MACKENZIE DELTA AND BEAUFORT COAST SPRING BREAKUP NEWSLETTER

Report 2017-010
May 25, 2017 at 19:00 UTC

Friends of Steven Solomon (Dustin Whalen, Paul Fraser, Don Forbes)
Geological Survey of Canada, Bedford Institute of Oceanography
dustin.whalen@canada.ca, tel: 902-426-0652

Welcome to Breakup 2017

You may also want to check out the Mackenzie-Beaufort Breakup group on Facebook (https://www.facebook.com/groups/1745524288993851/).

This year, in addition to sharing the newsletter to our mailing list of >370 addresses, we are posting the newsletters on the CACCON (Circum-Arctic Coastal Communities KnOwledge Network) website. You can find them at https://www.caccon.org/mackenzie-beaufort-break-up-newsletter/

Funding for our current breakup monitoring activity is from the Climate Change Geoscience Program of the Geological Survey of Canada, Natural Resources Canada.

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 any observations of timing of events, extent of flooding, evidence of breakup, or anything out of the ordinary, and we thank you for all of the feedback received so far.

For those interested in conditions further south, we recommend that you contact Angus Pippy (Water Survey of Canada) in order to receive his very useful High Water Report: contact Angus at 867-669-4774 or angus.pippy@ec.gc.ca.

Water level data presented in our newsletters are courtesy of Environment Canada (Water Survey of Canada) and are derived from their real-time hydrometric data website at http://www.wateroffice.ec.gc.ca/index_e.html, which we acknowledge with thanks. Particular thanks to colleagues in Inuvik for keeping so many of the delta gauges operating through the difficult breakup season. Weather reports and forecasts are also from Environment Canada (Meteorological Service of Canada) at http://weather.gc.ca. Ice road conditions are from the GNWT Department of Transportation road reports and travel alerts (@GNWT_DOT). Daily MODIS imagery is courtesy of NASA Worldview at https://earthdata.nasa.gov/labs/worldview/.
Current conditions

Cloud and chances of rain remain in the forecast today for Inuvik, Aklavik, and Tuktoyaktuk with expected temperatures in the teens for Inuvik (14 °C) and Aklavik (13 °C), while temperatures in Tuktoyaktuk (8 °C) should stay slightly cooler. Temperatures in Paulatuk (0 °C), Sachs Harbour (0 °C), and Ulukhaktok (2 °C) will stay close to freezing with chances of flurries in both Paulatuk and Ulu.

Reports on yesterday’s Big River Update (CKLB Radio) (https://soundcloud.com/cklbradio/big-river-update-may-24th-2017) indicate that most of the ice has moved out of Peel Channel at Aklavik after the ice initially started moving on May 23. Jessie Pascal provides a picture below that shows the sparse chunks of ice moving in the channel (Figure 1).

At Inuvik, the ice in East Channel continues to move periodically with much of the ice remaining in place. Figure 2 is an aerial shot from Kristian Binder showing rotting ice on East Channel just north of Inuvik on the evening of May 23. Additional photos, taken on May 24, courtesy of Ellen Lea (Figure 3) and Mervin Joe (Figure 4) show the remaining ice in East Channel at Inuvik. The ice at Inuvik is also shown in a video posted by Joey Amos Tumma on the Mackenzie-Beaufort Breakup Facebook site (https://www.facebook.com/groups/1745524288993851/). Downstream of Inuvik, from his cabin on Semmlers Channel, Gerry St. Amand reports that the ice has now moved out of Semmler’s Channel and ‘Mackenzie ice’ is now moving through the area.

Aerial photos courtesy of Lena Allen-Sharpe show ice conditions at Swimming Point, Tununuk Point (Bar C), and Reindeer Station on May 23 (Figure 5).

Figure 1. Jessie Pascal a proud resident of Aklavik, shows off the Peel Channel in all of its break-up glory on May 25th 2017. Thank you Jessie.
Figure 2. Rotting ice in East Channel just north of Inuvik on May 23. Photo courtesy of Kristian Binder.

Figure 3. Remaining ice in East Channel at Inuvik on May 24. Photo courtesy of Ellen Lea.
Figure 4. Bobby Joe at the river bank on East Channel in Inuvik (May 24), a great photo showing ice conditions and water level with sunshine and a smile. Photo courtesy of Mervin Joe.

