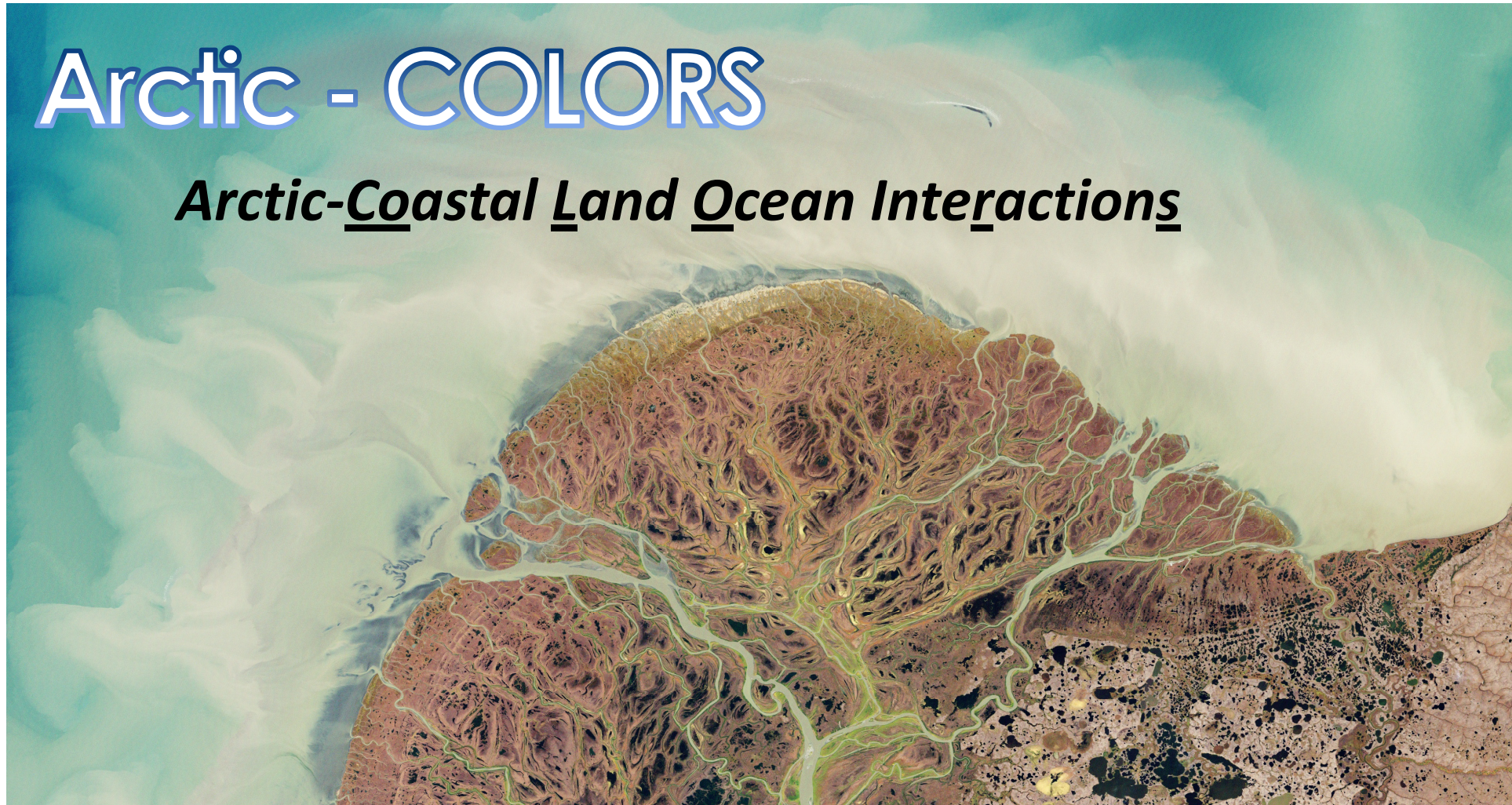


Arctic - COLORS

Arctic-Coastal Land Ocean Interactions



Project PIs:



