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## **MACKENZIE DELTA AND BEAUFORT COAST SPRING BREAKUP NEWSLETTER**

Report **2018-12**

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### **Welcome to Breakup 2018**

Welcome to the 2018 Mackenzie and Beaufort breakup season. We are now into our 13th season of the breakup newsletter, which was started by Steve Solomon in 2006. This year is the third breakup season for the Mackenzie-Beaufort Breakup group on Facebook <https://www.facebook.com/groups/1745524288993851/>. Over time we hope this forum hosted in the ISR will take over as the main place to share observations and experience during breakup in the Delta and the coastal communities of the region.

Funding for our current breakup monitoring activity is from the Climate Change Geoscience Program of the Geological Survey of Canada, Natural Resources Canada. Again this year we are posting the newsletters on the CACCON website: [www.caccon.org/mackenzie-beaufort-break-up-newsletter/](http://www.caccon.org/mackenzie-beaufort-break-up-newsletter/). Please let us know if you do not wish to receive these reports (contact info above) and we will take you off the list. For those of you living in the north, we welcome photos, observations of timing of events, or anything out of the ordinary, and we thank you for all of the feedback received so far.

Water-level data are courtesy of Environment and Climate Change Canada [ECCC] (Water Survey of Canada) and derived from the real-time hydrometric data website at [http://www.wateroffice.ec.gc.ca/index\\_e.html](http://www.wateroffice.ec.gc.ca/index_e.html), which we acknowledge with thanks. Weather forecasts are also courtesy ECCC (Meteorological Service of Canada) at <http://weather.gc.ca>.

### ***Current Conditions***

Temperatures have been cooler in the delta again, with wind from the north in Inuvik, a forecast high of 6 °C, and a low tonight of 0 °C. A mix of sun and cloud today will give way to flurries or rain showers over the next few days. Conditions are much the same in Aklavik. In Tuk, today's high is 0 °C, with light snow and a low of -3 °C tonight. Paulatuk is partly cloudy and foggy, with a high of 0 °C and a low of -1 °C. Ulukhaktok has a mix of sun and cloud today and tonight, with a high of 5 °C and low -2 °C. Fog patches can be expected as open water moves closer. Wind is

light. Sachs Harbour is cloudy, high 0 °C, low -2 °C, and is expecting periods of snow tomorrow night and Sunday. The satellite visibility for the next few days will not be good.

### Water levels

Water levels throughout the delta continue to drop. At the head of the delta, the Mackenzie at Arctic Red River (10LC014) is down to about 5.2 m, a little over 2 m above the pre-flood level on May 1, and about 8.5 m below the peak on May 19 (Figure 1). The discharge into the delta is now down to below 9000 m<sup>3</sup>/s. Water Survey staff reset the gauge on May 30, resulting in an upward adjustment of just over 1 m, suggesting that ice-push had moved the sensor into shallower water.

