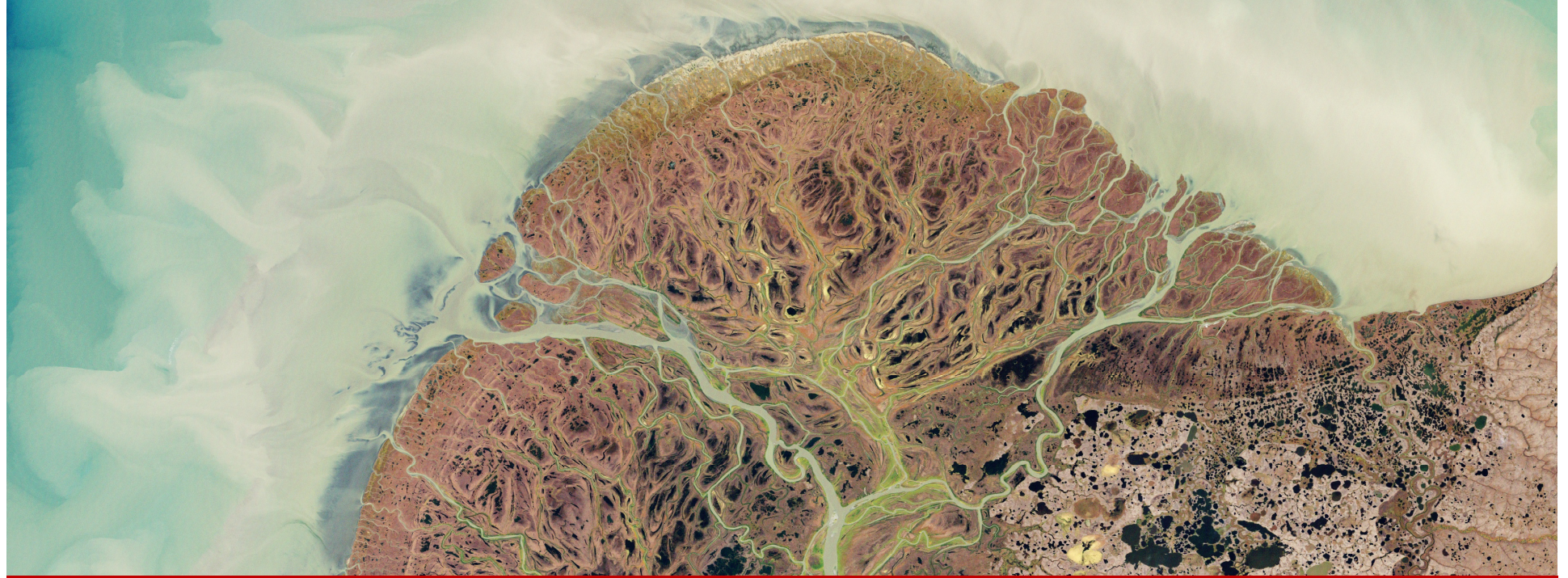


# Arctic - COLORS

## *Arctic-Coastal Land Ocean Interactions*



### Project PIs:



Antonio Mannino  
(NASA/GSFC)

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Carlos Del Castillo  
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Maria Tzortziou  
(CCNY)

Joseph Salisbury  
(Univ. of NH)

Marjorie Friedrichs  
(VIMS)

Patricia Matrai  
(Bigelow)

<http://arctic-colors.gsfc.nasa.gov>



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## Panel Recommendations - Science Objectives

