

# NGA LTER & Gulf Watch Alaska Cruise NUQ2019-01S

Northern Gulf of Alaska Freshwater Pathways Cruise  
23 July to 2 August 2019

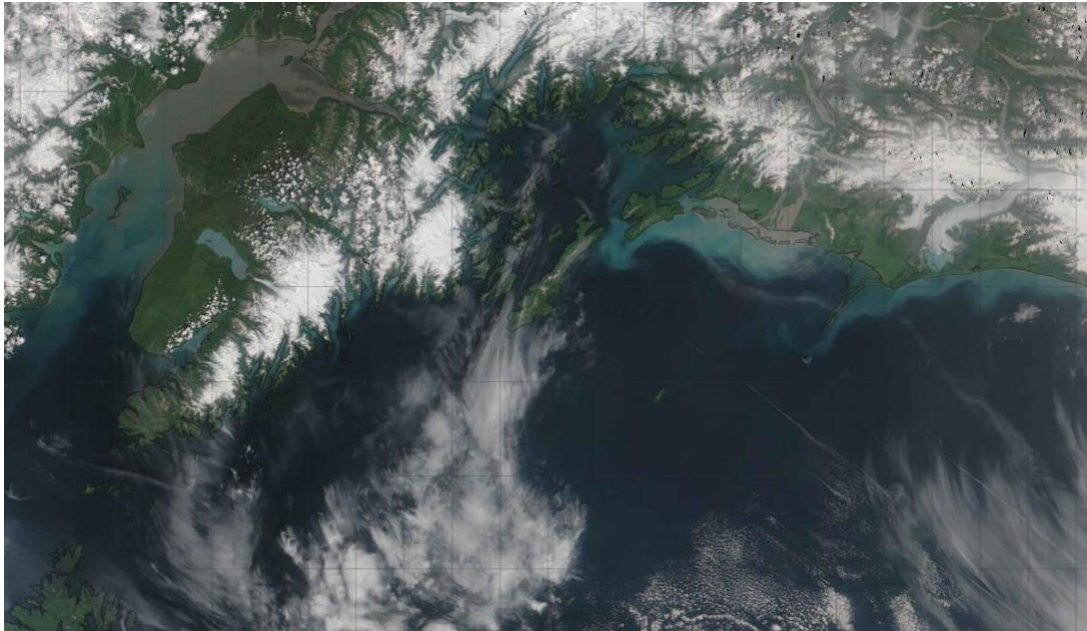
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## Synopsis and Objectives:

The scientific purpose of this research is to map the nearshore fresh water system of the Northern Gulf of Alaska. Weather permitting, we will work offshore of the Copper River delta, towing an undulating CTD in and out of the frontal systems between the fresh river water and the salty waters offshore. Inclement weather will re-direct operations into Prince William Sound. This cruise will attempt to re-occupy transects covered by R/V Sikuliaq in early July 2019, seeking information on the temporal evolution of the fresh water distribution and freshwater pathways.



Satellite image of the plume study area from 17 July 2019.



### **Operations and Cruise Schedule:**

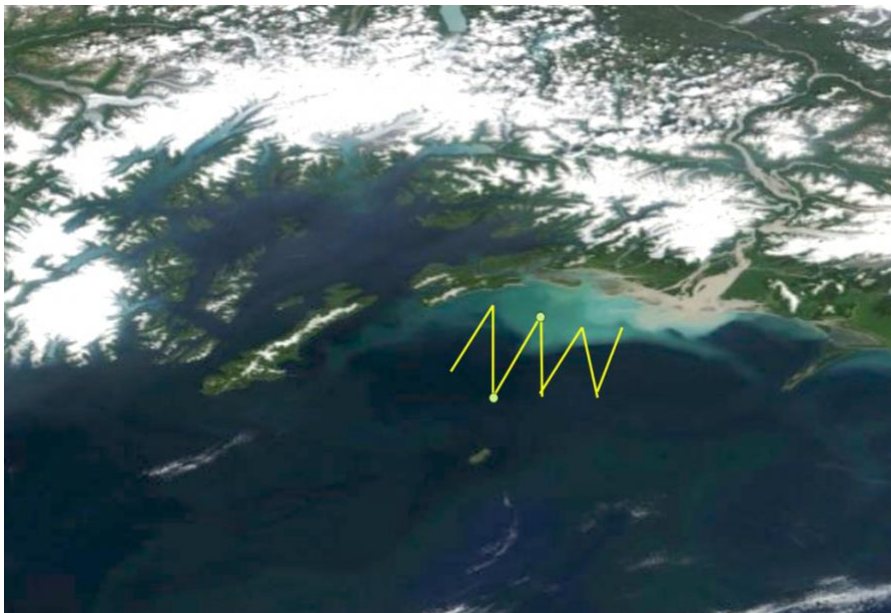
Cruise NUQ201901S operations will be limited to 12 working hours per day. We anticipate anchoring in Port Etches on the night of July 23 and then returning here nightly or to other appropriate anchorage spots. We will likely have to refuel in Cordova 1-3 times during the course of the 10-day cruise. Communication with Cordova fishermen indicate that 24-hour fishing openers are likely to occur on Tuesday July 23 and Thursday July 25, providing an opportunity to follow a deep-draft tender through the channels and into Cordova on Wednesday and Friday mornings. The fishing fleet monitors Channel 6. We will return to Seward by mid-morning on Friday August 2<sup>nd</sup>.

