

# Sea Ice in Alaska's Arctic

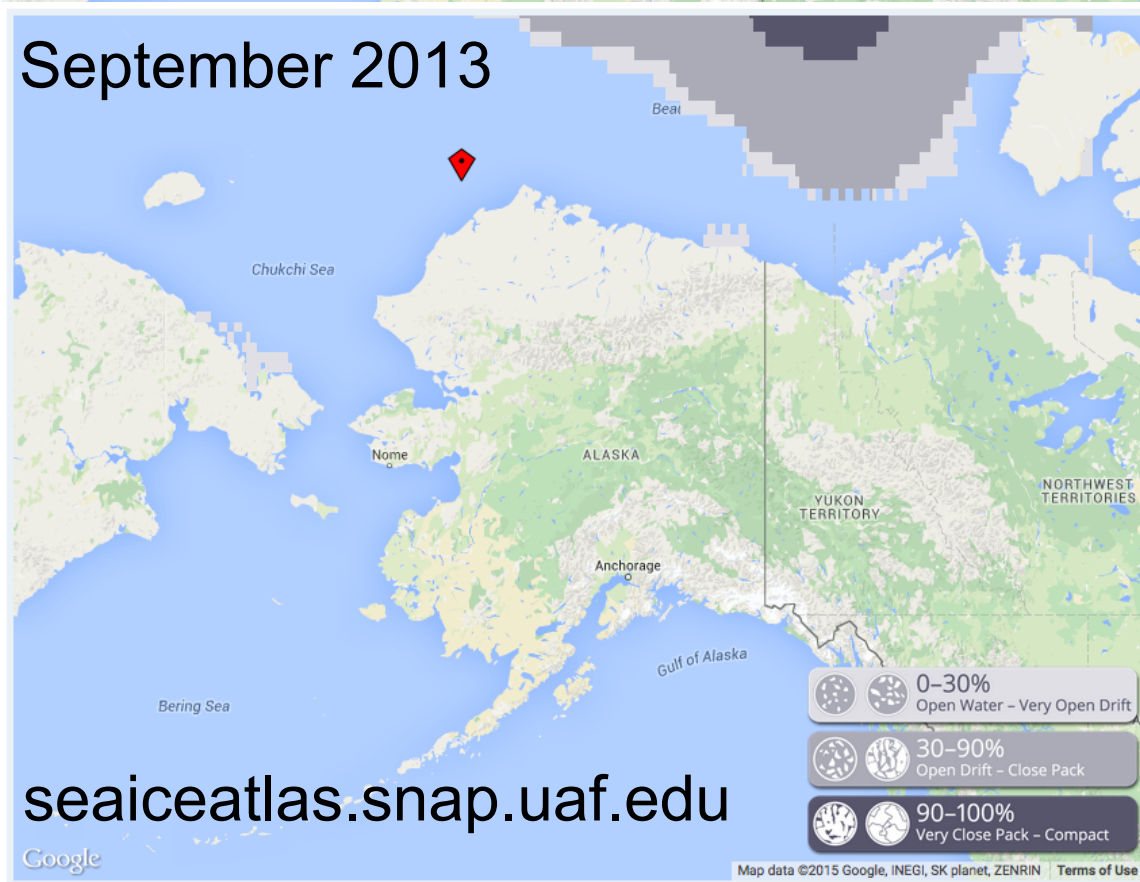
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- Data & further information: [sizonet.org](http://sizonet.org); [seaice.alaska.edu/gi/data](http://seaice.alaska.edu/gi/data); [eloka-arctic.org/sizonet](http://eloka-arctic.org/sizonet); [seaiceatlas.snap.uaf.edu](http://seaiceatlas.snap.uaf.edu)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





