ENHANCING ACCESSIBILITY: FOSTERING BETTER DATA ACCESS AND WORKFORCE DEVELOPMENT IN ALASKA COASTAL MAPPING

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akcoastalmapping

Topobathy Technical CoE

US Army Corps of Engineers

Partners

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Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX)

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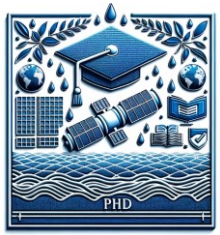
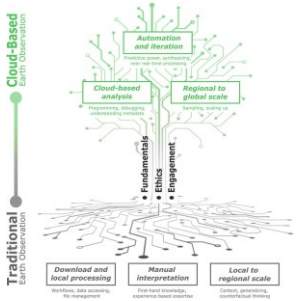
Introduction

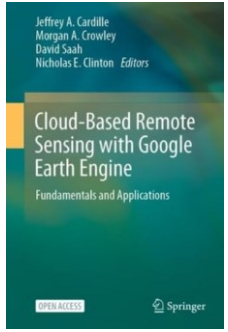


Statewide Threat Assessment

Awesome GEE Community Catalog



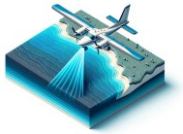
Crowley, M. A., Stuhlmacher, M., Trochim, E. D., Van Den Hoek, J., Pasquarella, V. J., Szeto, S. H., et al. (2023). Pillars of cloud-based Earth observation science education. AGU Advances, *4, e2023AV000894.* https://doi.org/10.1029/2023AV000894



Trochim, E. D. (2023). Built Environments. In: Cardille, J.A., Crowley, M.A., Saah, D., Clinton, N.E. (eds) Cloud-Based Remote Sensing with Google Earth Engine. Springer, Cham. https://doi.org/10.1007/978-3-031-26588-4_34