### **Communications Plan:**

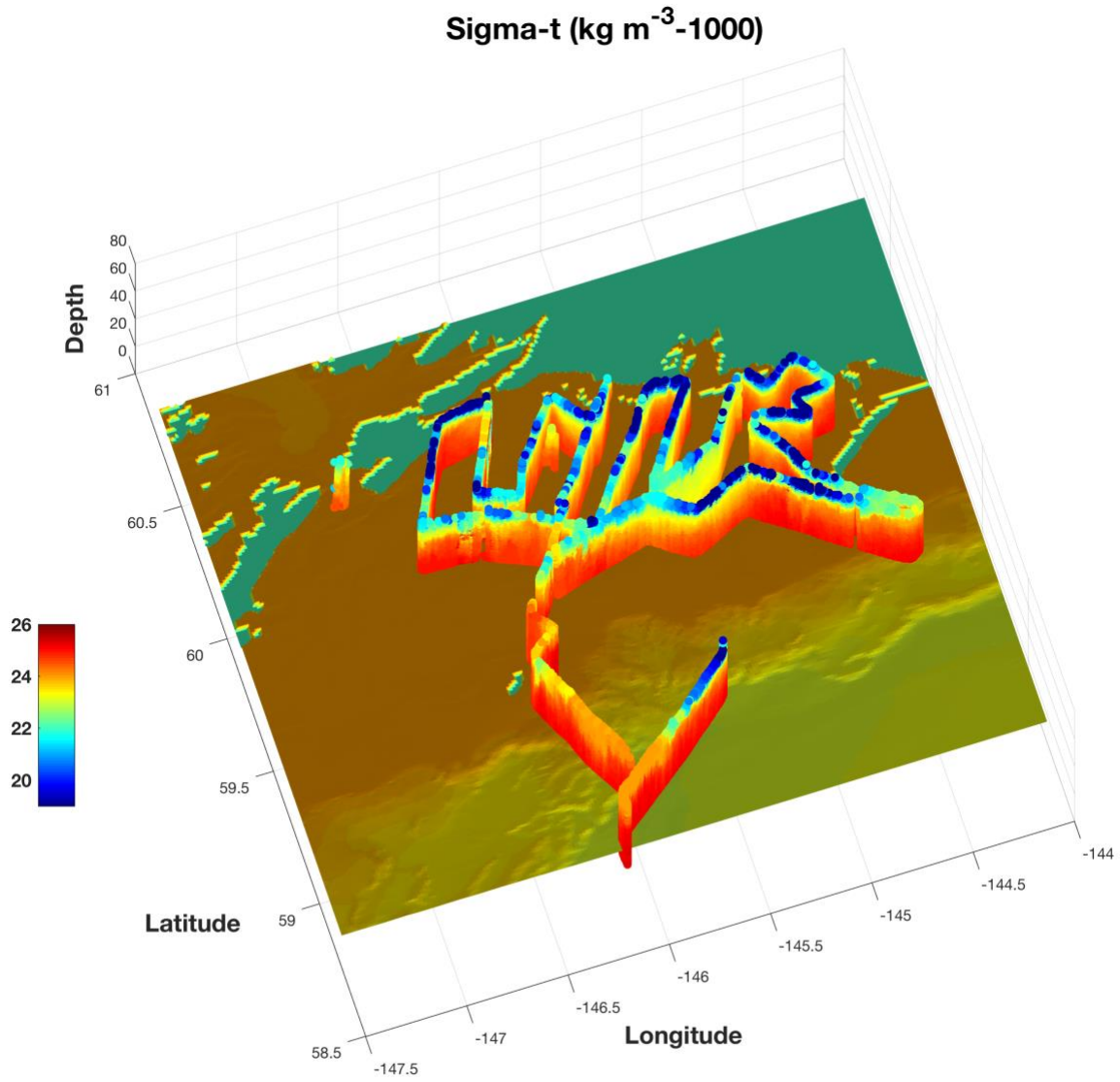
We will attempt to check in with SMC at 8:30 AM daily (or as soon as possible afterwards if occupied by operations) by calling the office via satellite phone on weekdays or Doug's cell on weekends/holidays. If we get no answer via phone we will try texting Doug via InReach communicator.

