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GIS WR
Project Update

Benthic Isoscapes in the Arctic Ocean

Purpose: Generate maps that predict the spatial and temporal distribution of stable isotope values (δ13C and δ15N) for certain benthic fauna in the Arctic Ocean in order to make inferences about the feeding relationships among organisms.

Progress:

I decided to first focus on creating isoscapes of common carbon sources at the base of arctic food webs—these carbon sources include particulate organ matter (POM) and phytoplankton. Data for these groups span multiple years and seasons. Because dynamics in the arctic are controlled by the timing of seaice breakup, I will need to research the timeing of ice-out in the arctic ocean over the last several years in order to partition data into different seasons (ie. Spring (before ice out) and summer (after ice out).

I have added the pacMARS stable isotope data I received from Dr. Ken Dunton and Mr. Tim Whitacre, into arcMAP. The layer is in the GCS_WGS_1984 geographic coordinate system using the D_WGS_1984 datum. The projected coordinate system is the North_Pole_Stereographic.

I spent some time searching through the available basemaps to find a suitable basemap for the data. I decided that the National Geographic basemap best showed the coastlines and the ocean topography in the arctic Alaska region (Figure 1). However, I now realize that it might not be possible to change the projection of a basemap, and my data do not appear on the basemap where they should be (ie. Points are in blank space). Because of this, I will need to spend some time searching for a more appropriate map to use a basemap.

