

Update #3 (Final) for the Ross Sea and McMurdo Sound Seasonal Outlook 2020-2021

19 January 2021

Christopher Readinger
U.S. National Ice Center
4231 Suitland Rd.
Suitland, MD 20746
E-mail to: nic.cdo@noaa.gov

INTRODUCTION

The U. S. National Ice Center (USNIC) provides planning and real time operational support for the efforts of the United States Antarctic Program (USAP) through collaboration with National Science Foundation (NSF) and the U.S. Coast Guard (USCG). Specifically, this outlook is provided as environmental awareness to safely plan icebreaker operations in the McMurdo/Ross Sea channel and escort ice-strengthened tanker and ice-strengthened cargo ships to the pier at McMurdo Station, located at 77°51'S, 166°40'E [4].

In this specific outlook, the term “ice edge” is used to delineate the boundary between areas with greater than or equal to 4/10ths sea ice and areas with less than 4/10ths sea ice.

METHODOLOGY

Climatology: The rates of recession for the Ross Sea ice edge are predominately derived using an analog forecasting technique that relates historical observations of pre-season ice extent and thickness to the predicted severity of austral summer ice conditions. This analog data from climatological conditions is adjusted to reflect the expected impact of current meteorological and oceanographic conditions in the Ross Sea.

UPDATE

Current Conditions: As of 18 January 2021, the fast ice in McMurdo Sound has eroded down to 4.5 NM but shows no signs of a major breakout anytime soon. The remaining ice will hopefully remain intact for the rest of the summer. As for the pack ice, what hasn't melted has mostly been pushed north by prevailing southerly winds leaving an almost ice free route all the way through the Ross Sea.

