

Sea Ice in Alaska's Arctic

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- Data & further information: sizonet.org; seaice.alaska.edu/gi/data; eloka-arctic.org/sizonet; seaiceatlas.snap.uaf.edu
- Chapter on Sea Ice Hazards in Ellis et al. (2015) *Coastal and Marine Hazards, Risks, and Disasters*, Elsevier, pp. 381-401



September 1852



September 2013



Reduced summer ice extent

- Increased fetch & solar heating of surface ocean
- Greater wave heights & coastal heat transfer
- Impacts on coastal dynamics & retreat
- Reductions in multiyear ice

Sea-ice services, hazards & ice use



- Sea ice provides important services that have been disrupted, increased risks from hazards & exposure
- Slow onset
 - Climate regulation
 - Coastal protection
 - Geologic agent
 - Subsistence activities
- Rapid onset
 - Marine & coastal hazard
 - Transportation corridor
 - Platform

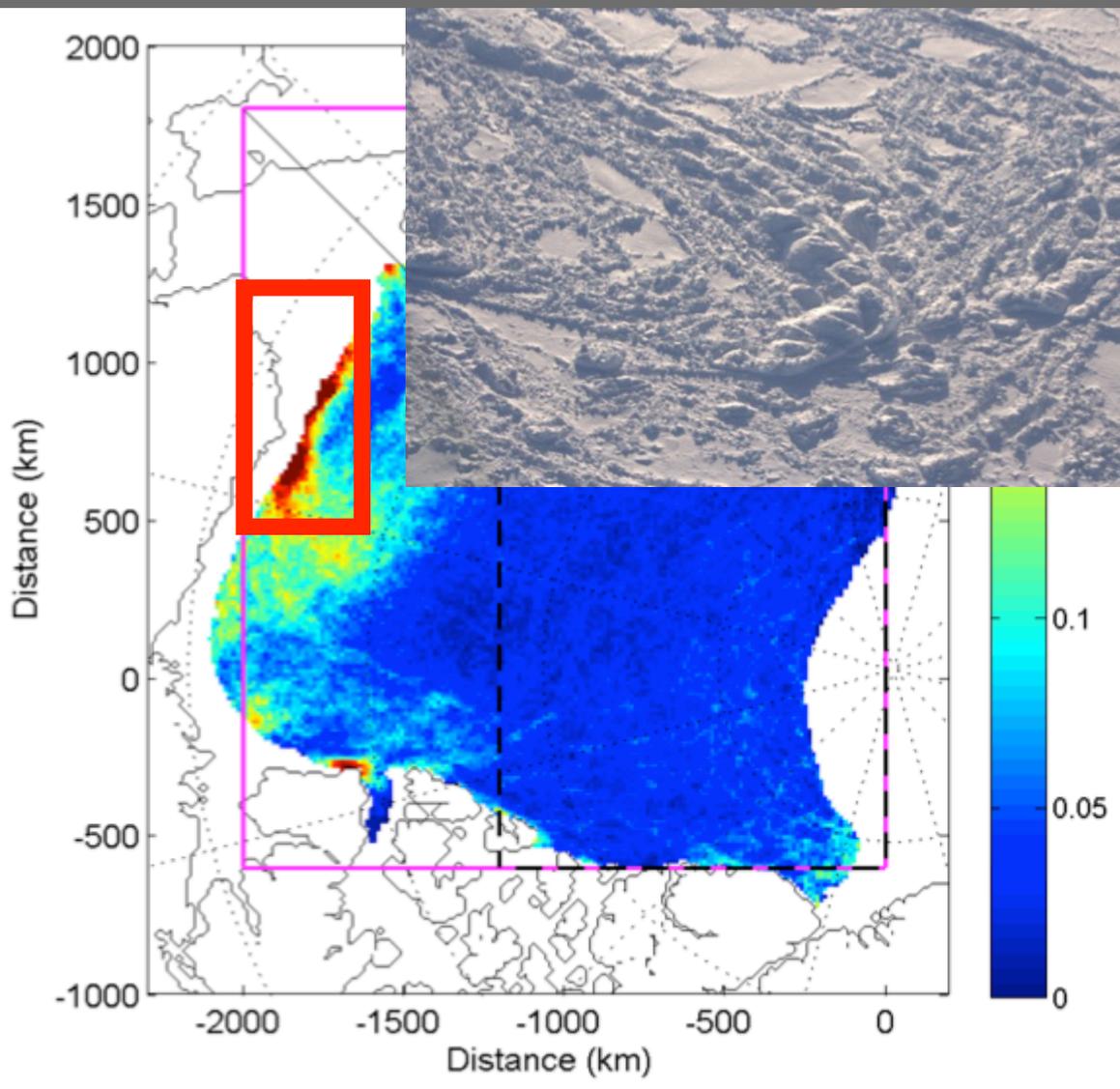


C. Nayokpuk, Shishmaref



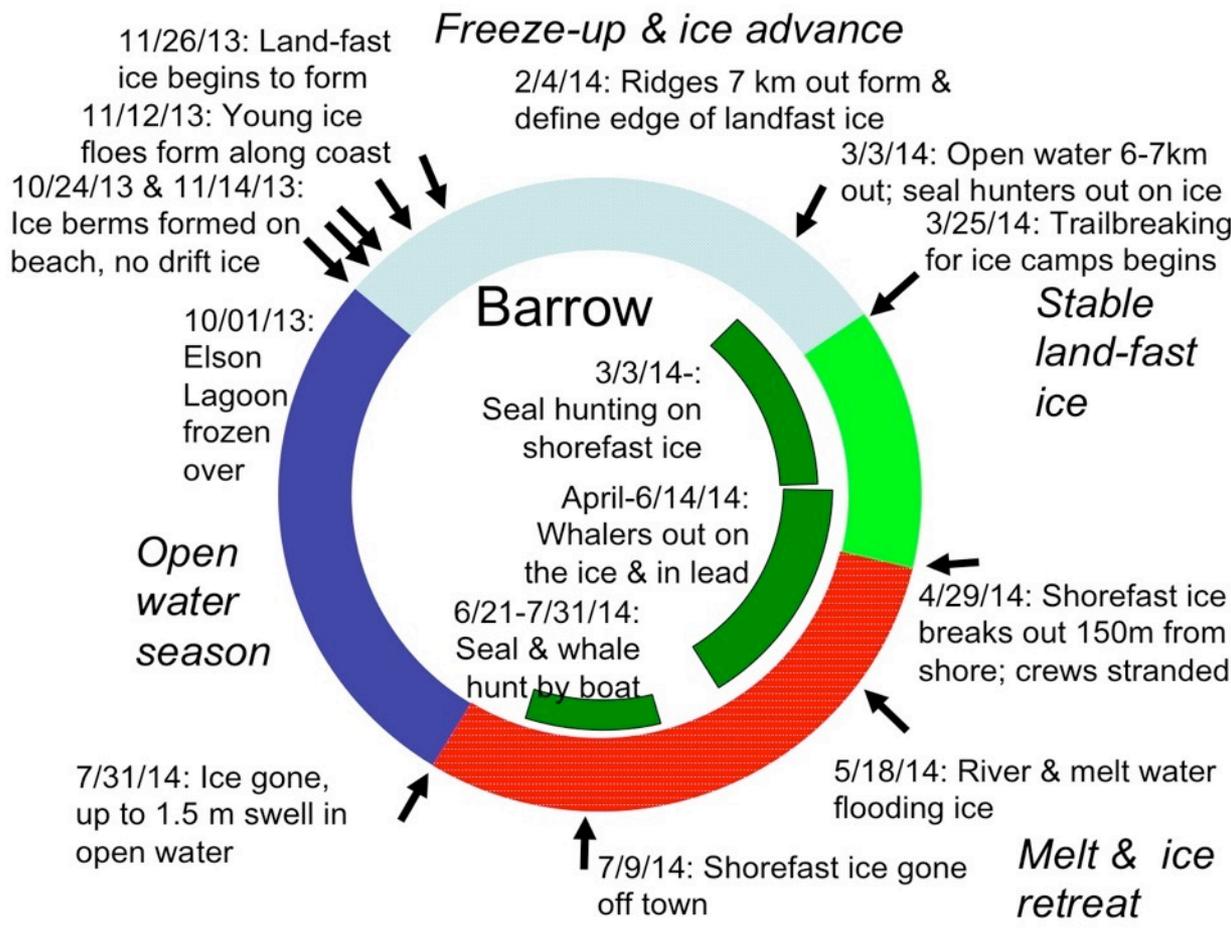
Masterson

AK Ice is more mobile & highly deformed

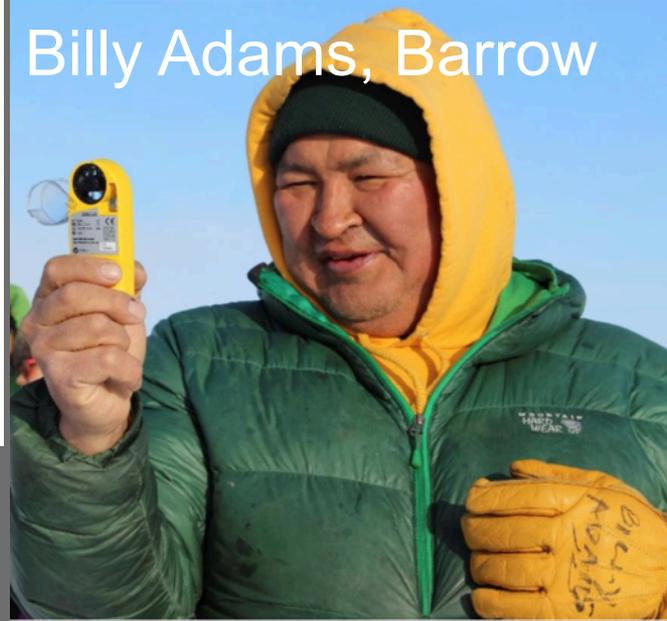


- Ice speed increased by more than a third since 1990s, in AK up to factor two
- Old & deformed ice continues to drift into AK waters from higher Arctic
- Highly deformed sea ice is a key ice hazard – oil & gas exploration leases downstream

Alaska Indigenous ice experts: Changes in seasonal ice cycle – later freeze-up, earlier break-up, ice less stable