Overall: More **specificity in overarching aim and science questions**

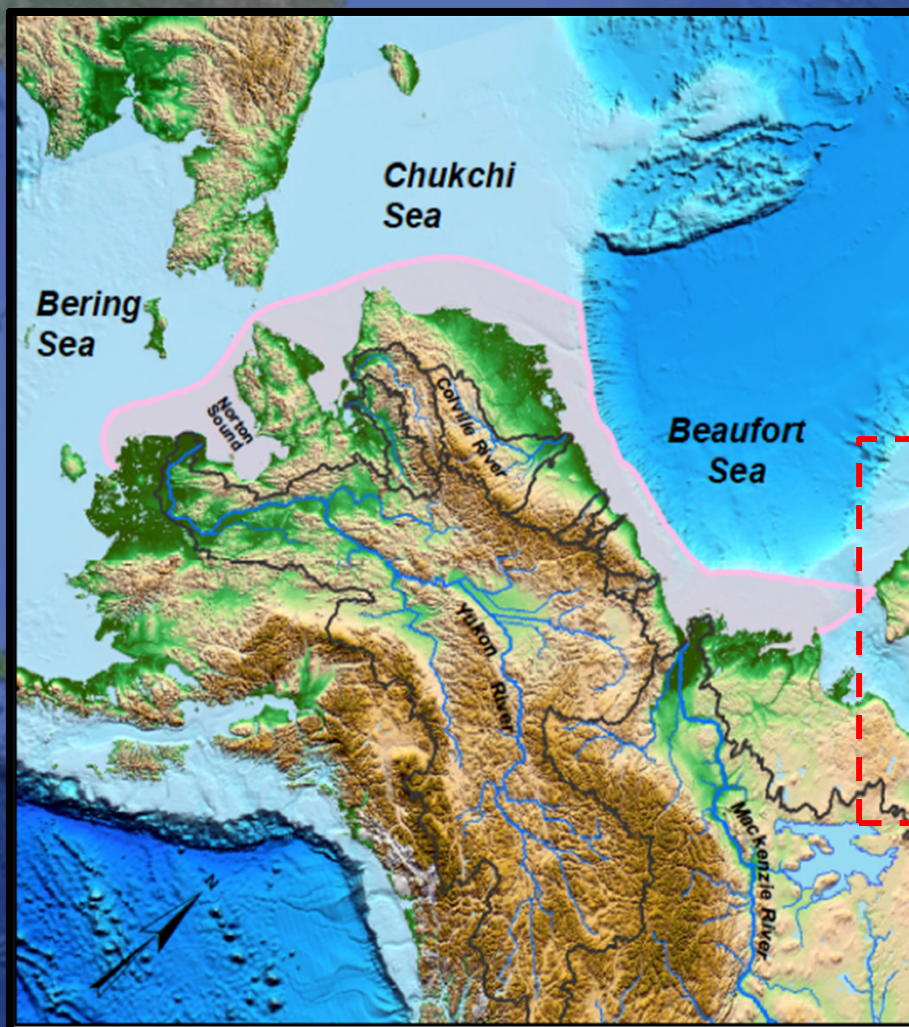
The science plan should align specific proposed measurements with the **particular knowledge gaps to be filled**, which should be tied back to the hypotheses to be tested (*Recommendation 1*). (estuarine transformations, coupled BGC/ecology, seasonality, permafrost, climate,)

Either narrow the focus of the proposal to eliminate the role of **the atmosphere** or expand the proposal by making more explicit linkages between the atmosphere, ocean and land (*Recommendation 2*). (“re-aligned” – but do still need specific measurements)

The writing team should revisit the question of what **ecological problems and biogeochemical processes are most important** and what sorts of measurements would need to be made to attack those problems quantitatively (*Recommendation 3*).

Distinguish between cases where **climate change** signals might be detectable, scientific cases where the primary outcome will be establishing a **current baseline**, and those cases where the primary impact of the project will be the development of new algorithms (*Recommendation 11*). (cc by hindcasting/modeling,