eScience Institute
Data Science for Social Good

1st AK GEE Workshops



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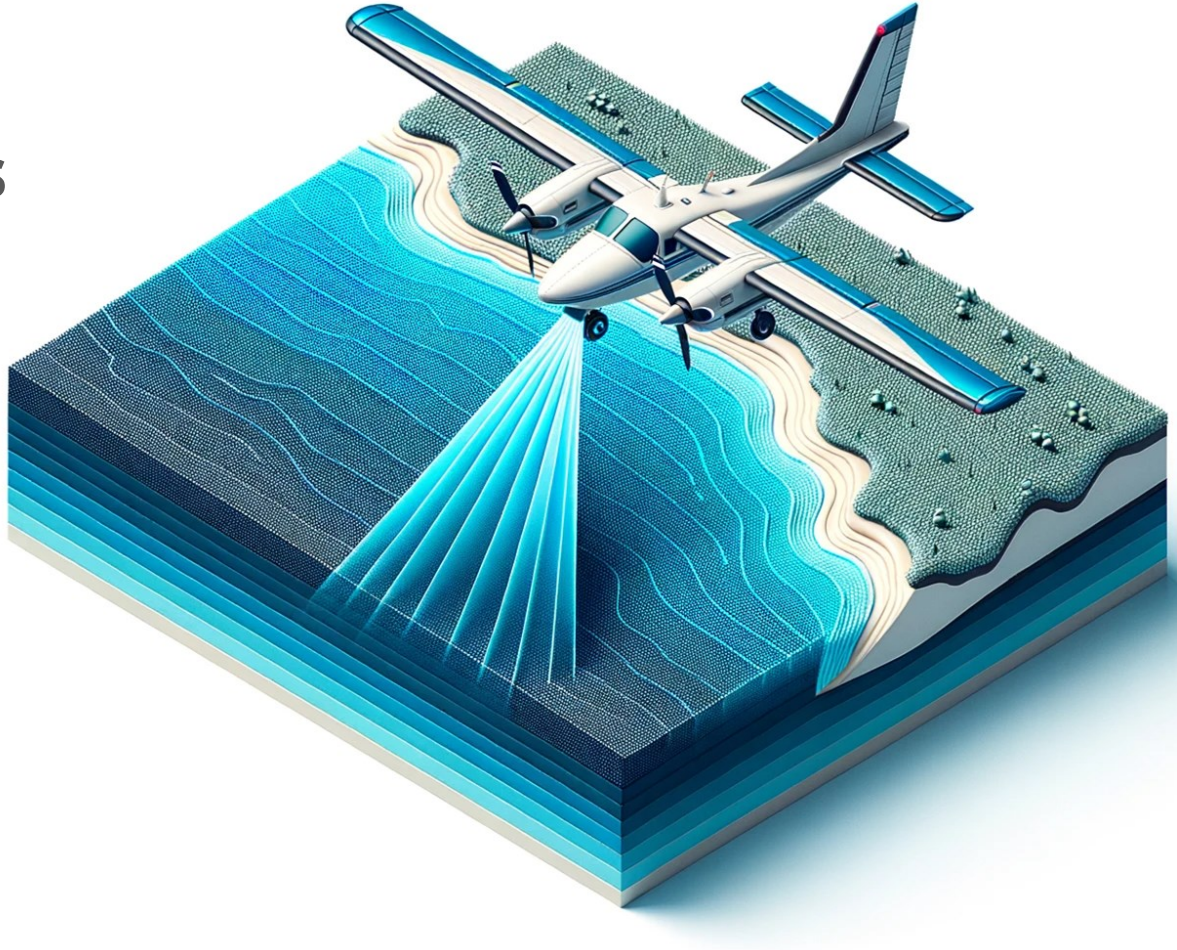
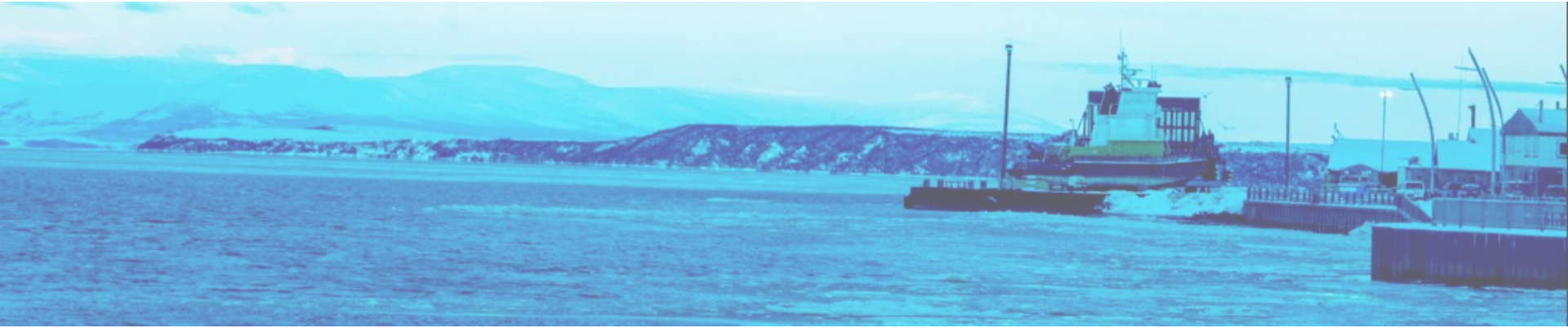
Experts 2023

New Paradigms

Availability of topobathy lidar data in AK and cloud compute colocated with data



Need for Enhanced Accessibility



Current barriers include limited data availability, training opportunities and need for workforce development