I am attaching the preliminary maps I have made for this project so far. I am experiencing many technical difficulties to project the data correctly onto a basemap, after I have isoloated a subset of the data (ie. POM data in Figure 2). I am meeting with the TA for the class on Thursday to work through these issues.
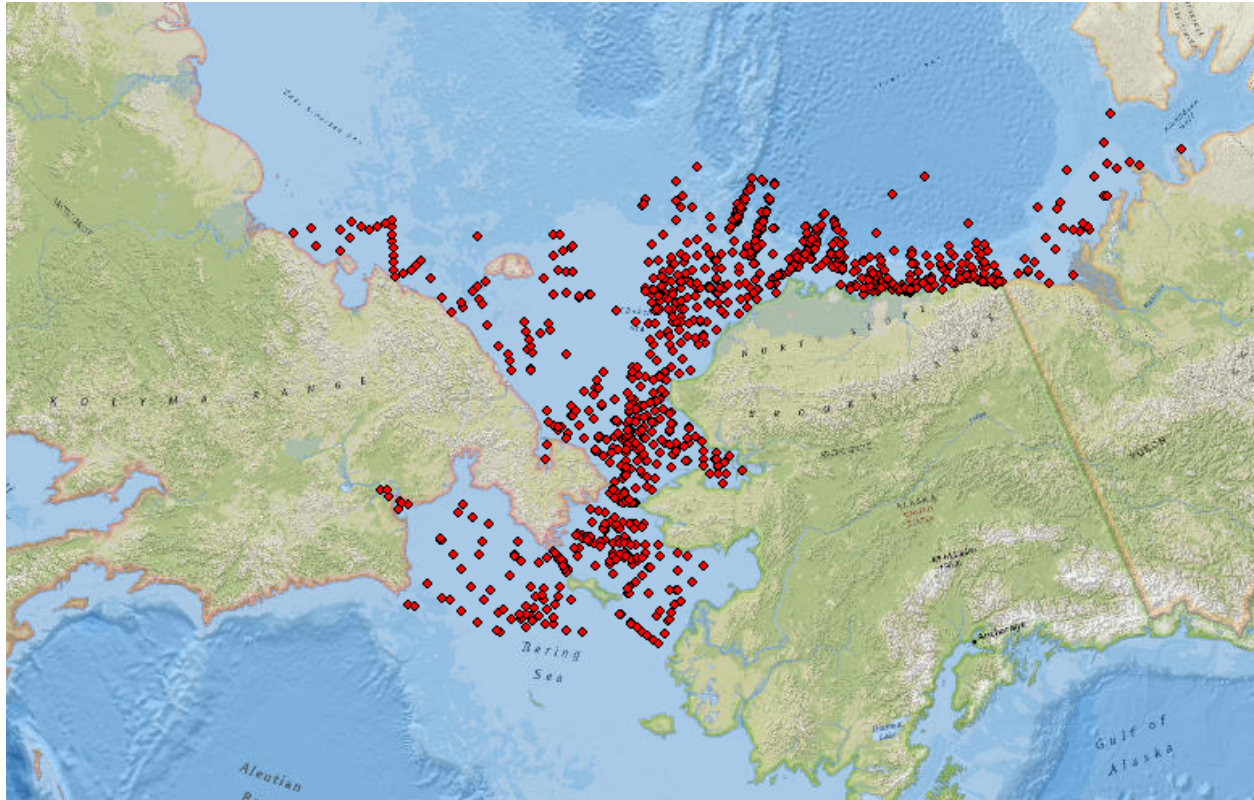
Figure 1. Shows the location of all 4,000+ isotope samples archived in the pacMARS project from the Bering, Chuckchi and Beaufort seas over the last 15 years.
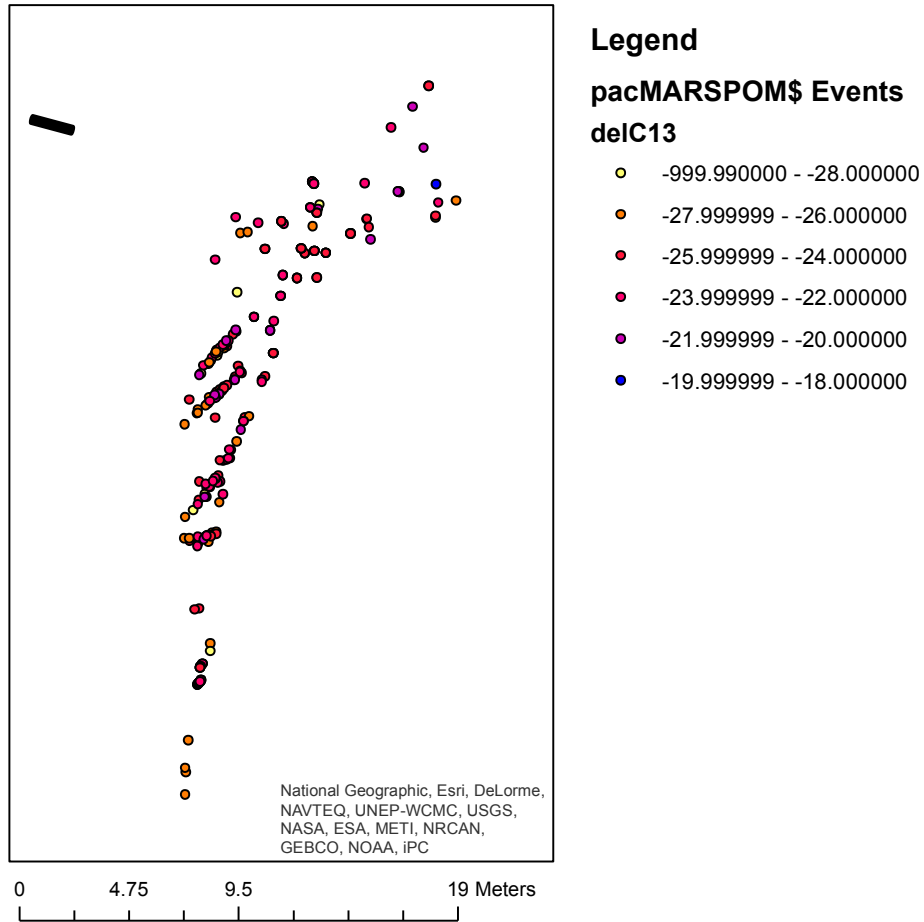
Legend

pacMARSPOM$ Events
delC13

○	-999.990000 - -28.000000
○	-27.999999 - -26.000000
●	-25.999999 - -24.000000
●	-23.999999 - -22.000000
●	-21.999999 - -20.000000
●	-19.999999 - -18.000000

National Geographic, Esri, DeLorme,
NAVTEQ, UNEP-WCMC, USGS,
NASA, ESA, METI, NRCAN,
GEBCO, NOAA, iPC

0   4.75   9.5   19 Meters

Figure 2. Shows a preliminary isoscape for the δ^{13}C values of particulate organic matter (POM) in the Arctic Ocean. Something is wrong with the projection of this data, however, because they do not appear over the correct region of the Arctic Ocean and the scale of their projection is incorrect (these samples span a much larger region than 20 meters).