Antonio Mannino
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Peter Hernes
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<http://arctic-colors.gsfc.nasa.gov>

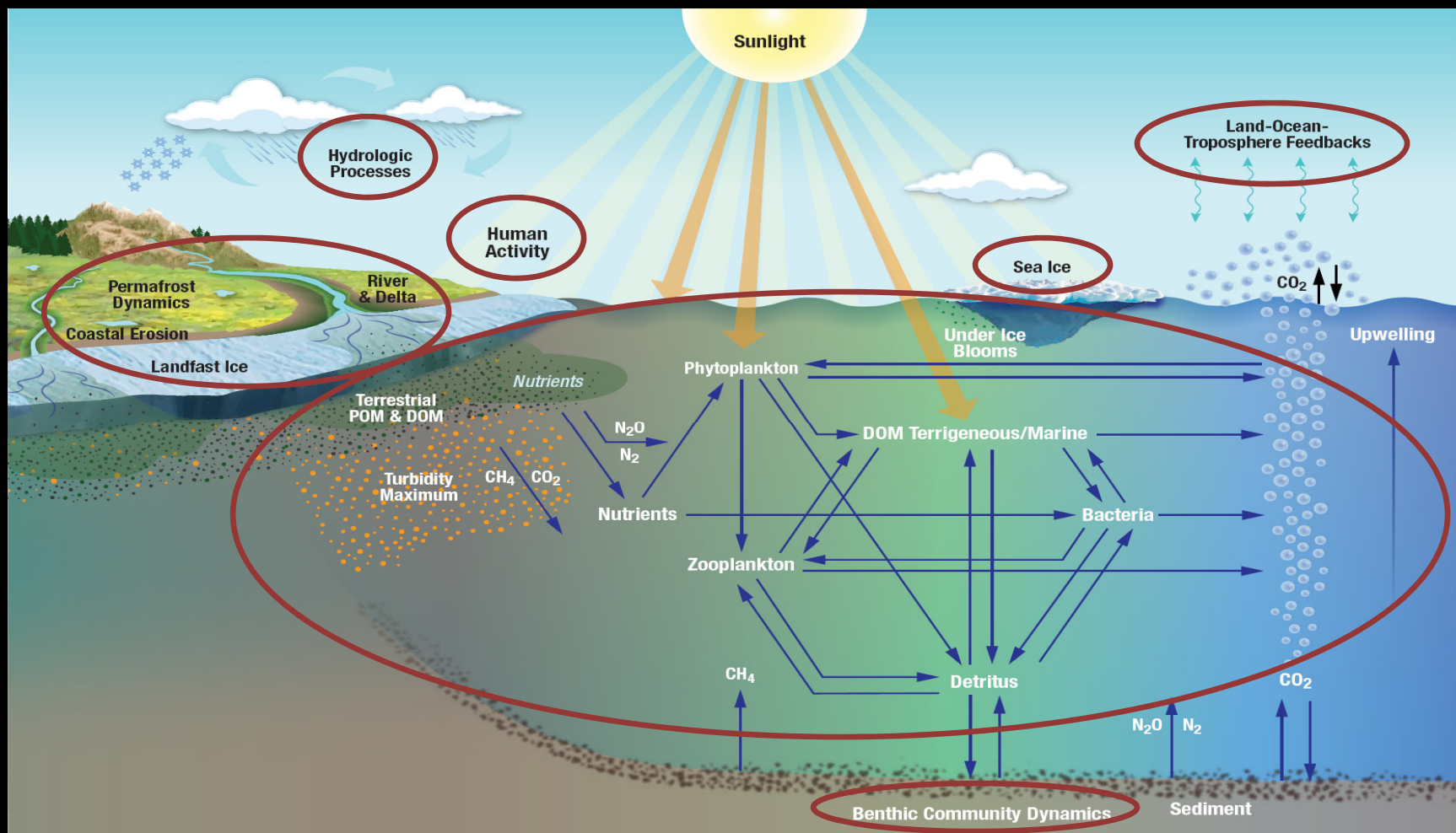
Coastal Arctic as an integrated land-ocean-atmosphere-biosphere system



