SALSA ON ICE REPORT: 15 November 2017

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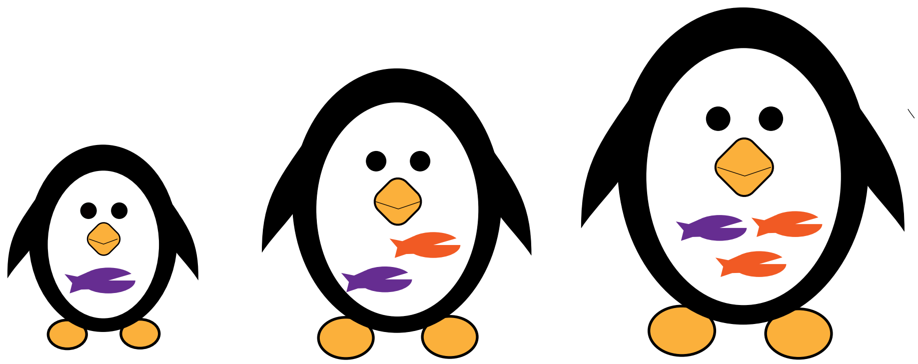
Sediment Lab Update

I've been spending my days in the sediment laboratory applying our cleaning protocol that I described in my last update. I was able to finish the job today! It took two days to clean up the benches, cabinets, faucets, and door handles, another two days to clean the floor, and a final day to cover everything up. In order to determine whether or not our cleaning protocol worked, I spent today taking swipe samples. For these samples, I take a very small quartz fiber filter, moisten it with isopropyl alcohol, and wipe it along whichever surface I want to test. The filter is placed in a vial, sealed, and shipped to the National Oceanographic Sciences Accelerator Mass Spectrometry (NOSAMS) facility at Woods Hole Oceanographic Institution where it will be analyzed. In case you're interested in distances, I travelled 8,212 miles from St. Petersburg Florida to Christchurch, New Zealand where I hopped on another flight to travel 2,375 miles to McMurdo Station. The swipe samples will be flown 9,470 miles back to NOSAMS at the same time that I make my trip back to Christchurch and eventually Florida. That's a cumulative 30,644 miles travelled between me and these swipe samples!

To many it may seem like we're being pretty dramatic by flying around the world to do a little clean up job, but the cleanliness of our laboratory space is actually pretty important to the success of the analyses we will be running. We will be using samples collected next year for radiocarbon dating, in which we measure an unstable isotope of carbon (^{14}C) in an accelerator mass spectrometer. In case you are unfamiliar with isotopes, I've included some location appropriate characters to help describe them.



Elements, like penguins, come in different sizes. Isotopes have the same number of protons but different numbers of neutrons in their nuclei. To visualize this, you can think of isotopes like these penguins, with the same number of purple fish in their bellies, like protons, but different numbers of orange fish, like neutrons! Some isotopes, like ^{14}C, are unstable-and we can use the rate at which they decay to understand how old something is. The measurement of ^{14}C is difficult because its concentration is less than one atom in every 1,000,000,000,000. Are you starting to see how a little bit of contamination could add up to inaccuracies of epic proportions? This makes it "worth it" to travel around the world for a clean-up job.

Now that I've likely bored you with chemistry jargon, I'll leave you with this photo that I took from Observation Hill yesterday. The ring around the sun is called a solar halo, which is an optical phenomenon that occurs when light interacts with ice crystals in the atmosphere. Interestingly enough, I just read a journal article in the Crary library here on station that describes how particular shapes of the ice crystals may result in different types and colors of the halo observed. The more you know!

Report by Ryan Venturelli