## Arctic-COLORS Core Study Domain

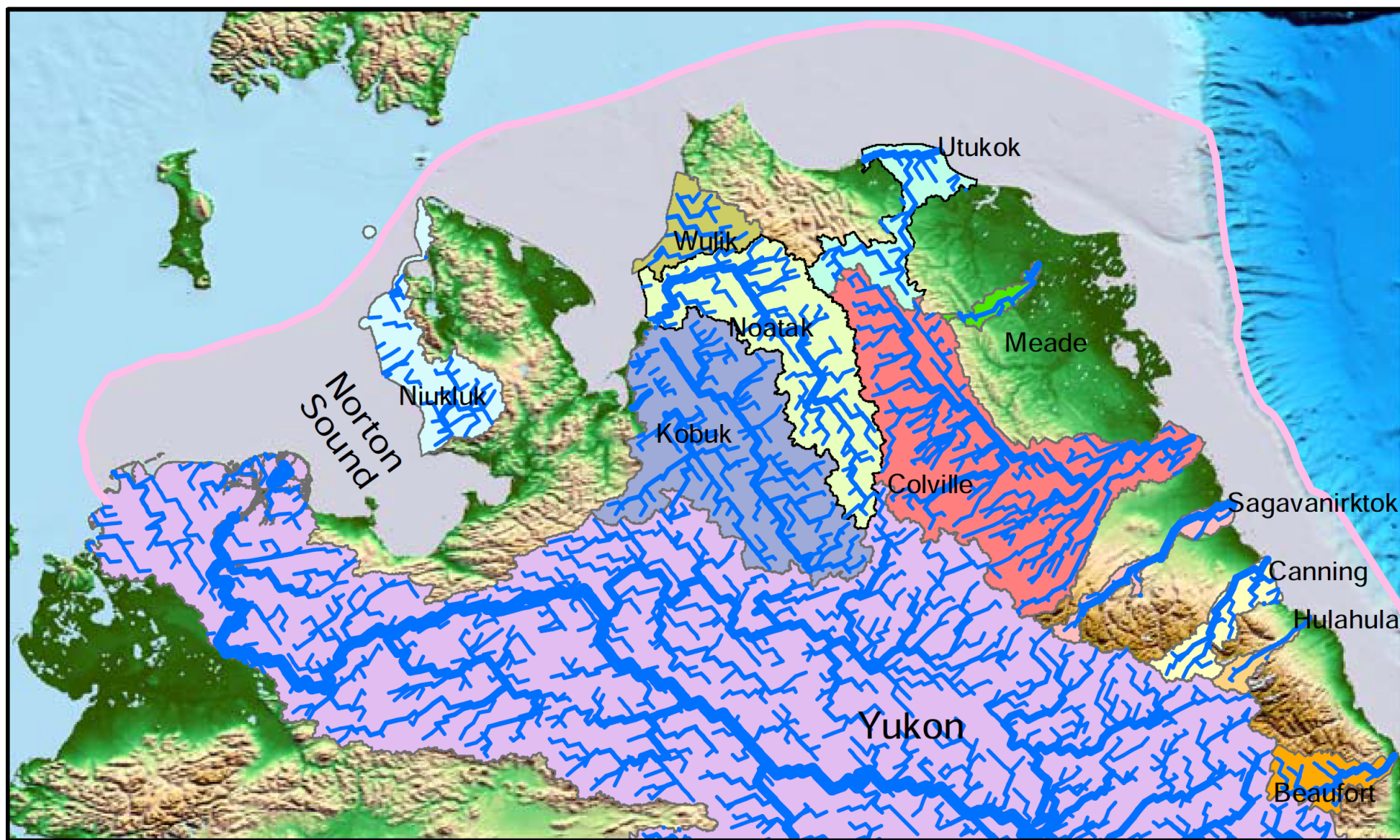


*Victoria and Banks  
Islands in the Canadian  
Archipelago – POLAR  
Knowledge / CHARS*



## Arctic-COLORS Study Domain

Large globally important rivers, regionally important deltas, tundra rivers, coastal lagoons, erosional bluffs