## *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

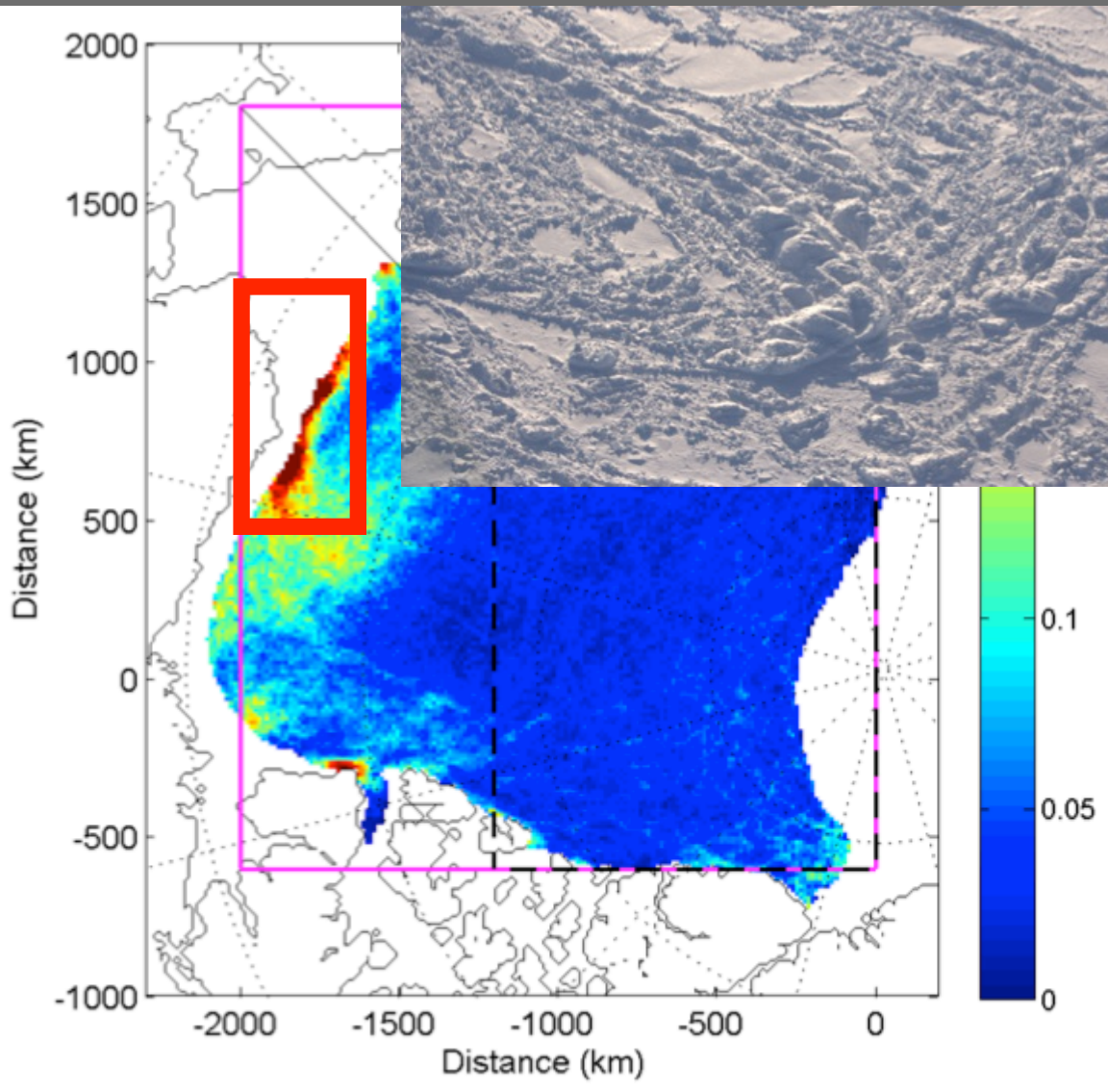
# Sea-ice services, hazards & ice use

- 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



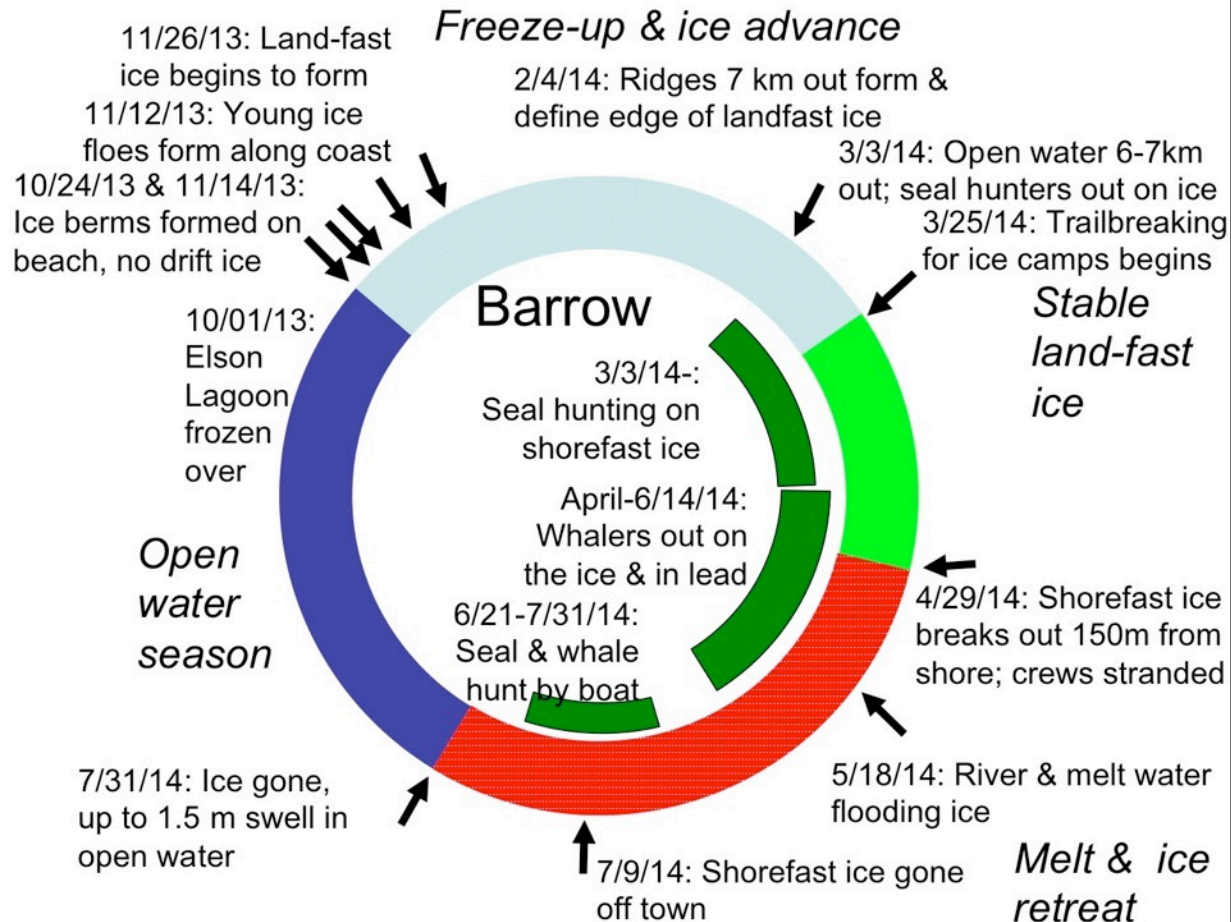