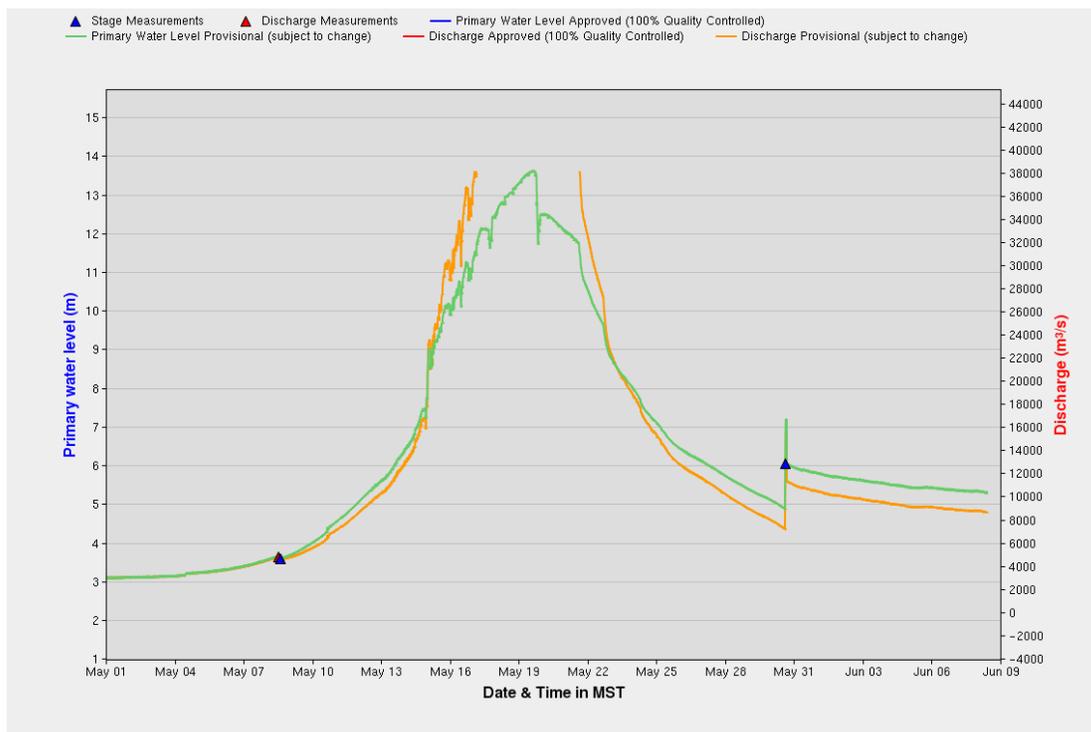


Figure 1. Provisional water level and discharge for Mackenzie River at Tsiigehtchic (10LC014) since May 1 (courtesy Water Survey of Canada).

In East Channel at Inuvik (10LC002), the gauge remains a bit flaky, but the general trend is clear, with water level dropping at a slowly decreasing rate since the peak early on May 26 at close to 15 m (arbitrary datum) (Figure 2). The level is now down to 12.79 m as of 11:30 MDT this morning, down 15.4 cm over the previous 24 hours. In Peel Channel at Aklavik (10MC003), the pattern of this year's flood was quite distinctly different (Figure 3), with a much less abrupt rise than occurred in East Channel (Figure 2). The peak level at Aklavik was relatively low this year, as can be seen in the multiyear plot of daily mean water levels (Figure 4). It is also interesting to note that the water level is falling more slowly than typical at Aklavik. Water Survey staff serviced this gauge on June 5, resulting in an upward adjustment of close to 19 cm (Figure 3).