Colville River, Arctic coastal ocean
(Image from geogdata.csun.edu)

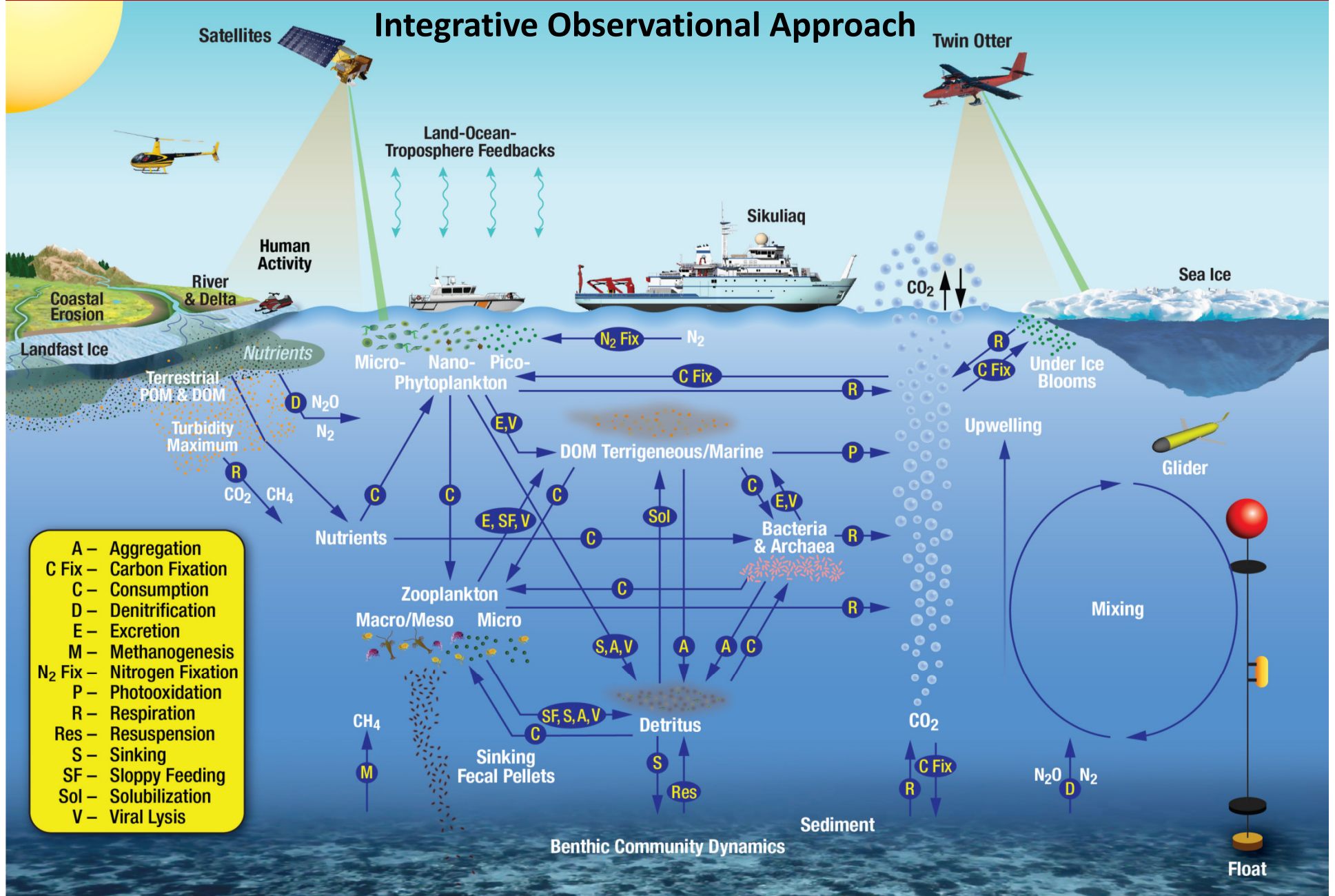
Revised Overarching science goal:

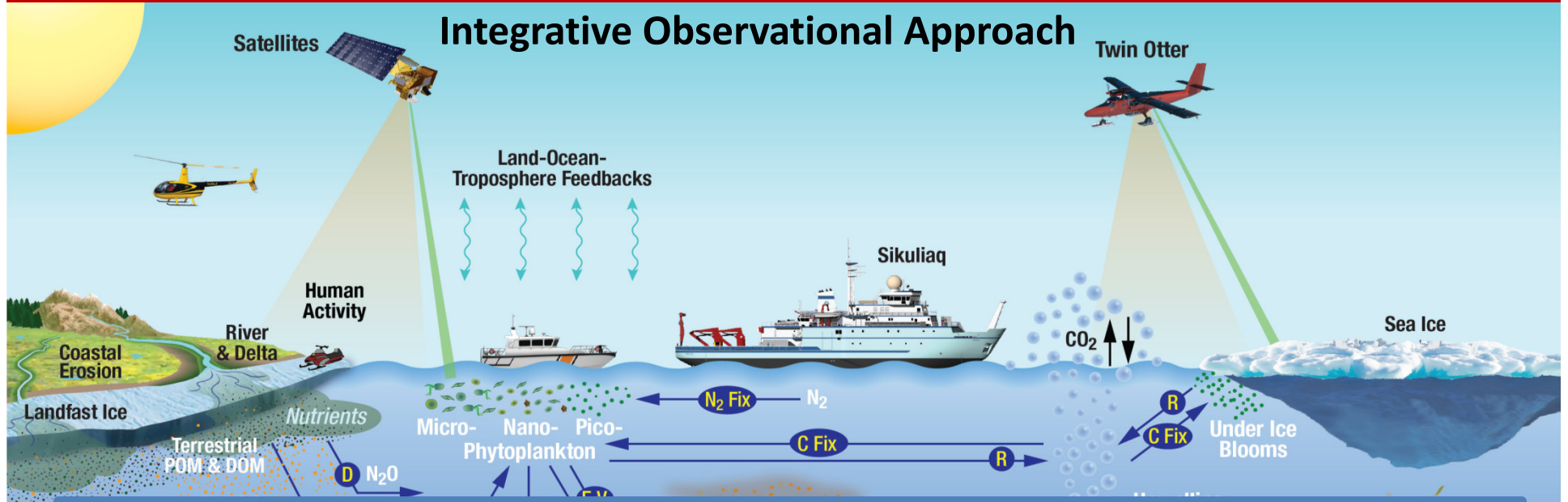
to quantify the biogeochemical response of the Arctic nearshore ecosystem to rapidly changing terrestrial fluxes and ice conditions.





Integrative Observational Approach





- **Not a traditional oceanographic campaign with a few major cruises**
- Diverse array of measurement approaches proven to be effective in the Arctic for **year-round measurements and sampling**
 - Ice camps, ATVs, sleds (lower river, delta, landfast ice regions)
 - Small boats and small ships (lower river to nearshore seas)
 - Medium and large icebreakers (nearshore to outer shelf seas)
 - Deployable small vessels for shallow-water and near ice work
 - Helicopter-enabled sampling
 - Moorings, floats, buoys, gliders and other autonomous vehicles
 - Airborne and satellite remote sensing

A – Algal
 Fix – Carbon fixation
 C – Consumption
 D – Denitrification
 E – Excretion
 M – Methanogenesis
 N – Nitrogen
 Fix – Nitrogen fixation
 P – Photooxidation
 R – Respiration
 Res – Resuspension
 S – Sinking
 SF – Slippy Feeding
 Sol – Solubilization
 V – Viral Lysis