# AK Ice is more mobile & highly deformed



- 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



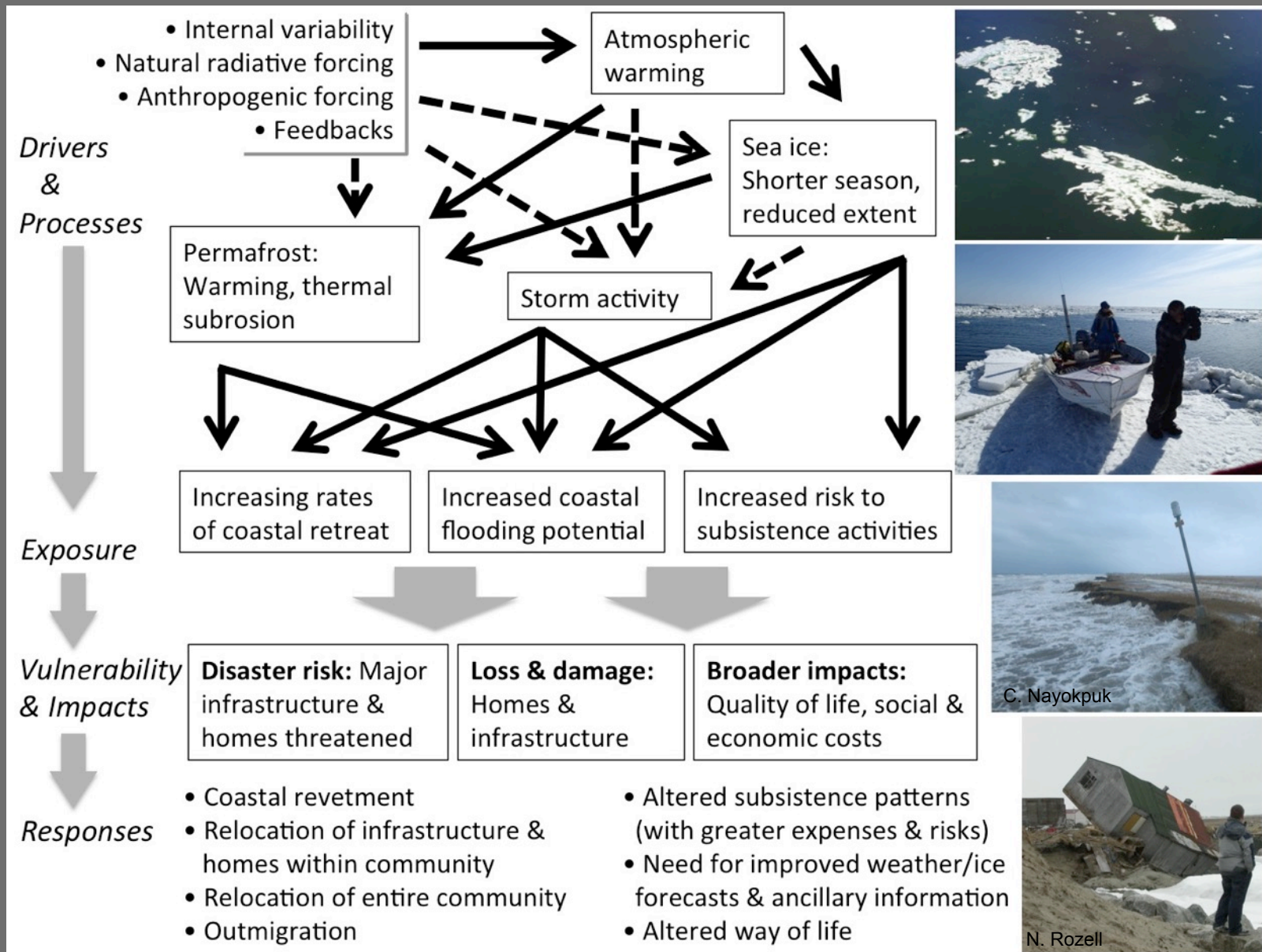
Billy Adams, Barrow



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



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



# *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 [%] <sup>a</sup>		
Category	2010/11	2014/15
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

<sup>a</sup>. 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