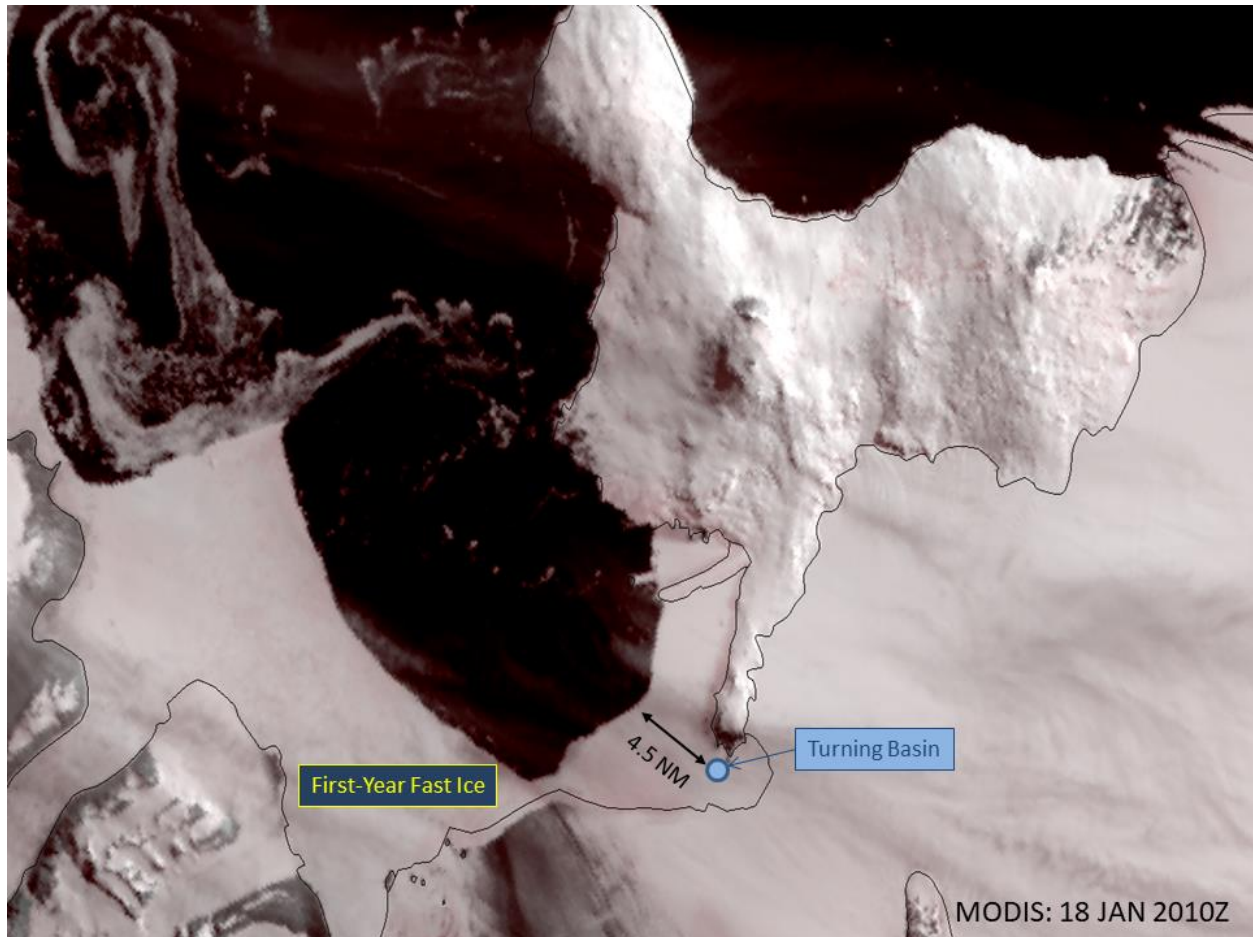


Figure 1. Fast Ice situation in McMurdo Sound as of 18 January 2021. MODIS Image.

Comparing the USNIC sea ice analysis from 14 January to the 2020-2021 Outlook created in mid-November (Figure 2) shows that the trend we identified in mid-December still persists with the Outlook predicting the sea ice to be farther north and the polynya much larger than in reality, although it is not quite as far off as the ESPC model suggested it might be a few weeks ago. The large area of consolidated sea ice in the western Ross validates fairly well and the thin band of sea ice across the central Ross is there, although too far north. The biggest differences still lie in the size and shape of the Ross Sea polynya and the eastern Ross which has melted much more than predicted. As of January 14th, the channel was not yet open but it has opened in the past few days, 3-5 days earlier than the Outlook predicted. The opening is not across the top as it typically is, but near the north-east corner of the polynya, near 175°W.

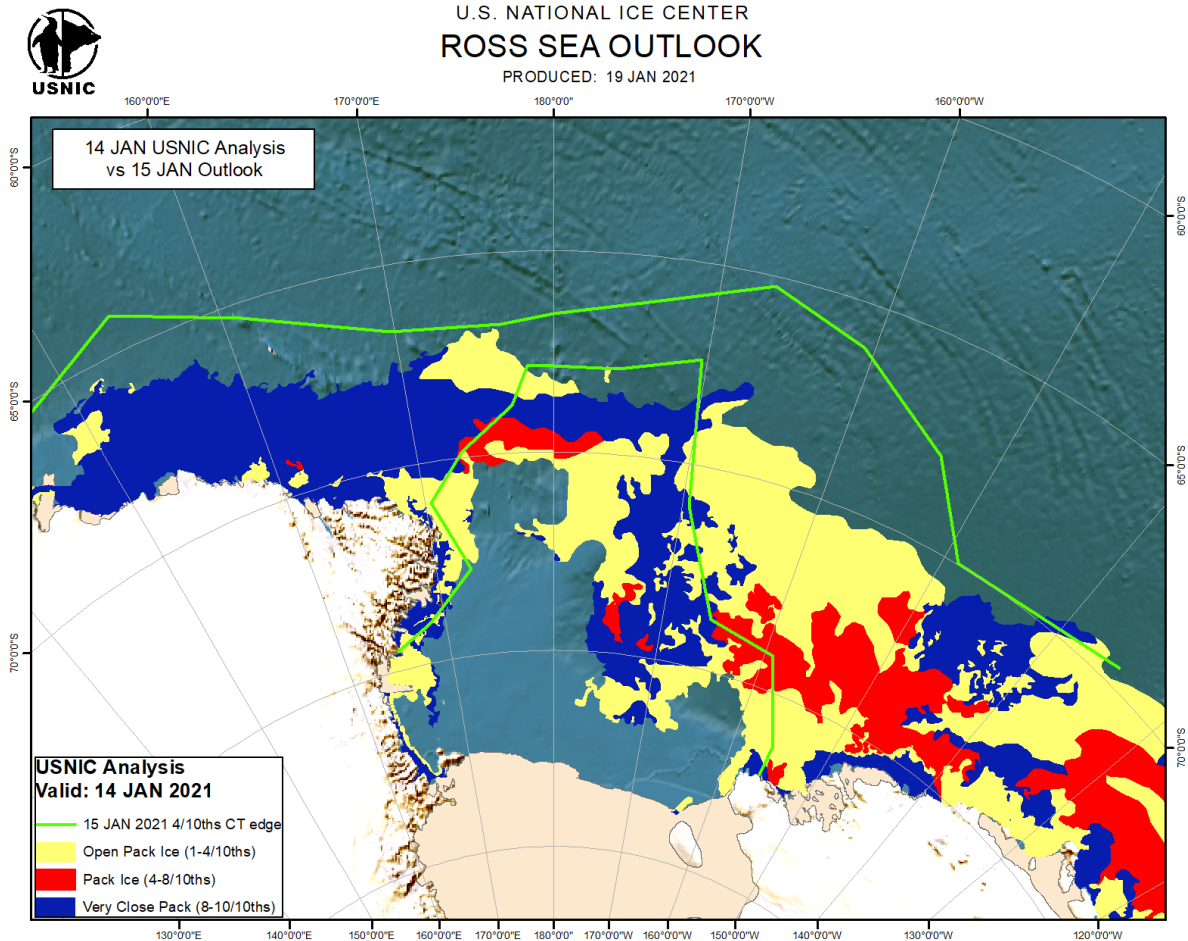


Figure 2. Ross Sea recession Outlook valid 15 Jan compared to USNIC hemispheric analysis valid 14 Jan 2021.

