Welcome to Breakup 2017

Here is the second report for this 2017 Mackenzie and Beaufort breakup season. As always, photos and on-the-ground reports are the really interesting pieces and we’ll try to pass on any you can send us as we watch the gauges and the satellite imagery. Today we are pleased to be able to share two aerial views of East Channel at Inuvik courtesy of Adam Wright.

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

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

This year, in addition to sharing the newsletter to our mailing list of >370 addresses, we are posting the reports on the CACCON (Circum-Arctic Coastal Communities KnOwledge Network) website. You can find them at https://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. Also, if you have a change of e-mail address and can let us know, we will be pleased to adjust our mailing list. We hope you will feel free to pass this on to others and if they contact us we can add them to 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 and Climate Change 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 George Lennie and 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 and Climate Change 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**

The weather has been mild in the Delta but Ulukhaktok yesterday was bracing for blizzard conditions.

As of May 5, the Mackenzie River ice crossing and the Tsiigehtchic winter access road were closed at 5 pm MDT and the Dempster Highway crossing of the Peel River was expected to close at any moment (information from @GNWT_DOT).

Adam Wright shared two May 6 (Saturday) views of East Channel at Inuvik, showing some water accumulating on the plowed roads and snow machine tracks (Figure 1). Thanks Adam!

**Water levels**

The water level in the Mackenzie at Norman Wells (10KA001) has risen 20 cm in the last 3 days (up 4.2 cm in 24 hours to 5.56 m at 07:35 MDT), but is well below the median, which shows a sharp rise beginning in the first few days of May (Figure 2). In East Channel at Inuvik (10LC002), the water level is above 11.7 m and has continued rising at a slow constant rate for several days (Figure 3). Peel Channel above Aklavik (10MC003) is up to 10.6 m and similarly rising slowly, about 15 cm below median (Figure 4). Reindeer Channel at Ellice Island (10MC011) is above 9.7 m (arbitrary datum) and rising slowly (Figure 5).

Plots of daily mean water level at Inuvik, Aklavik, and Reindeer Channel all show the same slow rise and levels below all previous years shown (2006 and 2008-2016) except 2011 (Figures 6-8).
Figure 1. Two views of East Channel at Inuvik and some distance downstream (courtesy of Adam Wright, 6 May 2017).
Figure 2. Water level in Mackenzie River at Norman Wells (10KA001) since March 1, 2017. Median level is shown in blue.

Figure 3. Water level in East Channel at Inuvik (10LC002) since April 10, showing slow rise and slight acceleration since April 23 (courtesy Water Survey of Canada). Median level is shown in blue.
Figure 4. Water level in Peel Channel above Aklavik (WSC 10MC003) since April 10. Median level is shown in blue.

Figure 5. Water level in Reindeer Channel at Ellice Island (10MC011) since April 1 showing a very slow rise.
Figure 6. Daily mean water levels 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 7. Daily mean water levels in Peel Channel above Aklavik (10MC003) 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 8. Daily mean water levels 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**

Terra-MODIS imagery yesterday was extensively obscured by cloud, particularly in the Amundsen Gulf region, where there was cloud from the storm bringing strong easterly winds and snow to Ulukahtok, Kugluktuk, and Cambridge Bay. The previous day, May 6, provided a good overview of ice conditions throughout the region ahead of the storm (Figure 9). In Amundsen Gulf, the ice has been further evacuated from the central gulf, leaving 100 km of open water at the widest point (toward Dolphin and Union Strait in the lower right. There is a very wide lead (up to 50 km) off the west coast of Banks Island (although there may have been some progressive refreezing along the outer margin). There is also a fracture cutting east into M’Clure Strait ice between northern Banks Island and Prince Patrick Island.

Figure 10 shows a higher resolution image for the Yukon coast and Tuk Peninsula, with landfast ice limits for the first week of May in 2014, 2015, and 2016. The lead off Kugmallit Bay was up to 50 km wide outside an ice limit 56 km NNW of Toker Point. The bite in Mackenzie Bay is typical and closer to the Yukon coast than in 2015 and 2016, but more extensive than all three previous years on the eastern side off the Delta. North of the Delta and Richards Island, the limit this year is almost identical to the May 3 limit in 2015, but further east off the Tuk Peninsula, the landfast ice this year is more extensive than in the previous years. This figure shows the unusually narrow landfast ice in this area last year and the relatively narrow fast ice in 2014.
Figure 9. MODIS corrected Land Surface Reflectance (true colour) from the Terra (MOD05) satellite acquired 6 May 2017, showing ice conditions from the Alaska border to M’Clure Strait (courtesy NASA Worldview).
Figure 10. MODIS corrected Land Surface Reflectance (true colour) from the Terra (MOD05) satellite acquired 6 May 2017, showing ice conditions from the western Yukon coast to Cape Bathurst (courtesy NASA Worldview).