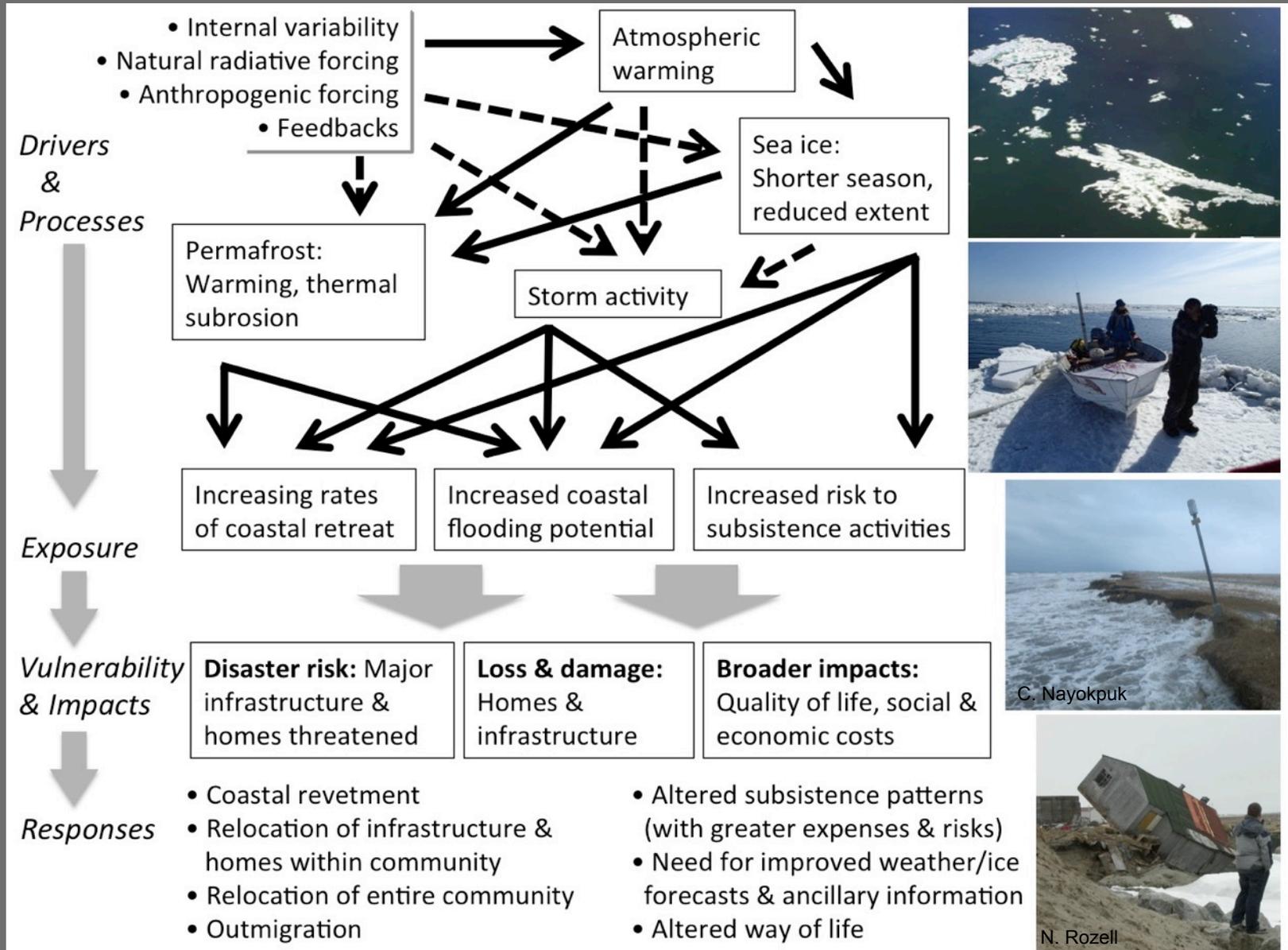
Joe Leavitt, Barrow



Billy Adams, Barrow

Community expert observations (>5000 daily logs)
<https://eloka-arctic.org/sizonet>

Adaptation, Loss & Damage – UN Framework Convention on Climate Change & COP-21



Huggel et al., Climatic Change, 2015

The Arctic System Provides Important Services that Benefit All Humanity

- With a rapidly changing Arctic environment in response to global and regional drivers, these services are changing or being disrupted
- As a result of such changes and disruptions, hazards and risks to people and ecosystems emerge at the local, regional and global level
- Tracking, responding to, and mitigating such threats & impacts is a challenge for the global community

International dimensions of Arctic change & Arctic research

- Arctic Council agreements on SAR & Spill response
Arctic fisheries moratorium
- Indigenous Peoples' Summit on Global Change & Anchorage Declaration
- Recent implementation of international agreements & codes by IMO, ISO & others
- Arctic policies in place in Japan, Korea & EU
- Economic & research activities by non-Arctic nations
- Research in response to Arctic change & Arctic system services as a unifying element: e.g., IARC-led NABOS program in Russian EEZ

TABLE I. OBSERVING PROGRAMS IN U.S. MARITIME ARCTIC BY ORGANIZATION

Fraction of organizations [%] ^a		
<i>Category</i>	<i>2010/11</i>	<i>2014/15</i>
U.S. Federal	16	23
State of Alaska (ex. academic)	6	3
Local Government/Organization	3	3
U.S. Academic	31	37
Industry	16	7
Foreign Nations	28	27

^a. Data from Alaska Ocean Observing System and National Oceanographic Data Center; total number of organizations – 2010/11: 31; 2014/15: 30



Arctic Observing Summit (AOS) 2016

- Hosted at UAF in March 2016, jointly with Arctic Science Summit Week; close to 1000 participants from 30 countries
