U.S. National Ice Center Celebrates Antarctic Sea Ice Birthday

Sea-Ice in the Southern Ocean. Photo Credit: Dr. Pablo Clemente-Colon/USNIC 2016

April 1, 2016 – The start of April is used as a benchmark to separate "the old from the new" in Antarctic sea ice. "First year ice" develops during the winter months when conditions for sea ice formation are favorable. The first year ice that survives the summer melt season is classified as second year ice (The aging system is similar to students at law school. First years are just starting…). Having persisted through the melt period in the southern hemisphere, this ice typically becomes thicker, harder, more dense, and can pose an increased obstacle for navigation. Two members of the U.S. National Ice Center team, Chief Scientist Dr. Pablo Clemente-Colón, and Ice Analyst, Mr. Christopher Readinger, were very fortunate to experience first-hand what it is like to operate within these different Antarctic ice types while onboard the USCGC Polar Star during Operation Deep Freeze 2016.

The greater density of older sea ice is a result of two processes: deformation of the ice from the movement of individual floes as winds, tides, and currents put pressure on a relatively flat sheet of ice, and a freshening of the ice as salt slowly leaches out. As a result of all this pressure, second year ice is characterized by a rougher surface. It is also fresher, clearer, stronger, and becomes more brittle and thicker than first year sea ice.

Sea ice that has survived two ice-birthdays is known as multiyear ice. Most of the multiyear ice in Antarctica is located on the eastern side of the Antarctic Peninsula due to a circulating current in the Weddell Sea. Although Antarctica produces millions of square kilometers of ice each winter, only a small percentage survives to become second year or multiyear ice. This is due to the larger circulation in the Southern ocean and lack of land constraining its movement toward

lower latitudes, as much of the Antarctic sea ice easily flows into the warmer ocean waters where it melts.

Since 1978, the U.S. National Ice Center has also been compiling the latitude, longitude, and general size of icebergs larger than ten nautical miles on a side observed from space around the Antarctic continent as part of its routine monitoring of sea ice conditions. This tracking criteria was changed as of the first of the year to include icebergs of twenty square nautical miles or greater. During this melt period, however, A57 in the Bellingshausen Sea, B09 in the Wilkesland, and D15 in the Weddell Sea split. Additionally, D25 calved, and two icebergs were dropped as they were too small to be tracked via satellite imagery.

The iceberg information is made available to the general public. Ice analysts are able to distinguish various ice types using a combination of Synthetic Aperture Radar (SAR), visible, and infrared satellite remotely sensed imagery in Antarctica to analyze the daily ice edge, produce a weekly hemispheric ice concentration and stage of development analysis, and create tailored products for operating units.

The U.S. National Ice Center is a tri-agency operational center represented by the United States Navy, the National Oceanic and Atmospheric Administration, and the United States Coast Guard. The U.S. National Ice Center mission is to provide global to tactical scale ice and snow products, ice forecasting and other environmental intelligence services for the United States government.