Scoping Study Timeline

2014

Jan

- Kick-off

June

- 1st Community Workshop

Nov

- 2nd Community Workshop

2015

Aug

- Draft Report posted for comments

Sept

- Submitted Final Report to NASA

30d

- NASA posted for 30-day comment

Nov

- NASA Panel Review

2016

Febr

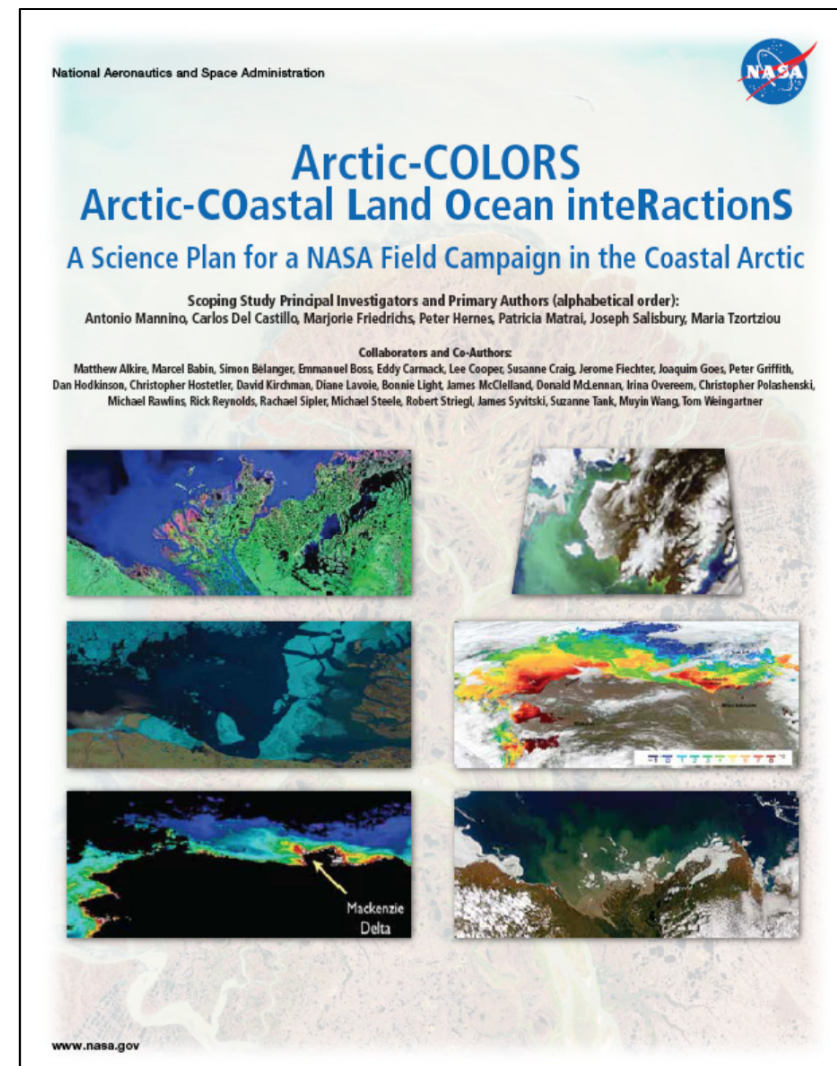
- We received Panel Summary

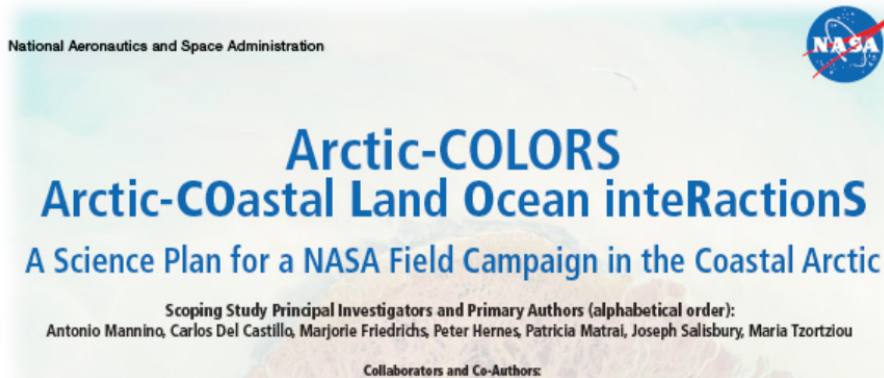
Aug

- Open Community Workshop

Dec

- Submission of revised Report



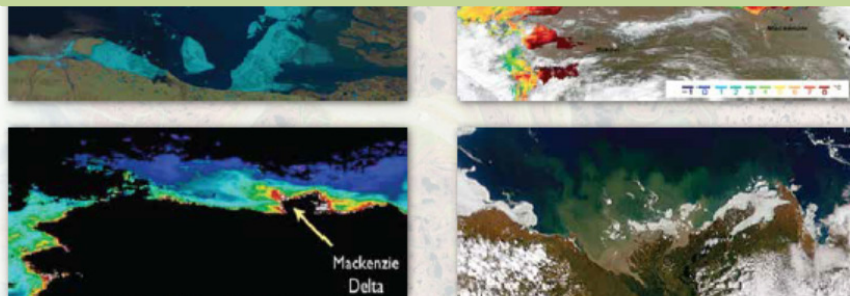


Arctic COLORS Scoping Study Report:

Panel Conclusion: Arctic-COLORS is of potential high merit, but needs further study/planning to resolve science or other issues.

REVIEW PANEL

“An Arctic coastal experiment represents an important and timely opportunity for [NASA] because of the rapidly changing Arctic Environment.”



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*).

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*).

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*).

Panel Recommendations - Implementation Objectives

Either prioritize (on quantitative grounds) or justify (in terms of ecological contrasts) why such a **broad range of experimental sites** is necessary (*Recommendation 4*).

Develop a clear strategy for linking **year-round measurements** with those associated with the **intensive field campaigns** given the newly prioritized set of scientific goals, as appropriate (*Recommendation 5*).

Dependencies and complementarities with other programs (e.g. ABoVE, BOEM, LTER, USGS, NACP/OCB CCARS, etc.) In particular, the linkages to ABoVE, and relevant operational timelines must be more explicit...Collaborating with USGS could be invaluable for extending ARCTIC COLORS data for more than the few years of field work proposed here (*Recommendation 7*).