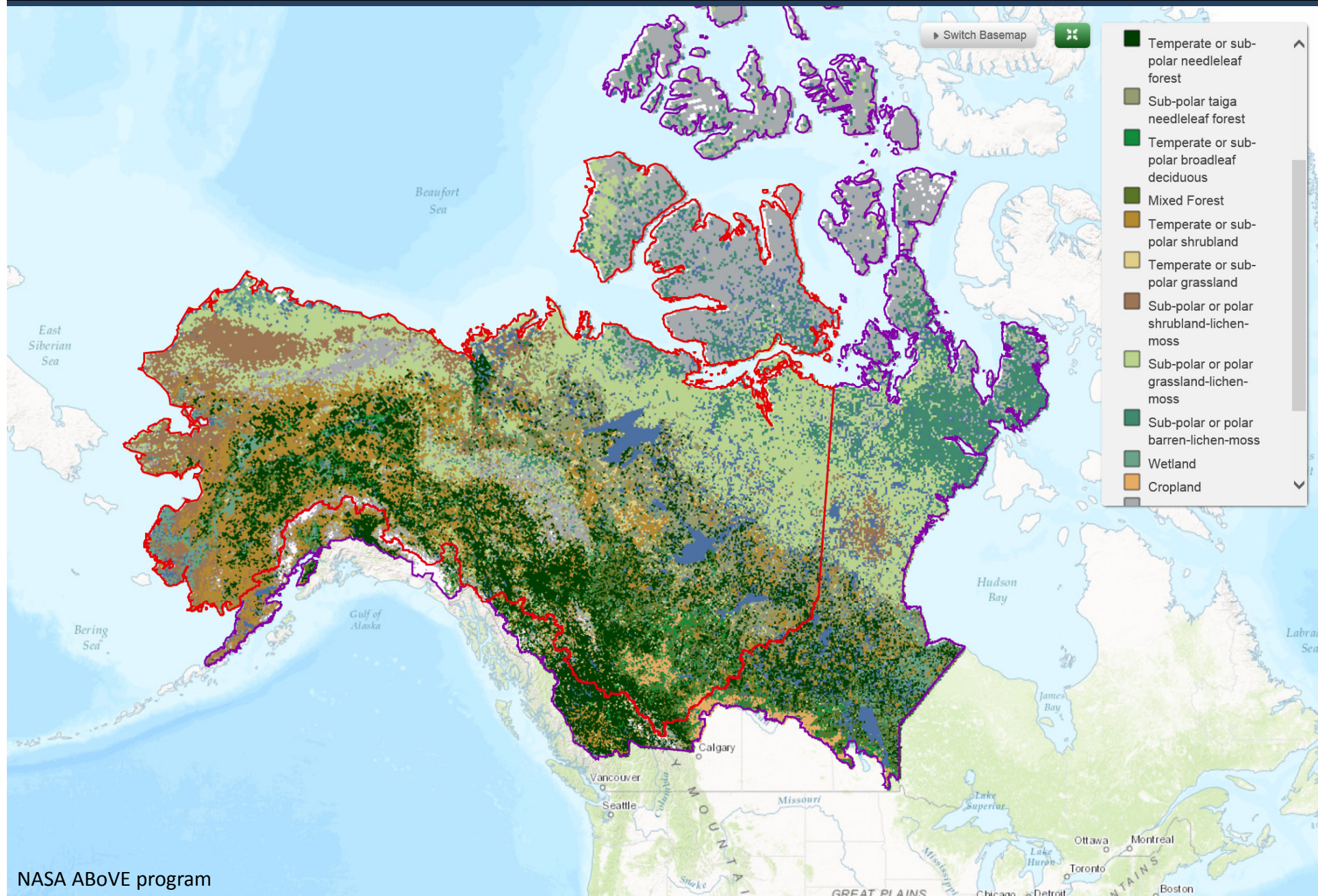


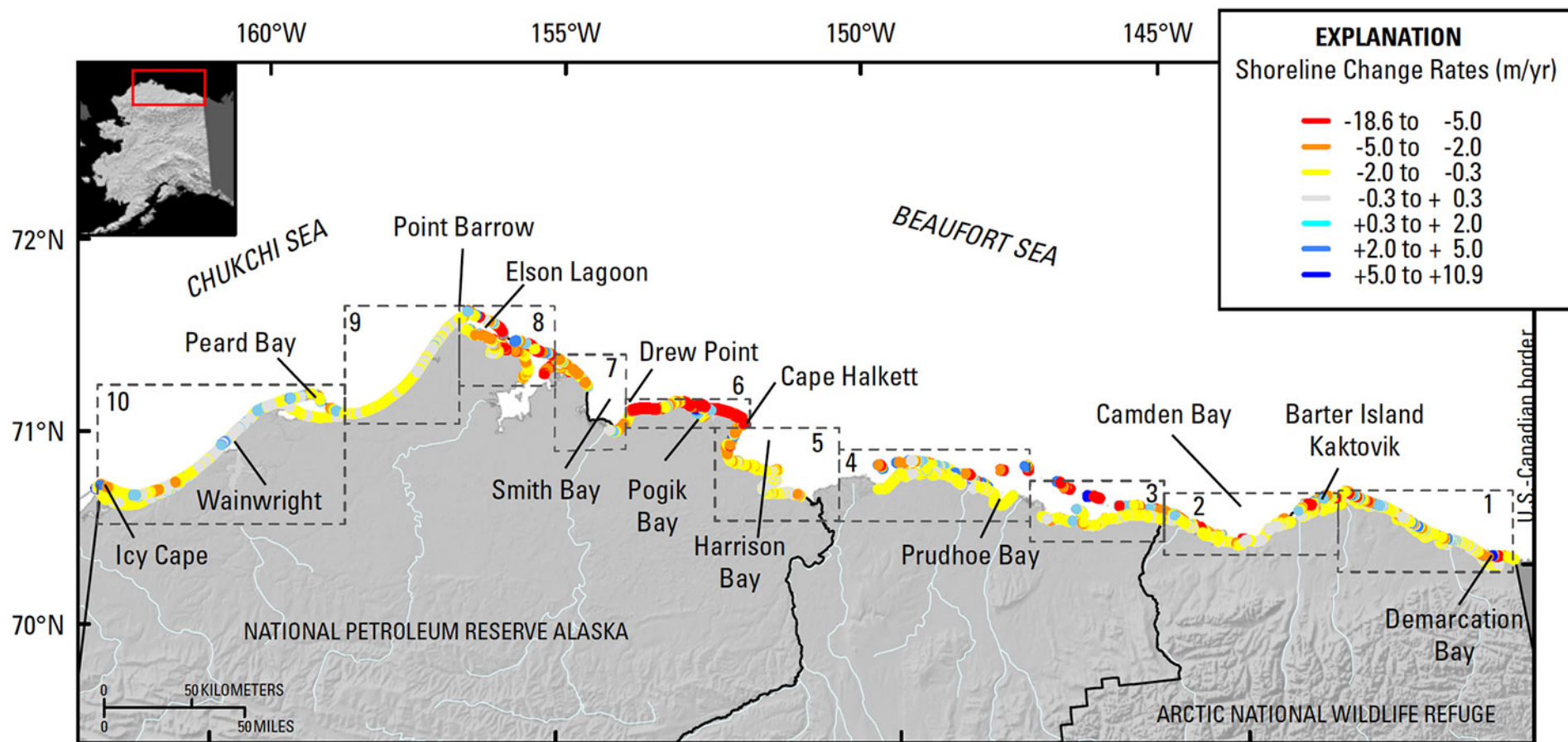
## Factors that affect decision on study region:

