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. Each year we think will be the last, but the feedback is positive and the annual spectacle of breakup is hard to resist. We hope this year will be good to everyone, without too much flooding. We will try to keep you posted on events as they unfold. 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.

This year will the third breakup season for the Mackenzie-Beaufort Breakup group on Facebook [https://www.facebook.com/groups/1745524288993851/](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. We need to start thinking about how observations can be archived to add to our collective knowledge of breakup timing and processes and there may be roles for many partners in doing this.

The original purpose of the newsletter was to document flooding over the outer Mackenzie Delta in support of various research programs. Over recent years, we have expanded the scope to consider all aspects of breakup and spring flooding in the ISR region and Gwich’in communities in and near the Delta. 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 390 addresses, we are posting the newsletters on the CACCON (Circum-Arctic Coastal Communities KnOwledge Network). Along with the 2017 reports, the reports so far this season can be found at: 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. 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 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://earthdatnasa.gov/labs/worldview/.

**Current Conditions**

The forecast for Inuvik, Aklavik, and Fort McPherson is increasing cloudiness with highs of +8 °C, +7 °C, and +12 °C, respectively, and lows of +4 °C, +2 °C, and +4 °C. There is a chance of showers and, for Aklavik possibly some freezing rain late this morning. In Tuktoyaktuk, it is mainly sunny, with increasing cloud this afternoon, a high of +3 °C and low of +2 °C, wind east 20 km/h gusting to 40. Paulatuk was -11 °C at 06:00 MDT this morning but it heading for a high of +4 °C today and a low of +1 °C tonight. There is a 30% chance of showers or flurries overnight. Sachs Harbour will be mainly sunny today and tonight, with a high of 0 °C and a low of -5 °C, wind east 20 km/h gusting to 40, increasing to 30 gusting to 40 this evening. Ulukhaktok will have a mix of sun and cloud, a high of -2 °C, low of -6 °C, and wind east 20 km/h, increasing to 30 gusting to 50 this evening.

Figure 1 shows an aerial view of East Channel north of Inuvik on May 19, again courtesy of Kristian Binder. This shows progressive melt of the, which appears to be rotting in place.
Figure 1. Another great drone shot from Kristian Binder, showing progressive deterioration of the ice as of Saturday (May 19).

**Water levels**

The water level in the Mackenzie River at Tsiigehtchic (10LC014) dropped rapidly late on Saturday, presumably related to ice release or gauge disturbance (Figure 2). It rebounded slightly, but has been dropping since, suggesting we may be past the peak there now. The rise in water level from May 10 to the peak at 13.5 m on Saturday was 9.5 m.
Water levels in the delta have been steady or rising slowly. The gauge in Peel Channel just upstream of Aklavik (10MC003) shows steady water levels with some ice disturbance over the past 24 hours (Figure 3), with a slight uptick suggested at the end. There is some uncertainty re the datum since disturbance last week, but assuming it is reading correctly, the level is about 13.4 m, below past flood levels. In East Channel at Inuvik (10LC002), the water level is still rising slowly after a plateau late last week (Figure 3). Because of disturbance in the record, the rate is difficult to measure, but it appears to be up about 40 cm over the past two days and is still rising at a steady rate, now standing at 14.4 m.
Figure 3. Provisional water level in Peel Channel at Aklavik (10MC003) since May 15, with the broken blue line showing median levels (courtesy Water Survey of Canada).

Figure 4. Provisional water level in East Channel at Inuvik (10LC002) since May 10 (courtesy Water Survey of Canada).
Napoiak Channel above Shallow Bay (10MC023) showed some slight deceleration late yesterday, up 7.2 cm over 24 hours (Figure 5). The water in Reindeer Channel at Ellice Island, after holding steady for several days, rose slightly over the past 24 hours (Figure 6).

Figure 5. Provisional water level in Napoiak Channel above Shallow Bay (10MC023) since May 10 (courtesy Water Survey of Canada).
Figure 6. Provisional water level in Reindeer Channel at Ellice Island (10MC011) since May 13 (courtesy Water Survey of Canada).

Figure 7. Daily mean water levels in Mackenzie River at Tsiigehtchic (10LC014) in 2006 and years this decade, with 2018 levels in black.
**Satellite Imagery**

In the outer delta, the outflow over bottomfast ice is now well established in Middle Channel between Langley and Niglintgak islands and seaward of the delta front, and less clearly in Kumak Channel (Figure 9). There is continued expansion off the southern outlet from Reindeer Channel, but the most extensive overflow is through, north, and west of the Olivier Islands, and south of the northern Reindeer Channel outlet in Shallow Bay.

It is clear that Reindeer Channel has been the main conduit of increasing discharge from the outset of this breakup season. We see just a hint of overflow in outer Arvoknar Channel, but no action in the unnamed channel to the west or in the vicinity of Taglu Island. The extent of overbank flooding is gradually increasing although there is very little in the outer 20 km of the delta. There is still no evidence of flow from East Channel into Kugmallit Bay.
Along the Yukon coast (Figure 10), there is extensive outflow from the Blow River but appears to be little happening in the Babbage and Firth. These may be obscured by thin fog or mist. There is slight darkening in the Babbage Estuary off the northern distributary of the Babbage Delta, which may simply represent local snowmelt. Likewise, at the mouth of the Firth, there is some pale grey suggesting overflow and extending behind the spit into Workboat Passage (south of Herschel Island), but it is very faint. A very narrow band of landfast ice remains north of Herschel Island, the coast to the west is still encased in landfast ice, and there as been little change in the extent of landfast ice covering Mackenzie Bay.
In Amundsen Gulf (Figure 11), there is extensive open water already and easterly winds have pushed the ice away from the floe edge off Sachs Harbour and Ulukhaktok. Landfast ice remains at both locations, but the coast from eastern Thesiger Bay to Nelson Head is almost ice-free. The landfast ice is also very narrow off Victoria Island at a point north of Ulukhaktok, south of Minto Inlet. Cape Bathurst appears to be free of landfast ice, but the wind and circulation have pushed loose pack ice against the coast. The landfast ice edge extends from the coast south of Cape Bathurst in Franklin Bay to seaward of Cape Parry and then across the mouth of Darnley Bay. There is no evidence of flow in the Brock or Hornaday rivers into Darnley Bay as yet.
Figure 11. NASA Worldview Corrected Reflectance from the Terra satellite for 20 May 2018 showing Amundsen Gulf.