Marginal Ice Zone (MIZ) Program

Successful Field Season Ends

Narrator: Where the edge of the Arctic ice transitions to open water — in the Beaufort Sea north and west of Alaska — 2014 was a year of intense field work for the Marginal Ice Zone Program.

Craig Lee: Yes, it was absolutely a success.

Narrator: Craig Lee of the University of Washington's Applied Physics Laboratory:

Lee: We have this amazing picture of the ocean, atmosphere, and ice going from the fully frozen period in March to meltdown and breakup right through to freeze-up.

Narrator: The data that make up this "amazing picture" will advance the main objectives of the MIZ project: to understand the physics that control sea ice breakup and melt in and around the ice edge, and to develop new robotic networks for collecting observations in, under, and around sea ice.

Lee: We were doing things that had never been done before — large deployments of robotic platforms maintaining a persistent presence with this large number of robots over the course of nearly half-a-year.

Almost all the instruments functioned pretty much flawlessly. The data return was fantastic. Remote sensing was great. The collaborations were incredible. Everyone worked together well as a team.

Narrator: An international team made up of scientists from more than a dozen organizations.

Lee: We had a very interesting year in terms of wave activity. We had very low wave activity. It was surprisingly calm when we were in the ice and in the open water. There just wasn't much wind so there weren't very many surface waves.

Jim Thomson: We're in the Beaufort Sea, which is north of Prudhoe Bay, Alaska. We're about 150 nautical miles off of land and we've been up in and around the ice edge for about one week now.

We've been using some buoys to measure the waves and the ice and understand how waves are approaching the ice and breaking up the sea ice. And now it's October. It's the end of the warm season and starting to get cold and the ice is beginning to refreeze. We're looking at how the waves are interacting with the ice as that unfolds.

Lee: He's made some fantastic measurements looking at the differences between surface wave activity outside of the ice and then surface wave activity as he moves into the ice. And he sees huge attenuation as the waves enter the ice so they die back pretty quickly.

Seth Zippel: We're at the ice edge. You can see a bunch of ice floes that are moving up and down in the waves. Just down wave, you can see it's really clear of all the high-frequency waves. The bigger floes are really scattering over the high-frequency components and cleaning out the wave set, while the lower frequency stuff propagates through and makes this very beautiful wave.

Luc Rainville: We're circling the ice edge — ice plate, as we call it — doing underway CTD. We're doing casts every 100 meters or so — or every 200 meters — with really high resolution both along the ice edge and away from the ice edge. We're seeing wonderful signals and great horizontal gradients.

Lee: The gliders actually did what they were supposed to do. The gliders went from open water through the marginal ice zone deep into the ice and back again. They collected over 20 sections like that — spanning open water into the ice.

Narrator: Craig Lee was based aboard a Korean ice breaker.

Lee: The Koreans are fantastic collaborators. They are extremely generous. In addition to the MIZ team, they had scientist there from a number of different countries. They had a very active group from Japan. Scientists from Russia, from India, various different parts of the world, all working on different aspects of arctic science.

Next is a long period of analysis. We're just starting to look at the data now. We see very strong flux in temperature and salinity — very strong changes — horizontal changes in ocean temperature and ocean salinity that were associated with the edge of the ice.

Each person — each group — holds a piece of the puzzle but nobody holds the whole puzzle. So the trick is to put all those pieces together and decide what really happened out there this year. It will take months and years to really develop an understanding of what we think we saw.

This is APL — The Applied Physics Laboratory at the University of Washington in Seattle