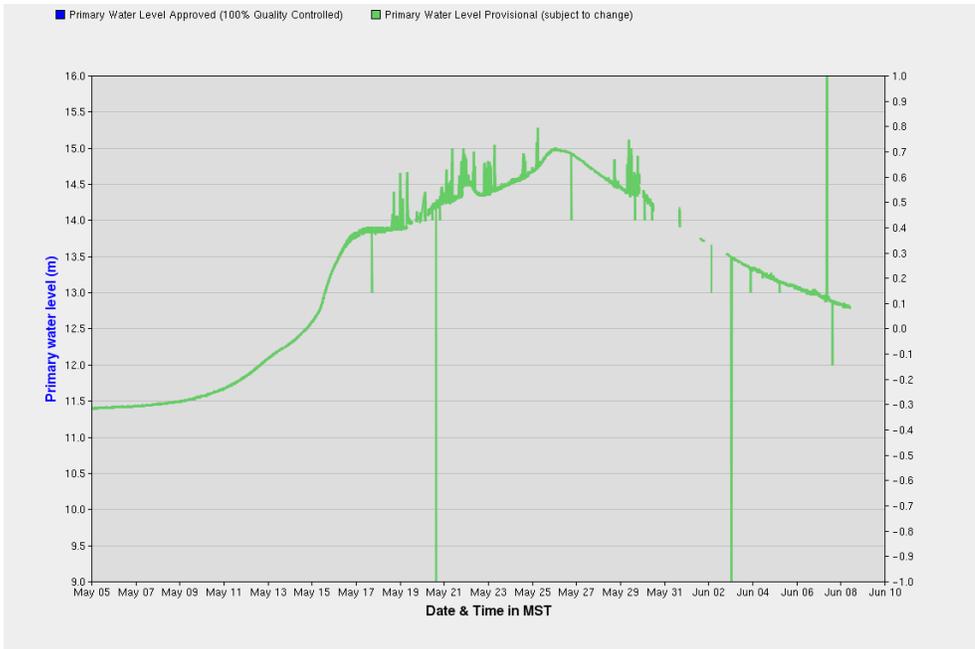


Figure 2. Provisional water level in East Channel at Inuvik (10LC002) since May 5 (courtesy Water Survey of Canada).

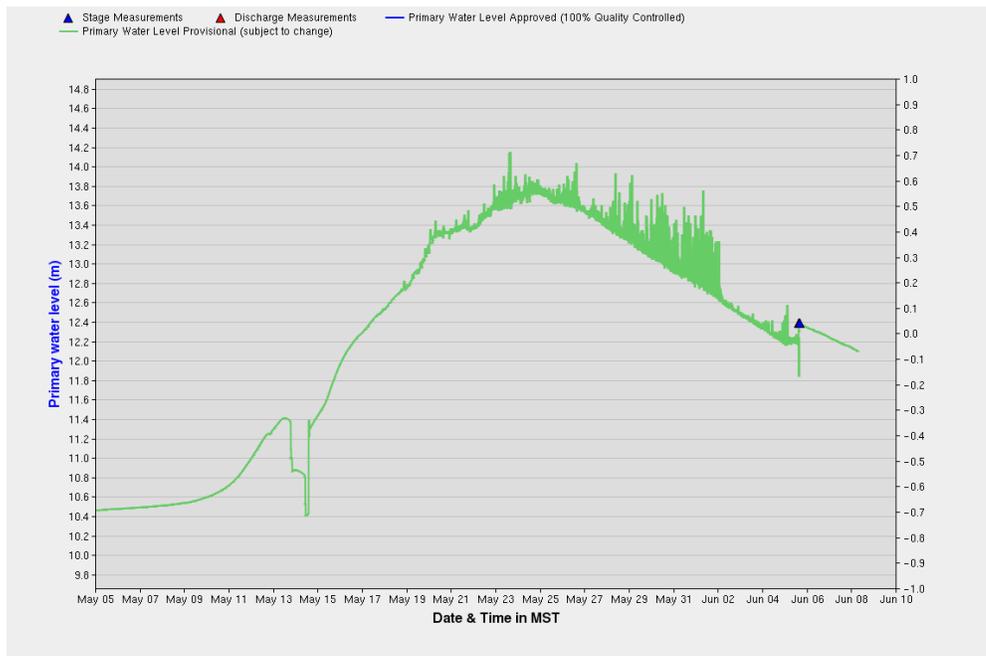


Figure 3. Provisional water level in Peel Channel above Aklavik (10MC003) since May 5 (courtesy Water Survey of Canada).