GOAL 1

Strategically improve topobathy lidar data

PLANNING, PROCESSING & VALIDATING

GOAL 2

Promote & connect data to Alaska end users

DATA DISTRIBUTION & ACCESS

GOAL 3

Enhance accessibility and useability for Alaska communities

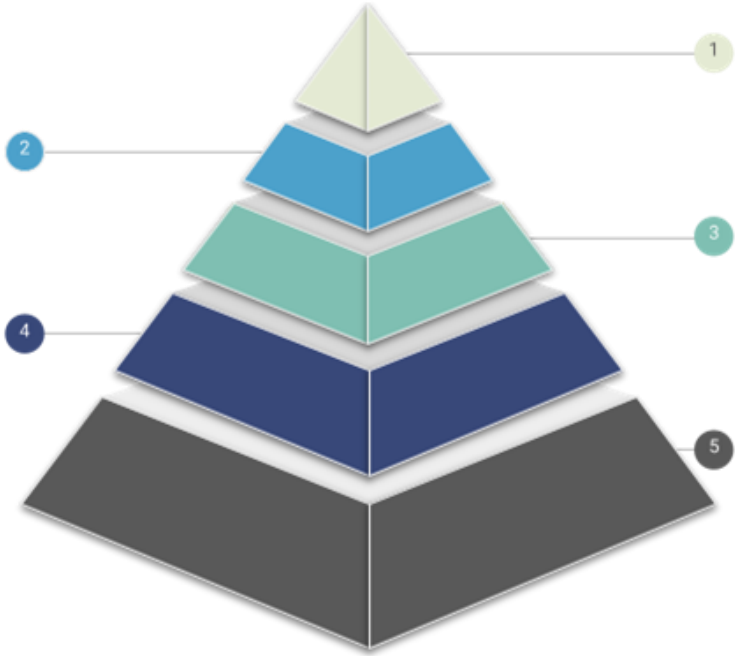
COLLABORATION & CAPACITY BUILDING

Partnership between

INE

US Army Corps of Engineers

Workforce Development: AK Coastal Mapping



Research leadership
1
Support post-doctoral fellowships to create future research leaders

Graduate students
3
Tackle specific research topics and techniques while including professional development
** CURRENT **

Foundational education
5
Host technical workshops, create processing manuals, knowledge transfer of techniques for applications
** CURRENT **

Project fellows
2
Host Sea Grant Alaska fellows supported by cohort program to refine technical skills and leadership ** CURRENT **

Undergraduate interns
4
Develop interest in coastal applications. Exposure to data, processing and applications
** CURRENT **

Our Team

inter- to trans-discipline geospatial approach

CM0	CM1	CM2	Woolpert
Jeremy Kasper, PhD		Oceanography	
Erin Trochim, PhD			Geospatial / INDS
Noelle Helder **			Marine Biology
Heike Merkel		Civil Eng	
Evan Joyce *			Geological Eng
Joy Lomelino *			CS
	Bax Bond		Electrical Eng
	Tane Timling *		Communications
	Karsten Sierra *		Mechanical Eng
	Mary Ella Rinzler *		Geography
		Michael Roddewig, PhD	Electrical Eng
		Steven Dykstra, PhD	Oceanography
		Eloise Brown	Oceanography
		Maddi McArthur **	Marine Biology
		William Rosenbluth **	Applied Math / CS
			Matt Hutchinson — Geomatics

\+ **Research Staff at ACEP and Woolpert**

* Student
** Early Career

Building a Skilled Workforce

beyond Formal Geospatial Education

1

Training Programs and Workshops

Opportunities for all career levels to further develop their skills, and professional networks

2

Collaboration with universities, agencies and industry partners

Get experience in different environments to prioritize skill development

3

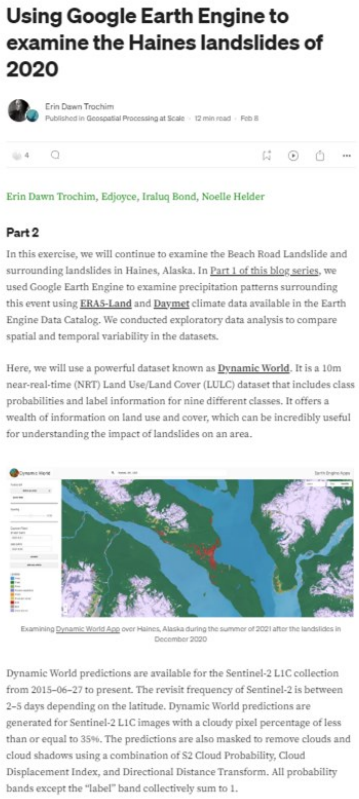
Mentorship and team-based approach

Maximize individual strengths, apply growth mindsets, gain capacity to work through challenges, peer-mentoring