Similarly, what are the synergies/relationships between Arctic-COLORS and other programs (e.g., ABoVE) that could help **mitigate certain risk**? Or, is dependency on an external program a risk in itself? (*Recommendation 10*)

Recommendation 13: ...

Solicit input from the community
on overarching science aim and science questions

Thursday afternoon Group discussion on Arctic COLORS revised **science questions**

Friday morning • More discussion on Arctic COLORS revised **science questions**

• Optimizing/constraining the Arctic COLORS **Study Domain**
(core and extended regions) (R#1, #4, #6)

• Optimizing the Arctic COLORS **Field Measurements Program**
(process studies and synoptic surveys) (R#4, #5)

Friday afternoon • Arctic COLORS **Implementation Plan** (R#6,#8, #9, #12)

• Arctic-COLORS within the context of other **U.S. agency programs**
and international initiatives (R#7, #10)

• **Next Steps**

Revised Hypothesis and Top-Level Science Questions

Hypothesis – It is not too late to establish a baseline for characterizing biological and biogeochemical conditions in the nearshore Arctic.

Top Level Science Questions:

1. Effect of Land on Sea (rivers, thawing permafrost, coastal erosion)
2. Effect of Ice on Sea (snow, landfast ice, sea ice)
3. Effects of future warming land on sea and future melting ice on Sea – seasonal and interannual first, and then future scenarios/predictions

Benthic Community Dynamics

Sediment