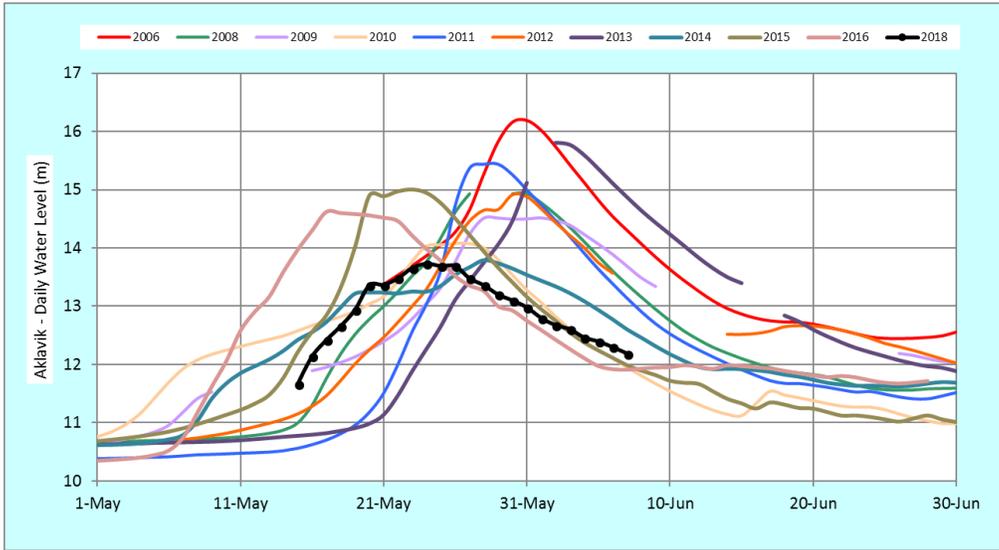


Figure 4. Daily mean water levels (provisional) in Peel Channel at Aklavik (10MC003) in selected years since 2006 and in 2018 (black).

Napoiak Channel above Shallow Bay (10MC023) continues to drop in a linear fashion, with a slight deceleration on June 4 (Figure 5). The level is down to 11.7 m, 1.6 m below the peak on May 26, and dropped 12.6 cm over the past 24 hours (as of 09:00 MDT this morning).

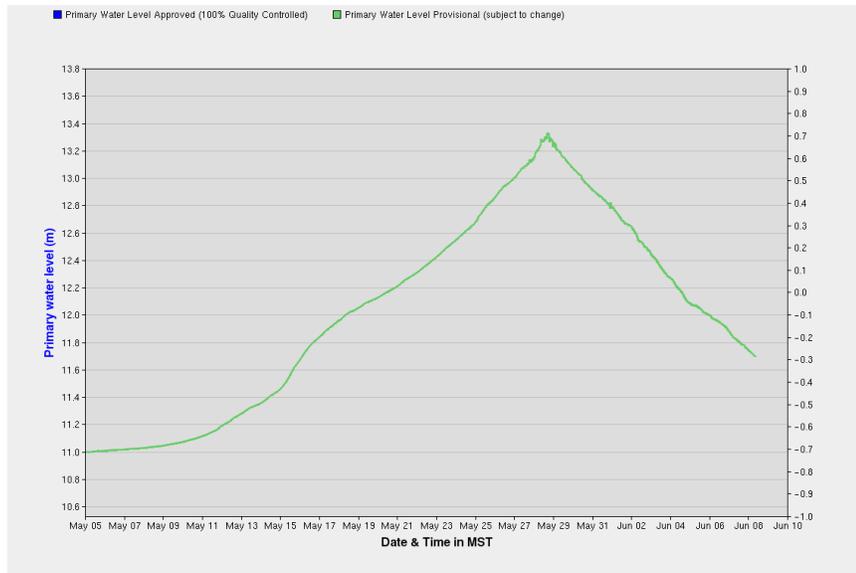


Figure 5. Provisional water level in Napoiak Channel above Shallow Bay (10MC023) since May 5 (courtesy Water Survey of Canada).

Reindeer Channel at Ellice Island is still dropping rapidly and is now below its late-winter level of 9.6 m (arbitrary datum, adjusted for the -38 cm offset on May 12) (Figure 6). Because of that offset, the peak level may have been underestimated and was, in fact, as high as 11 m, which would bring it more in line with previous years, though still among the lowest flood peaks in the outer delta recently. This is evident from a multiyear comparison of the daily mean records (Figure 7). The difference in daily mean peak water level between 2018 and 2013 (the highest recent peak in this part of the delta) is 82 cm, which translates to an enormous difference in the area inundated and receiving fresh sediment. The 2013 peak also occurred a week later than in 2018 (5 June 2013) (Figure 7).

