**Description of the Svalbard Ice Tracker 2017 Dataset – Ian D. Turnbull**

This dataset contains the time and position records of eight Global Positioning System (GPS) ice trackers (IT) deployed on six pack ice floes in the Barents Sea south of Svalbard in the Norwegian High Arctic. The trackers were contained in pelican cases and were tracked by the Iridium satellite network. They had a Circular Error Probable (CEP) of 1.8 m, with times (in Universal Time Coordinated or UTC) and decimal-degree latitude-longitude positions transmitted every 30 minutes. The trackers were manufactured by Canatec Associates International, Ltd. in Calgary, Alberta, Canada. The dataset contained in the Excel spreadsheet is divided into eight tabs, with one for each tracker record. The tabs are named for the last four digits of the unique International Mobile Equipment Identity (IMEI) assigned to each tracker. The trackers were deployed during April 24-26, 2017 from the Research Vessel (RV) Polarsyssel, which departed from Longyearbyen, Svalbard. Trackers 4610 and 8650 were deployed on an ice floe to which the vessel was moored for three days to perform on-ice work, as it drifted to the west of Hopen Island. The remaining trackers were deployed on five other drifting ice floes in the vicinity, reached by the vessel’s Zodiac fast rescue craft. The table below summarizes the tracker deployment times, and surface plan dimensions and areas of the ice floes on which they were deployed. Trackers 5630 and 2470 were deployed on the same ice floe. The pelican cases could float and therefore the internal temperature records were used to determine the dates and times they entered the water. The temperature transitioned from a larger diurnal cycle when exposed to air on top of the ice, to a significantly more muted diurnal temperature variation when floating in open water. An analysis of the trackers’ internal temperature records and the Svalbard regional daily ice maps from the Norwegian Meteorological Institute Ice Service led to the determination that the beacons most likely began falling into open water sometime on May 2, 2017. The temperature record for tracker 0630 is invalid. The whole dataset was used to study the rapid dispersion of the tracked ice floes just to the west-southwest of Hopen Island (e.g., see Turnbull and Marchenko, 2022). The dispersion of the ice floes was dominated by strong shearing within the local ice pack, coinciding with a rapid increase in the speeds of the local tidal currents, which was soon followed by a rapid increase in the wave energy. Each of the six tracked ice floes increased their observed drift speeds in sync with the increase in the local tidal current speeds at different times for each floe, but at approximately the same decrease in water depth as they reached the northern edge of Spitsbergen Bank. The rapid increase in the tidal currents was linked to the topographic enhancement of tidal motion near Hopen Island in the shallower waters of Spitsbergen Bank. This dataset can be further utilized for the regional calibration and validation of ice dynamical models. It may additionally be used for improving understanding of the physical mechanisms which control ice pack dynamics, divergence, convergence, shear, total deformation rates, and dispersion in regions where the tidal forcing on pack ice drift is strongly influenced by the presence of sharp gradients in seabed bathymetry.

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| **IT** | **Deployment Time (UTC)** | **Floe Dimensions (m)** | **Floe Surface Area (m2)** |
| 4610 | April 24, 08:54 | 30 × 43 | 934 |
| 9630 | April 25, 07:59 | 10 × 25 | 250 |
| 2620 | April 25, 08:05 | 10 × 15 | 150 |
| 3620 | April 25, 08:10 | 5 × 8 | 40 |
| 0630 | April 25, 08:15 | 20 × 30 | 600 |
| 2470 | April 26, 08:20 | 10 × 25 | 250 |

**Reference**

Turnbull, I.D., and Marchenko, A.V. (2022), “Deformation of an Ice Pack Influenced by Waves and Topographic Enhancement of Tidal Motion near Hopen Island in the Barents Sea,” *Cold Regions Science and Technology*, vol. 194, 103463, doi: <https://doi.org/10.1016/j.coldregions.2021.103463>.