### **Cruise Activities:**

Activities will include mapping of the plume extent and depth using an undulating towed Acrobat CTD system. We will deploy a number of satellite-tracked drifters (2 PacificGyre MicroStar and up to 8 Oceanetic SCT drifters). We may deploy one light, short-term mooring with a surface buoy. We will try towing an acoustic sled with a downward-looking ADCP mounted to the underside. The ADCP sled package is towed just below the surface away from the vessel by the starboard davit. The Acrobat is towed about 150 meters astern from the A-frame. Because of the tow locations of these two packages and their tow cable lengths, they will have no ability to foul with each other or the vessel while maintaining forward motion or even sharp turns. However, because we will be making cross-shelf transects into shallow water, it will be important to make wide and slow turns to keep the Acrobat from sinking toward the seafloor during a heading change maneuver. Fishing vessels may be in the vicinity during some days of operation and we will need to chart a course that avoids interference. Acrobat tows will involve zig-zags across the river plume frontal region (Figure 1); an example of this in practice is given in Figure 2. We may spend one 12-hour semi-diurnal tidal cycle doing repeat tows back-and-forth along one of these lines in order to characterize tidal straining across the frontal zone.



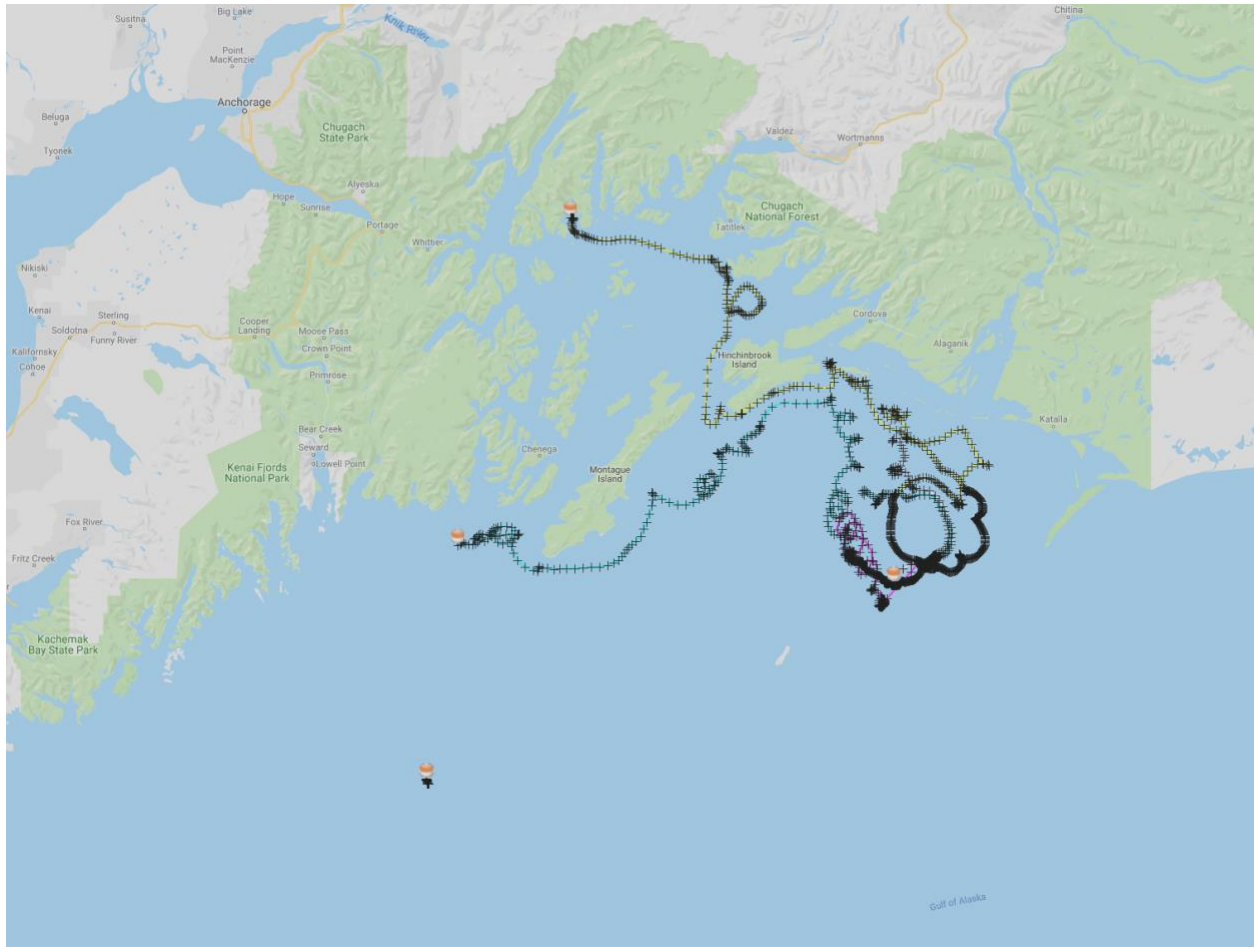
**Figure 1.** Satellite image of the NE Gulf of Alaska shelf and the Copper River sediment plume. Image from July 2018. Transect endpoints will be determined at sea based on in situ conditions, available satellite imagery, and results from cruise SKQ201915S.



**Figure 2.** Perspective map showing the location of Acrobat tows on cruise SKQ2019-15S.



**Figure 3.** Satellite image of the plume area on 29 June 2019.



**Figure 4.** Satellite-tracked drifter trajectories (blue, yellow and purple tracks) from deployments on 4 July 2019. Updated 22 July 2019. Southernmost marker shows location of GEO moorings.