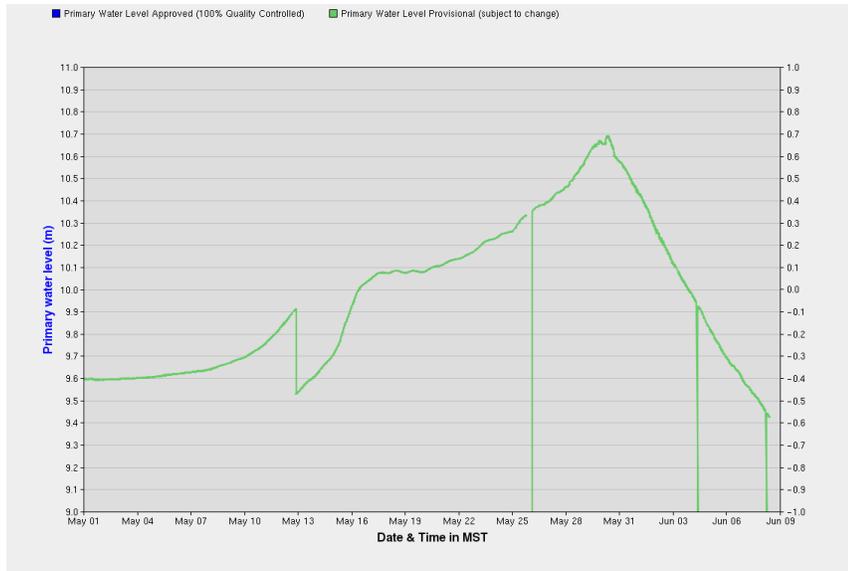


Figure 6. Provisional water level in Reindeer Channel at Ellice Island (10MC011) since May 1 (courtesy Water Survey of Canada).

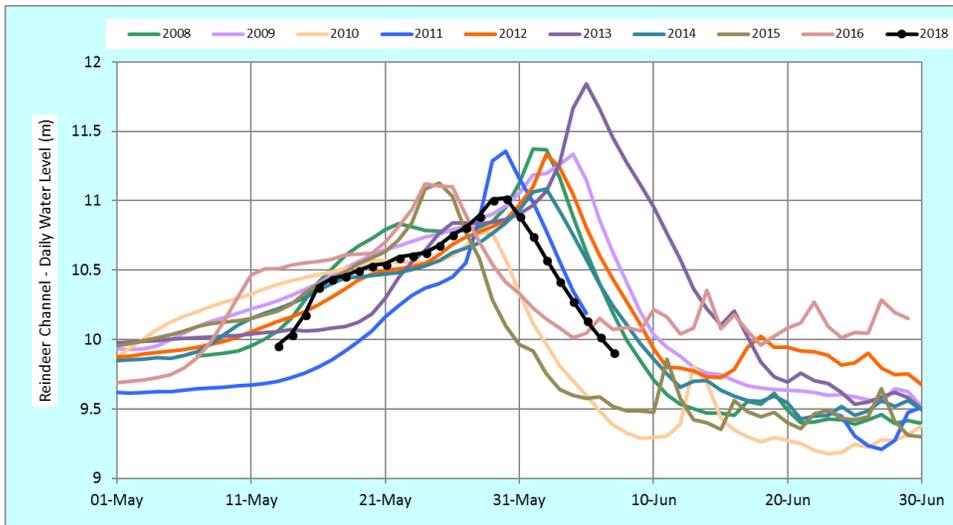


Figure 7. Daily mean water levels in Reindeer Channel at Ellice Island (10MC011) for the past decade with 2018 (black) adjusted for -0.38 m offset May 12 (Figure 6).

