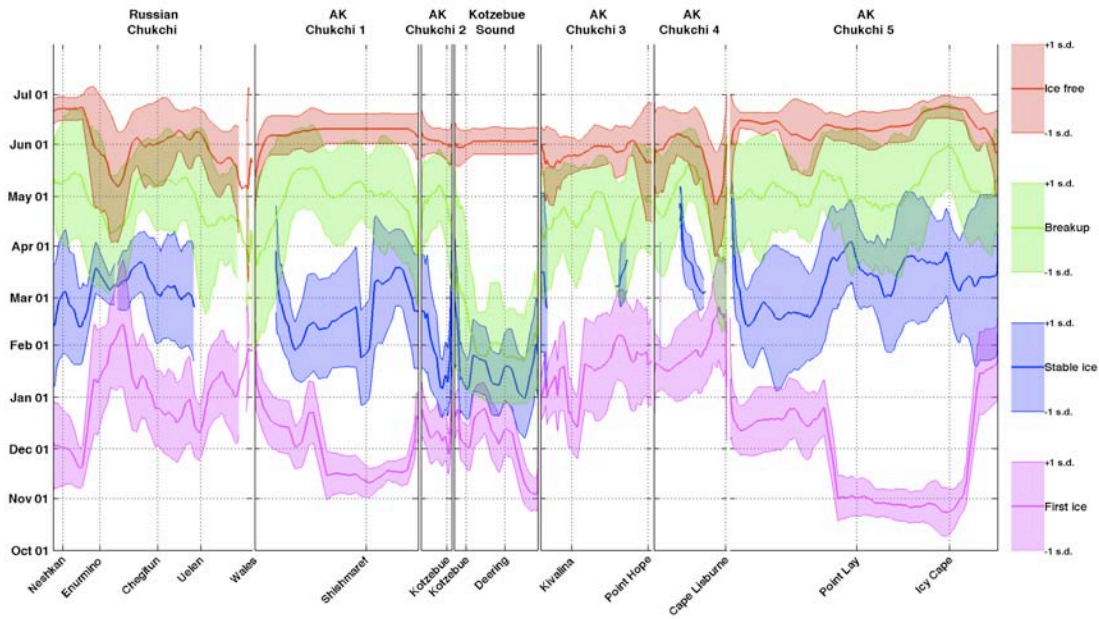
	SLIE Delineations	Shapefiles	Grids	GeoDB	Uploaded to web site	Notes
<b>Chukchi</b>						
1996-1997	Y	Y	Y	Y	Y	Complete
1997-1998	Y	Y	Y	Y	N	
1998-1999	Y	Y	Y	Y	Y	Complete
1999-2000	Y	Y	Y	Y	N	
2000-2001	Y	Y	Y	Y	N	
2001-2002						
2002-2003						
2003-2004						
2004-2005	Y	Y	Y	Y	N	Delineations complete
2005-2006						Need updated mosaics (unresolved geocoding errors, etc.)
2006-2007	Y	Y	Y	Y	Y	Complete
2007-2008	Y	Y	Y	Y		Complete up to April (Radarsat decommissioned)