Figure 5. Ice conditions on May 23 at (L to R) Swimming Point, Tununuk Point (Bar C), and Reindeer Station. See Figure 12 for location references. Courtesy of Lena Allen-Sharpe.

*Water levels*
At Tsiigehtchic, the Mackenzie water level (10LC014) started dropping late on May 23, ending the slow rise which had been ongoing since May 20. As of 04:35 MDT today the level was 11.1 m, down 42 cm over the past 24 hours (Figure 6).

In the Mackenzie Delta, the water continues to rise but at reduced rates due to extensive overbank flooding throughout the delta. At Inuvik, where the ice is broken but only moving intermittently, the water level in East Channel (10LC002) climbed 19.5 cm over 24 hours to 15.2 m at 04:35 MDT (Figure 7). While the water level gauge at Aklavik remains offline, reports from yesterday’s Big River Update (CKLB Radio) (https://soundcloud.com/cklbradio/big-river-update-may-24th-2017) indicate the water there continues to rise.

In the outer Delta, the water level in Reindeer Channel at Ellice Island (10MC011) continues to rise very slowly, up 2.5 cm in 24 hours to 10.6 m at 04:25 MDT (Figure 8).

Figure 6. Water level in the Mackenzie River at Tsiigehtchic (Arctic Red River) (WSC 10LC014) from May 10 (courtesy Water Survey of Canada).
Figure 7. Water level in East Channel at Inuvik (WSC 10LC002) from May 10 (courtesy Water Survey of Canada).

Figure 8. Water level in Reindeer Channel at Ellice Island (10MC011) from May 10 (courtesy Water Survey of Canada).

Figure 9 shows the daily mean water level at Tsiigehtchic falling again after initially peaking on May 20. This season’s peak was earlier than all years plotted except 2010 and 2016, peaking on the same day and at a similar level as in 2015. In both East Channel at Inuvik (Figure 10), and Reindeer Channel at Ellice Island (Figure 11), the daily water level plots show continued rise at the reduced rates.
Figure 9. Daily mean water level in the Mackenzie River at Arctic Red River (Tsiigehtchic) (10LC002) from May 6 this year (black) with equivalent data from the past 9 years and the record year of 2006 (derived from data courtesy of Water Survey of Canada).

Figure 10. Daily mean water level in East Channel at Inuvik (10LC002) from May 1 this year (black) with equivalent data from the past 9 years and the record year of 2006 (derived from data courtesy of Water Survey of Canada).
Figure 11. Daily mean water level in Reindeer Channel at Ellice Island (10MC011) from May 1 this year (black) with equivalent data from the past 9 years (derived from data courtesy of Water Survey of Canada).
**Satellite imagery**

May 24 MODIS imagery of the upper delta shows the Mackenzie River running primarily clear of ice into the ‘turtle’ beyond Point Separation (Figure 12). Moving north from Point Separation the ice in Middle Channel is darker and more broken for approximately 30 km downstream. Also, a small section of open water downstream of Horseshoe Bend indicates ice holding with the potential of jamming at that location. In the vicinity of Aklavik, Peel Channel is brown in colour and appears to be mostly clear of ice. Overall, there is a progressive ‘greening’ and ‘browning’ of the delta moving north from its head.

![MODIS - Aqua True Colour 24-May-2017](image)

**Figure 12.** NASA Worldview corrected Land Surface Reflectance (true colour) from the Aqua satellite showing the southern part of the Mackenzie Delta on May 24, 2017.

In the outer Mackenzie Delta, yesterday’s partly cloudy MODIS imagery (Figure 13) shows that overflow off the channel mouths has drained and receded to now remain confined within the limits of bottomfast ice. Overflow waters are also now sediment laden and brown in colour. There is widespread overbank flooding on Langley Island and off Kumak Channel to the north. Flooding is also visible along Reindeer Channel, on the Olivier Islands, and on Ellice Island.
Figure 13. NASA Worldview corrected Land Surface Reflectance (true colour) from the Aqua satellite acquired 24 May 2017, showing recession of overflow to within the extents of bottomfast ice. Extensive overbank flooding and snowmelt is also evident in the Delta.