## Satellite Imagery

The view yesterday was somewhat obscured over the delta and west, but the imagery shows little evolution over the past few days (Figure 8). There does not appear to have been any further erosion at the outer edge of the landfast ice within the imaged area. Although obscured, the Taglu delta plain looks to be still snow-covered, indicating that it was not flooded this breakup. Snowmelt has progressed northward to midway up Richards Island. There is more extensive flooded ice at the mouth of East Channel but other than the channel extending northeast toward Hendrickson Island, it is mostly still confined within the head of Kittigazuit Bay (Figure 8).

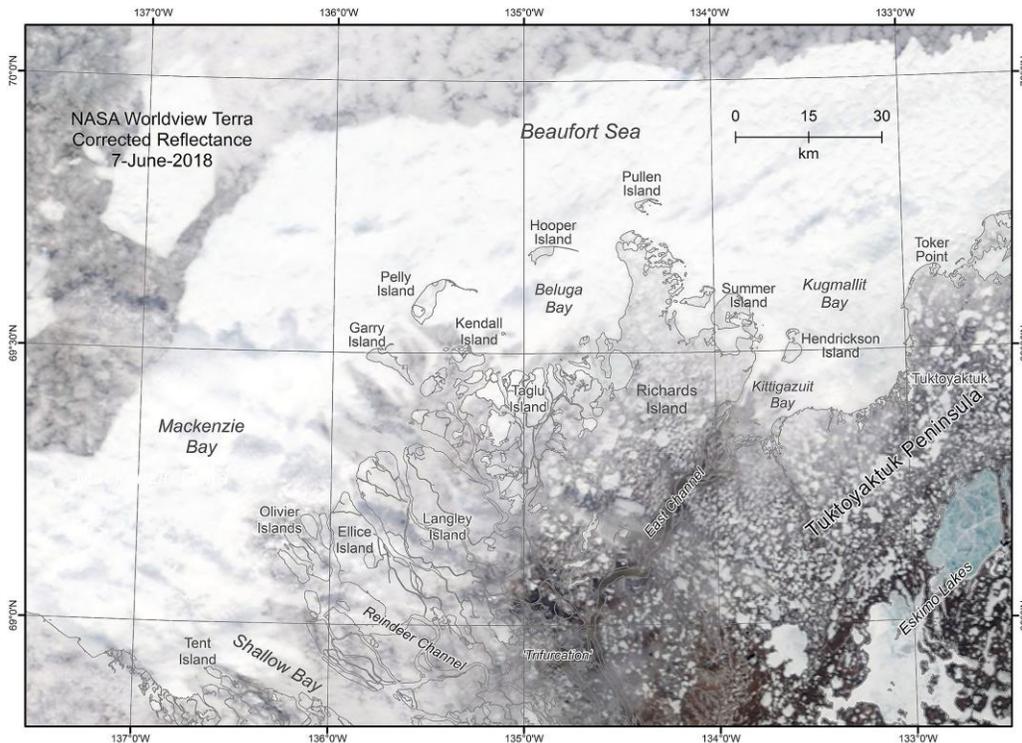


Figure 8. NASA Worldview Corrected Reflectance from the Terra satellite for 7 June 2018, showing the northern Mackenzie Delta, Kugmallit Bay, and western Tuktoyaktuk Peninsula.

The big development in Amundsen Gulf is the large area of ice that has broken away from the landfast ice in the mouths of Prince Albert Sound and Dolphin and Union Strait (Figure 9). At the north end, this is still resting close to shore, but the lead extends in toward shore at Ulukhaktok. A little more clearance is needed before the beach is open, but it's getting closer now.

In Darnley Bay, the area of blue ice fills the inner half of the bay now and there is a small area of open water right at the head of the bay west of the hamlet.

At Sachs Harbour, the area of landfast ice remains unchanged (Figure 9).