- Six core themes with broad stakeholder/agency participation:
 - International and national strategies for sustained support of long-term Arctic observing
 - Technology and innovation for sustained Arctic observations
 - Contributions of the Private Sector and Industry to sustained Arctic observations
 - Actor and Stakeholder engagement and needs in sustained Arctic observations
 - Arctic Observations in the context of Global observing initiatives
 - Interfacing Indigenous Knowledge, Community-based Monitoring and Scientific Methods for sustained Arctic observations



AOS 2016 - Conference Statement (selected points)

- **Coordinating the implementation** of an Arctic observing system that draws on existing Arctic and global initiatives and secure resources for sustained operation.
- **Creating a strategy** for international, sustained funding to overcome existing hurdles for globally coordinated Arctic research.
- Ensuring that the **observations can be maintained consistently** over the long term.
- Developing a globally connected **open data and information system** that provides value to Arctic and global communities.

<http://www.arcticobservingsummit.org/aos-2016-conference-statement-0>

Arctic Science Ministerial Meeting

- 28 September 2016, hosted by White House Office of Science & Technology, Washington, DC
- Arctic nations, Arctic Council Observer States, Indigenous Peoples groups
- Four themes:
 - (i) Arctic Science Challenges and their Regional and Global Implications
 - (ii) Strengthening and Integrating Arctic Observations and Data Sharing**
 - (iii) Scientific Understanding to Build Regional Resilience and Shape Global Responses
 - (iv) Arctic Science as a Vehicle for STEM Education and Citizen Empowerment