### *1. Science Questions*

- Effect of Land on Sea (**rivers, deltas**, thawing **permafrost/peatlands**, coastal **erosion, bluffs**)
- Effect of Ice on Sea (snow, **landfast ice, sea ice**)
- Effects of future warming land on sea and future melting ice on Sea – seasonal and interannual first, and then future scenarios/predictions





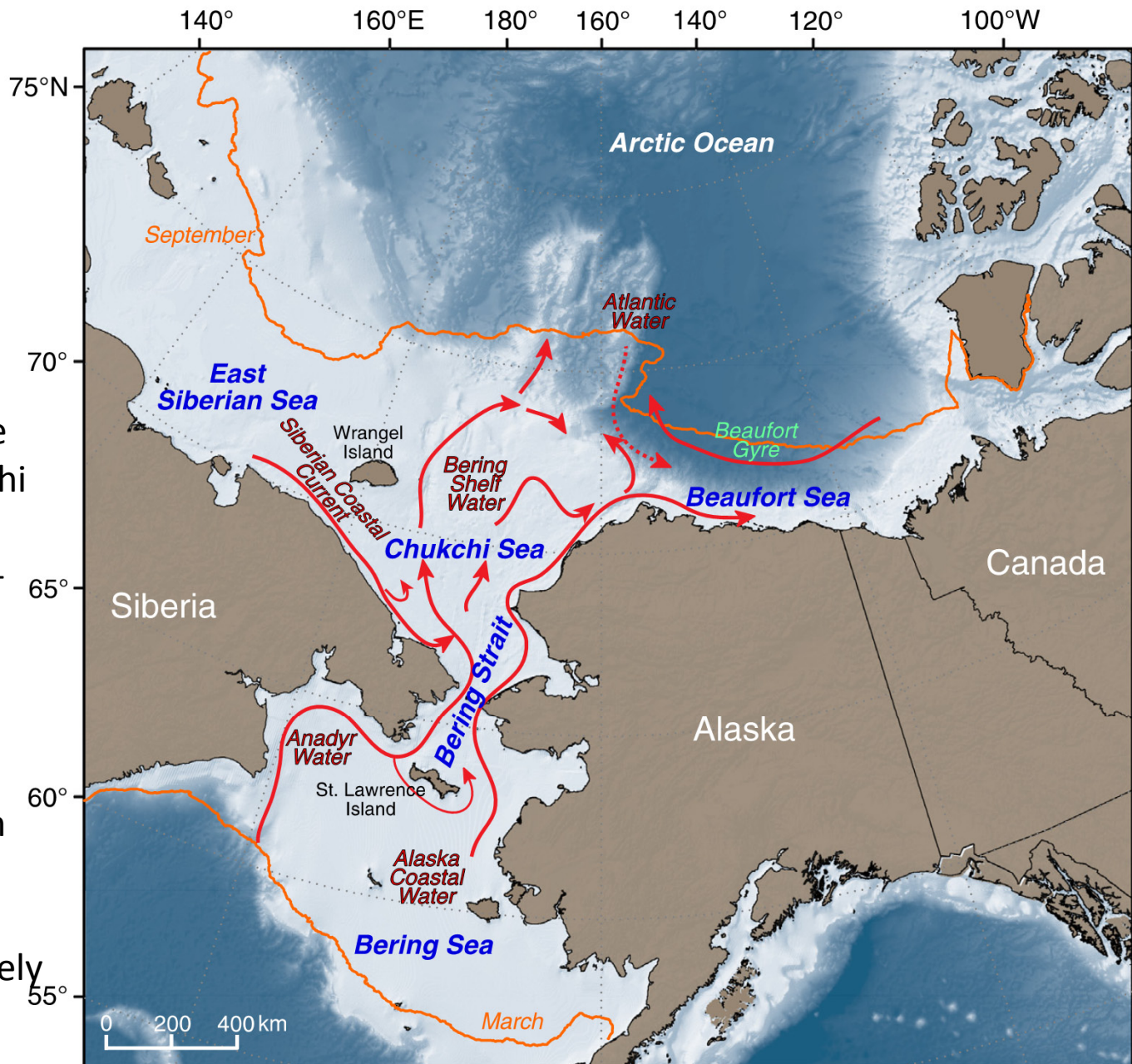


USGS. North coast of Alaska study area showing color-coded shoreline-change rates, boundaries of the 10 analysis regions (dashed boxes and numbers) used in the study, and key geographic locations. Figure 72 in "[National Assessment of Shoreline Change: Historical Shoreline Change Along the North Coast of Alaska, U.S.-Canadian Border to Icy Cape.](#)"



Riverine coastal domain hypothesis (Carmack et al. 2015)