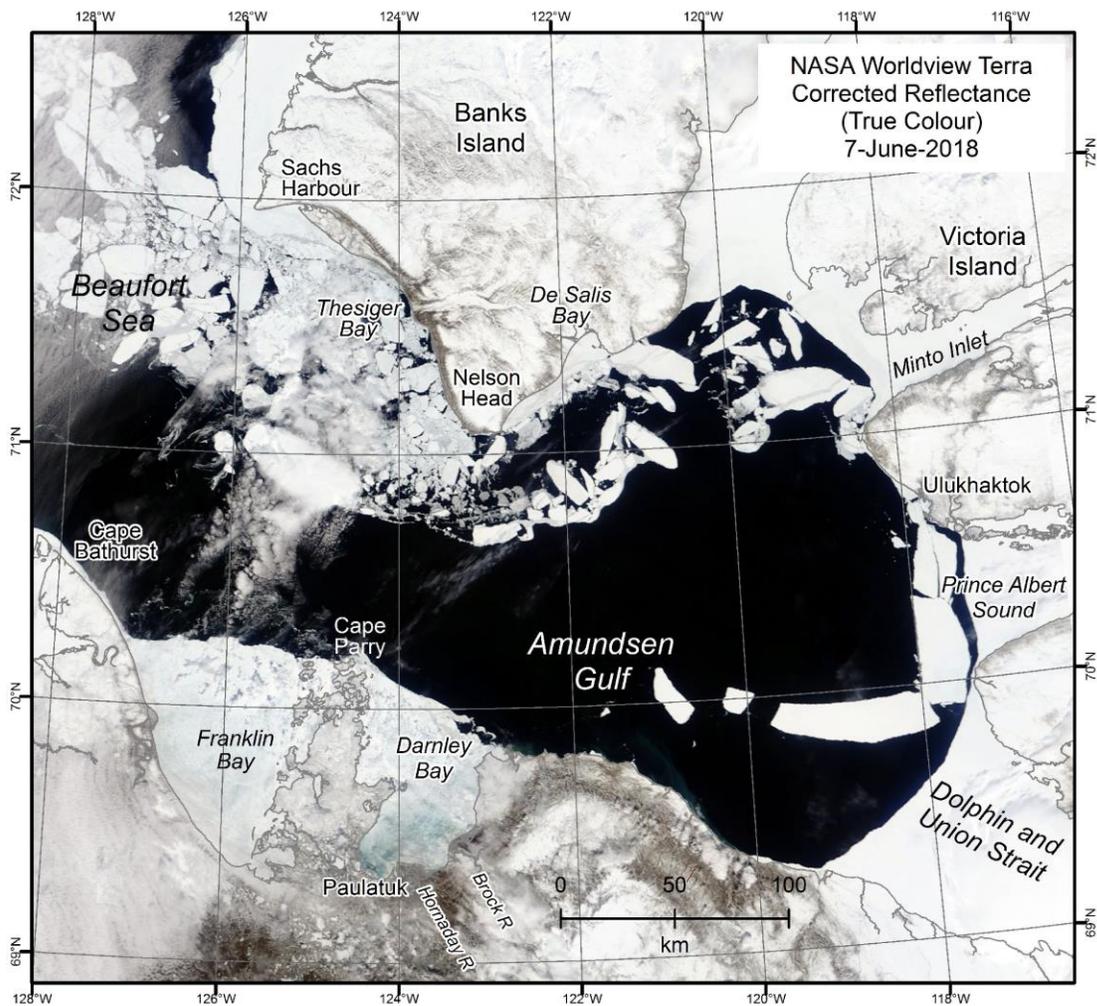


Figure 9. NASA Worldview Corrected Reflectance from the Terra satellite for 7 June 2018, showing the northern Amundsen Gulf with landfast ice still present at Sachs Harbour and Paulatuk, but a new lead at Ulukhaktok extends in to the point.