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Glacier-Climate Studies on the Prince of Wales Icefield, Ellesmere Island
Shawn Marshall, University of Calgary

Summary of Activities, May-July 2012

In spring and summer 2012 we carried out glacier-climate studies and meteorological, glaciological, and hydrological measurements on Vendom Glacier, Prince of Wales Icefield, Ellesmere Island. Our research group consisted of four people: myself and students/field assistants Erik Haag, Jill Rajewicz, and Jacqueline Dumas. We spent a total of 4.5 weeks at the site over two visits, May 21-June 1 and July 15-28. Travel to the site was via Twin Otter from Polar Continental Shelf Project, Resolute Bay. Travel at the site was on skis (May) and by foot (July).

Spring visit. During the May visit we landed on Vendom Glacier about 14 km from the western margin of the icefield and established our camp here (Figures 1 and 2). During our May visit we travelled up- and down-glacier from our camp to establish a network of weather stations. Figure 3 shows an example station. These are collecting temperature, humidity, snowfall, pressure, wind, and radiation data every 10 minutes, run off of batteries and solar panels. Stations were visited in July to collect data, and have been left in place to continue gathering data until May 2013. These were deployed from our base camp on the glacier, but we also spent a night camped off the glacier (Camp400M on Figure 1), where we established one of our weather stations and left a small cache of gear (tent, propane tank, stove). This will all be removed on completion of our study.

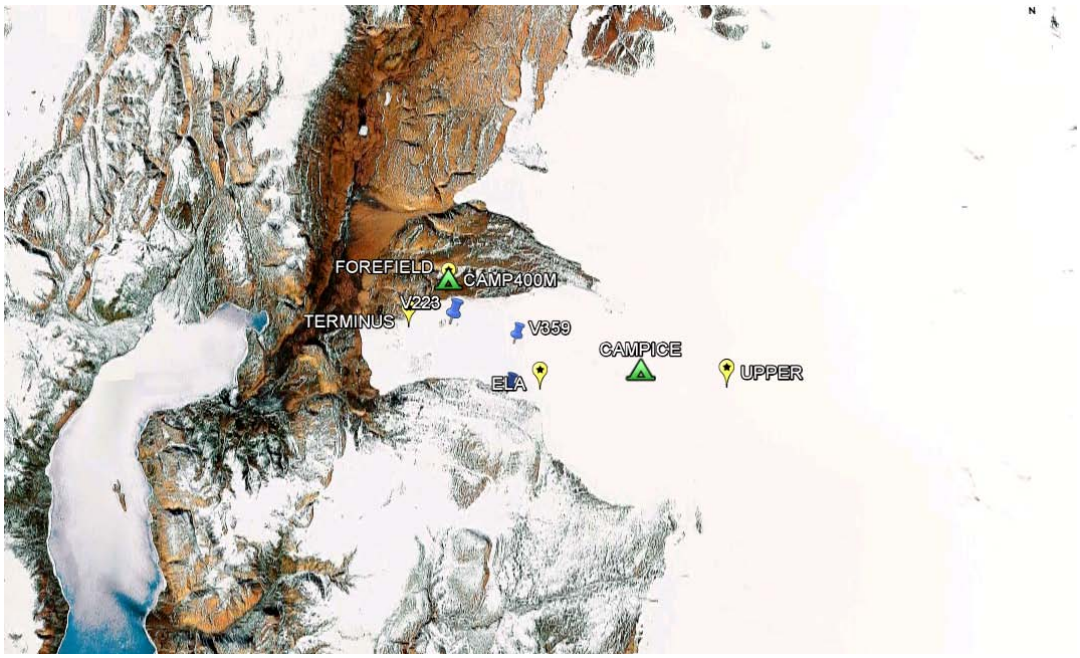

Figure 1. Map of study area on the southwestern margin of the Prince of Wales Icefield. The outlet glacier we are studying is unofficially named Vendom Glacier; its terminus lies about 4 km above the head of Vendom Fiord. Blue and yellow markers on the map indicate the locations of our weather stations.

We also measured snow depth and installed stakes to measure mass balance (thinning and thickening) of the sites along our transect over the period May 2012-May 2013, to understand the sources and magnitude of melt energy and the duration of the melt season on the icefield.

Figure 2. Camp on the Prince of Wales Icefield, May 2012.