- Contiguous flow of a narrow stream of “freshwater” flowing along the coast from the **Bering Sea** to the Chukchi Sea and to the Beaufort Sea (suggested as a Pan-Arctic phenomena)
- Yukon and Mackenzie river outflows** provide seasonal pulses of warm and fresh water to the northern Bering and Beaufort seas, respectively (Carmack et al., 2015)



## Factors that affect decision on study region:

### **1. Science Questions**

### **2. Budget**

- *Proposed budget: \$80M total for original science plan*
- *Can we/do we need to have a modular plan?*



## Factors that affect decision on study region:

### 1. *Science Questions*

### 2. *Budget*

### 3. *Temporal coverage/frequency*

- *Length of Campaign: two 2-year intensive field periods*

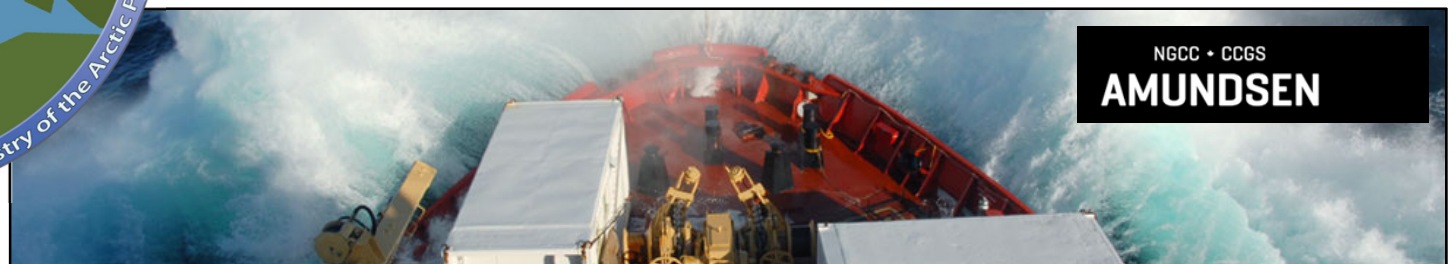
- *To address our science questions we need to have:*

  - Multiple years in same area: to address inter-annual variability*

  - Different seasons: **NO compromise in seasonality***

## Factors that affect decision on study region:

- 1. Science Questions***
- 2. Budget***
- 3. Temporal coverage/frequency***
- 4. Previous Campaigns (e.g., ICESCAPE, MALINA, past Amundsen expeditions)***

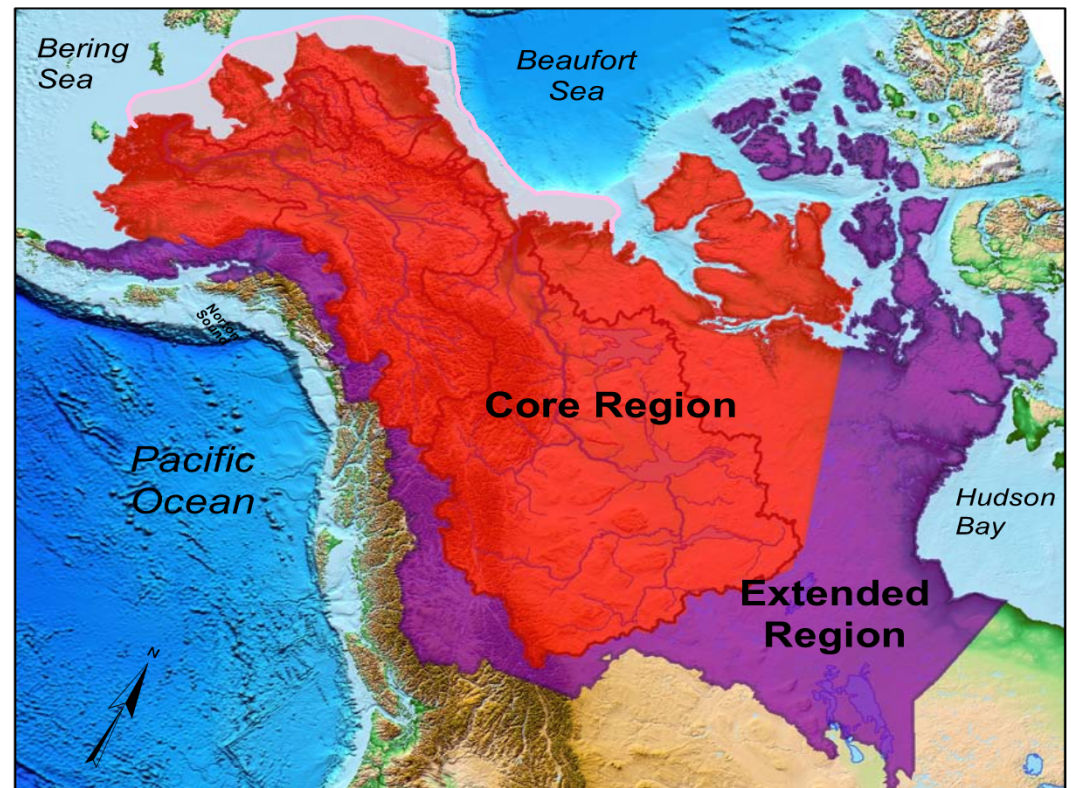






## Factors that affect decision on study region:

- 1. Science Questions***
- 2. Budget***
- 3. Temporal coverage/frequency***
- 4. Previous Campaigns (e.g., ICESCAPE, MALINA, past Amundsen expeditions)***
- 5. Coordination with ABoVE***