4

Ongoing development of learning materials

Demonstrate mastery and knowledge management



Using Google Earth Engine to examine the Haines landslides of 2020

Erin Dawn Trochim
Published in Geospatial Processing at Scale · 12 min read · Feb 8

4

Erin Dawn Trochim, Edjoyce, Iraluq Bond, Noelle Helder

Part 2

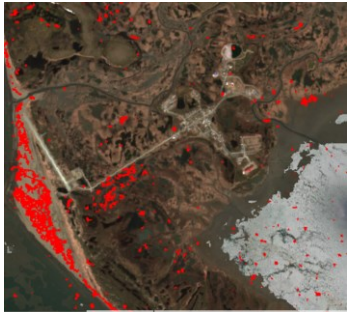
In this exercise, we will continue to examine the Beach Road Landslide and surrounding landslides in Haines, Alaska. In Part 1 of this blog series, we used Google Earth Engine to examine precipitation patterns surrounding this event using ERA5-Land and Daymet climate data available in the Earth Engine Data Catalog. We conducted exploratory data analysis to compare spatial and temporal variability in the datasets.

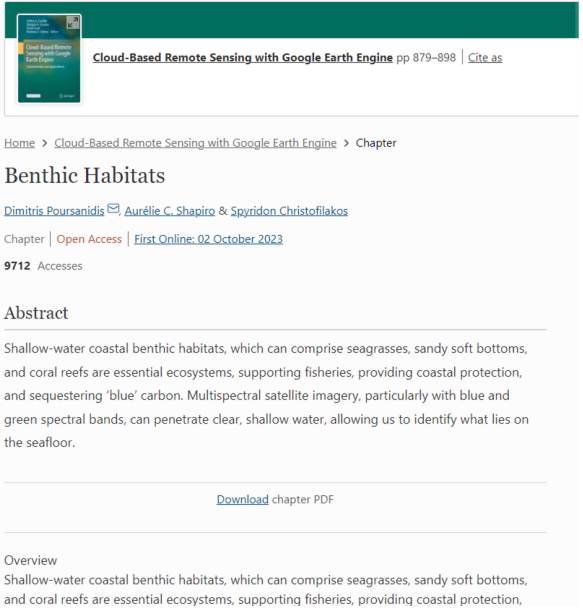
Here, we will use a powerful dataset known as Dynamic World. It is a 10m near-real-time (NRT) Land Use/Land Cover (LULC) dataset that includes class probabilities and label information for nine different classes. It offers a wealth of information on land use and cover, which can be incredibly useful for understanding the impact of landslides on an area.

Examining Dynamic World App over Haines, Alaska during the summer of 2021 after the landslides in December 2020

Dynamic World predictions are available for the Sentinel-2 L1C collection from 2015-06-27 to present. The revisit frequency of Sentinel-2 is between 2–5 days depending on the latitude. Dynamic World predictions are generated for Sentinel-2 L1C images with a cloudy pixel percentage of less than or equal to 35%. The predictions are also masked to remove clouds and cloud shadows using a combination of S2 Cloud Probability, Cloud Displacement Index, and Directional Distance Transform. All probability bands except the "label" band collectively sum to 1.