**Table 2: SLIE processing and database status for the Chukchi study region**

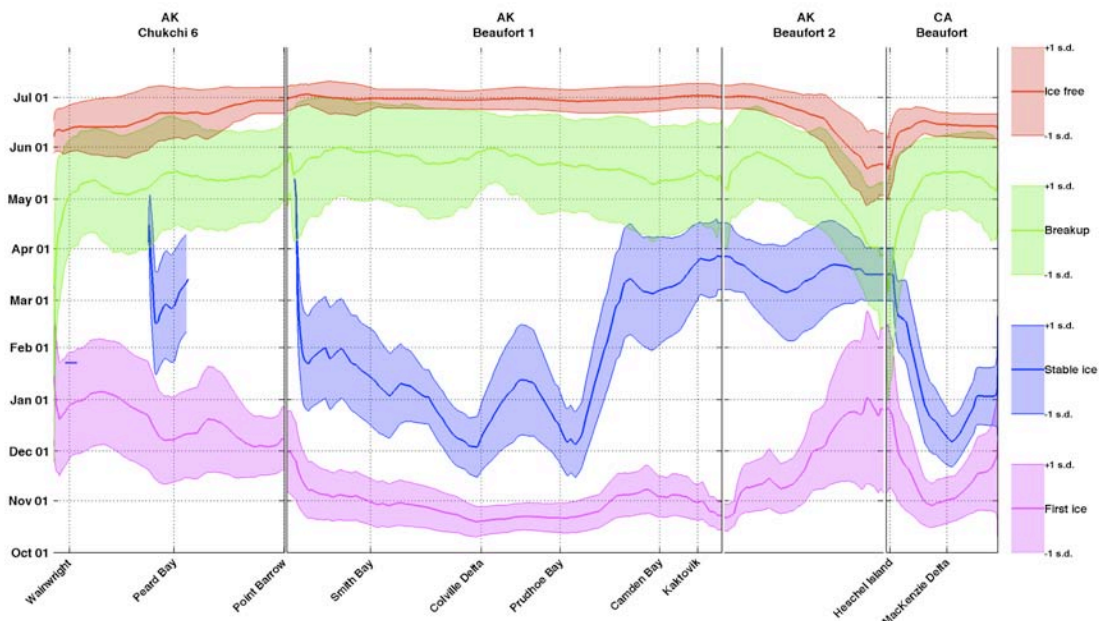
	SLIE Delineations	Shapefiles	Grids	GeoDB	Uploaded to web site	Notes
<b>Beaufort</b>						
1996-1997	Y	Y	Y	Y	Y	Complete (Previous study)
1997-1998	Y	Y	Y	Y	Y	Complete (Previous study)
1998-1999	Y	Y	Y	Y	Y	Complete (Previous study)
1999-2000	Y	Y	Y	Y	Y	Complete (Previous study)
2000-2001	Y	Y	Y	Y	Y	Complete (Previous study)
2001-2002	Y	Y	Y	Y	Y	Complete (Previous study)
2002-2003	Y	Y	Y	Y	Y	Complete (Previous study)
2003-2004	Y	Y	Y	Y	Y	Complete (Previous study)
2004-2005	Y	Y	Y	Y	Y	Complete
2005-2006						In progress; need mosaics (unresolved geocoding errors)
2006-2007	Y	Y	Y	Y	Y	Complete
2007-2008	Y	Y	Y	Y	Y	Complete up to April (Radarsat decommissioned)

We have presented preliminary results from these analysis tools using partial SLIE data in previous reports. Figures 1 and 2 show a new analysis of the variation of key event dates along the coast in both study regions. These two figures demonstrate that not only is the landfast ice season (between “first ice” and “ice-free” events) shorter in the Chukchi study region than in the Beaufort, but along-coast variability in the timing of events is also considerable greater. In addition, landfast ice in the Alaska Chukchi 3 region rarely reaches the 15m isobath and so

therefore seldom achieves stability as we define it in this study. We will investigate these results and their implications in more detail in the final report.



**Figure 1: Mean occurrence dates for key events in the landfast ice annual cycle in the Chukchi region, based on partial SLIE data.**



**Figure 2 Mean occurrence dates for key events in the landfast ice annual cycle in the Beaufort region, based on partial SLIE data.**

C. *Miscellaneous activities*

n/a

2) *Summary of significant technical, schedule or cost problems encountered during preceding month*

Although we have the necessary data analysis tools in place, we have incurred a number of unanticipated difficulties acquiring all the SAR data to meet our needs. These difficulties have been due in part to the high level of georeferencing accuracy and consistency that our landfast analysis demands. In addition, the amount of data we have ordered and the level to which it has been scrutinized exceed that of most of other users. As a result, we identified problems with the data that were new to the Alaska Satellite Facility. Despite a recent increase in the data flow rate, we will not be able to meet the deadlines specified in the cooperative agreement for submission of a catalog of satellite imagery and draft versions of the final report and Geodatabase. Following discussion with Warren Horowitz, we have therefore made a request for a no-cost 5-month extension, such that we will submit draft deliverables on March 31, 2012 and final deliverables on Sept 30, 2012.

3) *Summary of resolutions agreed to between Contractor and MMS re item (2)*

n/a

4) *Significant meetings held or other contacts made in connection with project during preceding month*

n/a

5) *Action items, open questions etc.*

n/a