Figure 3 shows the USNIC Outlook and the ESPC model forecast valid 01 FEB 2021. As expected, there is too much sea ice remaining in the Outlook, however the ESPC model has also backed off the extreme melting it had predicted for the central Ross 2 weeks ago. Based on what the remaining sea ice looks like in imagery with very large floes in the central region and consolidated pack in the western Ross, we believe the ESPC model is still overly aggressive with the melt.

Although there was little need for an official Outlook this season due to the cancellation of Operation Deep Freeze, the exercise was worth doing to continue testing our methodology and putting the ESPC model to the test to look for trends and biases. The analog technique with long-range model assistance still produces good results, although it can definitely be improved.



U.S. NATIONAL ICE CENTER
ROSS SEA OUTLOOK
PRODUCED: 19 JAN 2021

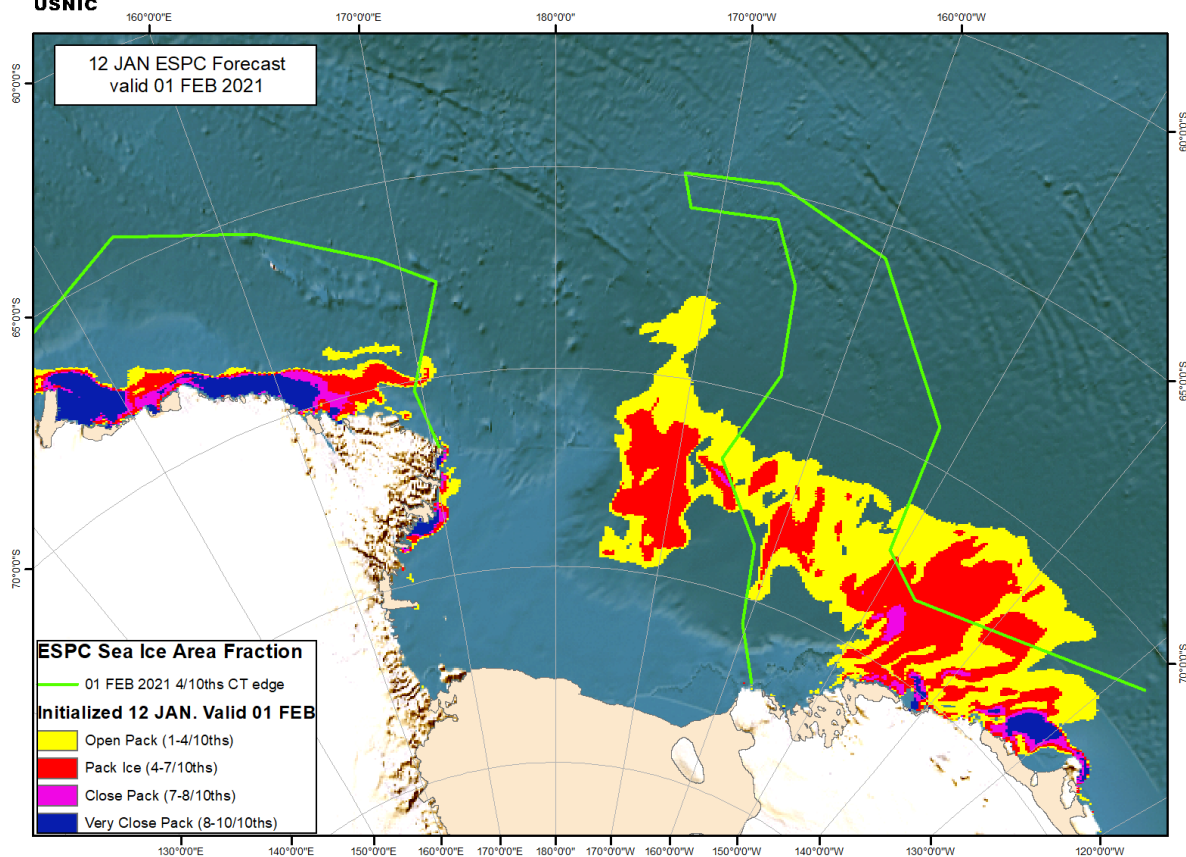


Figure 3. 01 Feb 2021 ESPC sea ice fraction forecast compared to 01 Feb USNIC Outlook (green line).