Post-Merbok flooding using existing Google Earth Engine Community tutorials to identify change in water in Hooper Bay and combine with new S2 CloudScore+





Cloud-Based Remote Sensing with Google Earth Engine pp 879–898 | Cite as

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Benthic Habitats

Dimitris Poursanidis, Aurélie C. Shapiro & Spyridon Christofilakos

Chapter | Open Access | First Online: 02 October 2023

9712 Accesses

Abstract

Shallow-water coastal benthic habitats, which can comprise seagrasses, sandy soft bottoms, and coral reefs are essential ecosystems, supporting fisheries, providing coastal protection, and sequestering 'blue' carbon. Multispectral satellite imagery, particularly with blue and green spectral bands, can penetrate clear, shallow water, allowing us to identify what lies on the seafloor.

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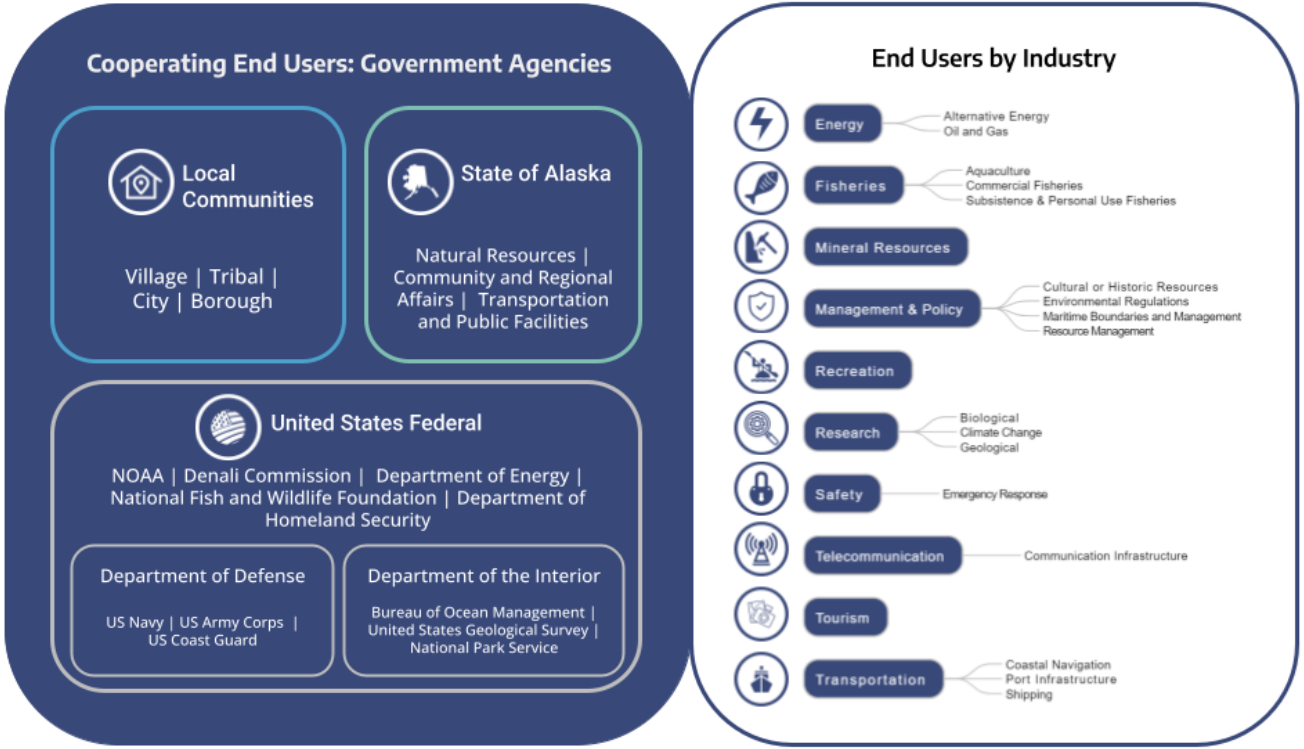
Overview
Shallow-water coastal benthic habitats, which can comprise seagrasses, sandy soft bottoms, and coral reefs are essential ecosystems, supporting fisheries, providing coastal protection,

Adapting SDB example to Alaska with JALBTXC topobathy data loaded in GEE Community Catalog

Looking Ahead



Thank-you

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