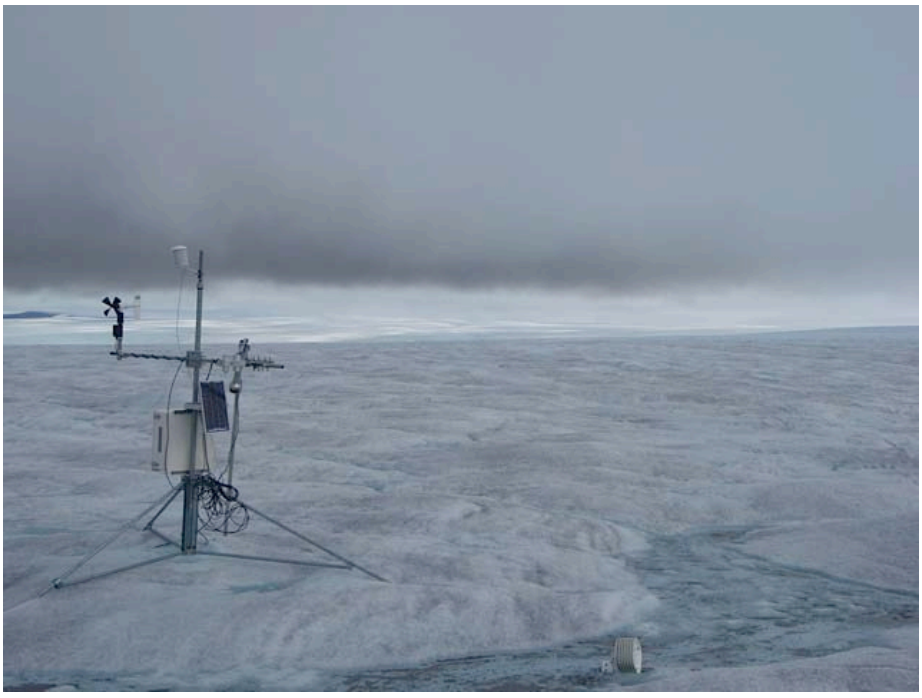

Figure 3. 'Terminus' weather station, Vendom Glacier, Prince of Wales Icefield (425 m elevation).

Summer visit. During the July visit we accessed our field site via an abandoned landing strip next to Humphrey River, about 4 km from the glacier terminus. This landing strip offered good Twin Otter access and it is the only viable summer option, as the outlet glacier is rough, crevassed, bare ice from June-August. Unfortunately, it did not offer easy access to the glacier. Humphrey River (to the north) and an unnamed glacial stream (to the south) were too high to offer easy passage, and a 250-m high hill stood between the landing strip and the glacier. We did find a route up and over the hill, which permitted access to the glacier, but it was not possible to lug our heavy gear over the hill so we established a base camp near the landing strip, on a small rise adjacent to Humphrey River (Figure 4), consisting of a large cook/food tent and four small sleeping tents. We slept here every night and commuted to the glacier.

We travelled on foot to the glacier terminus (Figure 5) to do our work, including: climbing up onto the glacier to access our weather stations; collecting water samples from the glacier and the meltwater streams; establishment of a stream gauging site to measure meltwater runoff from a small glacial stream in front of the glacier (Figure 6); and deployment of a tethered weather balloon to measure meteorological conditions in the lower atmosphere. Here our main interest was to measure the glacier winds and the heat transfer from bare land (e.g., Figures 4 and 5) onto the glacier. The tundra heats up in the sun, creating warm air masses that may or may not reach the glacier, providing energy to increase glacier melt. In theory, this heat exchange should increase with and be driven in part by strong glacier winds. However, we were unable to get close enough to the glacier to measure or test this. The helium tanks and car batteries needed to run the weather balloon were too heavy to traverse the hill on our hiking route to the glacier.

On completion of our summer study, we removed all equipment from the front of the glacier, including the stream site instrumentation shown in Figure 6. All camp waste was packed out and we believe that there is no sign of our presence there. We do not need to revisit the glacier forefield area in 2013; our work is finished here, and we only need to access the glacier to recover our weather station data, the stations themselves, and to measure the glacier changes over the period May 2012-May 2013.

Figure 4. Glacier forefield camp, July 2012, next to Humphrey River.

Figure 5. Terminus of Vendom Glacier, Prince of Wales Icefield.

Figure 6. Stream site in front of Vendom Glacier, to measure meltwater runoff.