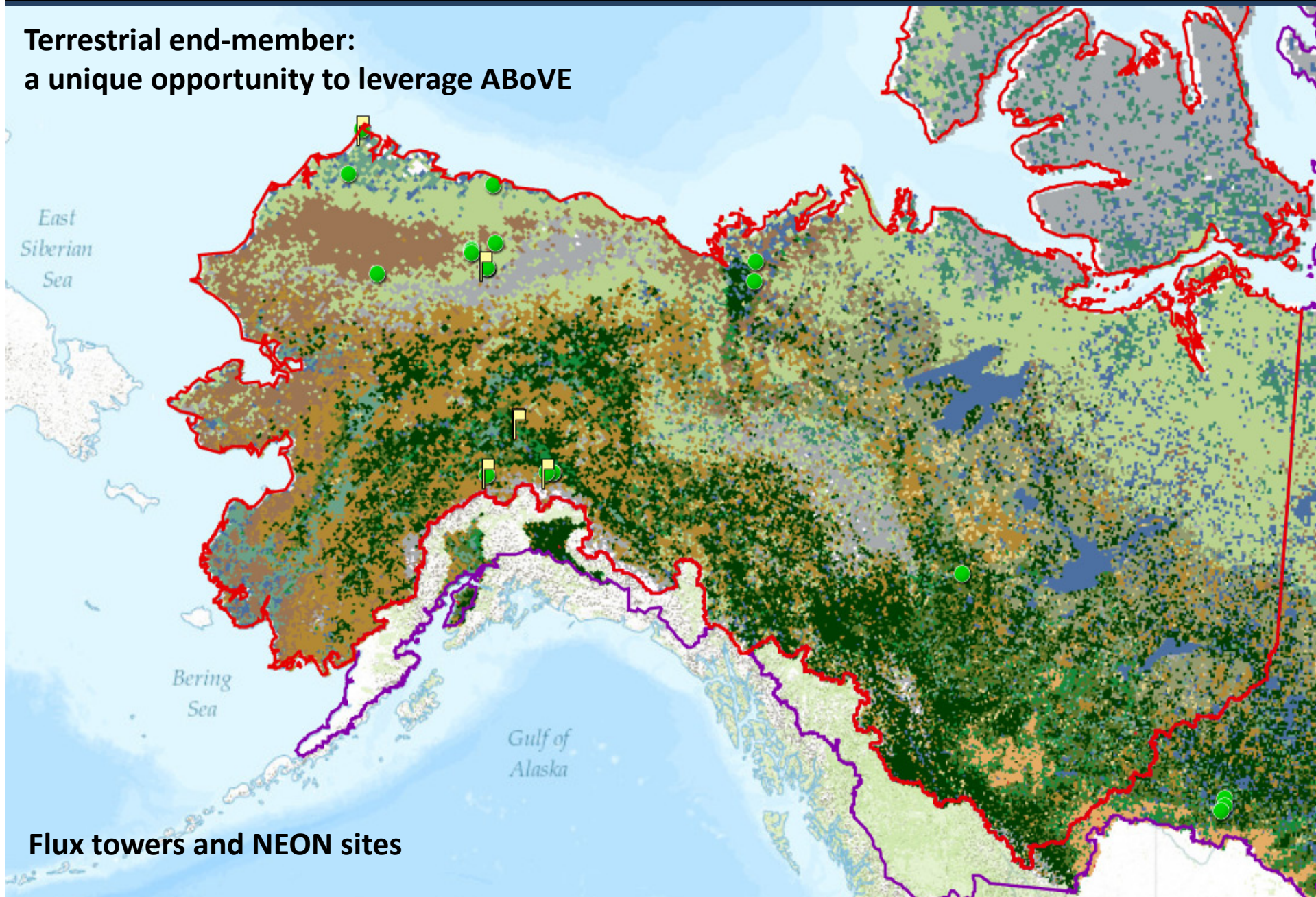


## Factors that affect decision on study region:

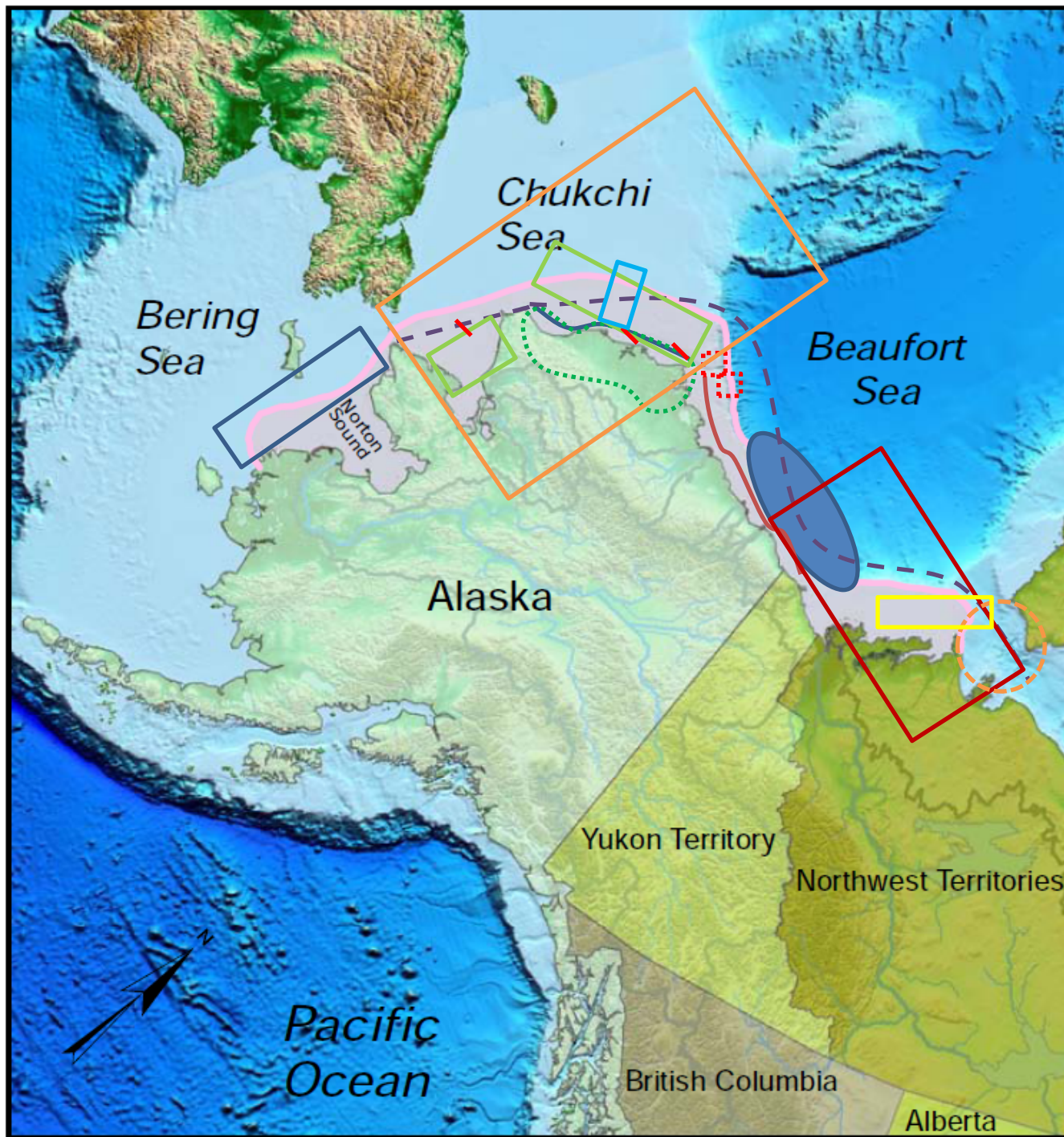
- 1. Science Questions**
- 2. Budget**
- 3. Temporal coverage/frequency**
- 4. Previous Campaigns (e.g., ICESCAPE, MALINA, past Amundsen expeditions)**
- 5. Coordination with ABoVE**
- 6. Existing Measurement Networks (existing monitoring sites, research centers etc)**
- 7. Access to resources**
  - ❖ Access to research vessels (small boats, ships etc), labs, aircrafts
  - ❖ Can collaborating institutes sample at additional sites to extent spatial coverage?
  - ❖ What other activities are planned for 2020-2028 we can leverage?



**Terrestrial end-member:  
a unique opportunity to leverage ABoVE**







-  AIDJEX
-  (c)ANIMIDA (1999-07)
-  BEST
-  C3O (2009)
-  CASES (2002-04)
-  CFL
-  COMIDA
-  CSESP (2008- )
-  ICESCAPE
-  Malina
-  SBI (2000-08)
-  SNACS (2005-06)
- 
- Current/New:
-  ABoVE
-  AKMAP (2010-12)
-  AMBON
-  DBO
-  MARES



