Description of Dataset: Ambient seismic noise data from the shallow sea floor off Tuktoyaktuk, Canada

Trond Ryberg[1], William Cable[2], Paul Overduin[2] & Christian Haberland[1,*]
[1] Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, D-14473 Potsdam, Germany
[2] Alfred-Wegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung, D-14473 Potsdam, Germany
[*] corresponding author (haber@gfz-potsdam.de)

Abstract
During the 2018 "Mackenzie Delta Permafrost Field Campaign" (mCan2018), a test campaign within the "Modular Observation solutions for Earth Systems" (MOSES) program, ambient seismic noise recordings at the sea bottom were acquired along two 300 m long transects from the shoreline to shallow marine area close to Tuktoyaktuk Island (Canada). In total, 21 measurements were taken. Raw data is provided in proprietary "Cube" format and standard mseed format.

Coordinates: 69.456N/ 133.003W
Keywords: Submarine permafrost, ambient seismic noise, H/V measurements, Mackenzie Delta

1. Introduction

The spatial distribution of submarine permafrost and its temporal variations are largely unknown. However, these parameters are considered to be important in the context of Arctic warming (climate change) and related feed-back mechanisms (through release of warming-relevant gases by thawing permafrost). As an alternative to direct probing of the top of the ice-bonded permafrost layer for example by drilling, ambient seismic noise measurements have shown to be useful to obtain these quantities in an efficient and environmentally-friendly way (Overduin et al., 2015).
The data contained in this data set (ambient seismic noise data at the shallow sea floor off Tuktoykatuk Island, Canada) were acquired during the 2018 "Mackenzie Delta Permafrost Field Campaign" (mCan2018), a test campaign within the "Modular Observation solutions for Earth Systems" (MOSES) program (Cable et al., 2019).

2. Data Acquisition

2.1 Experiment design and schedule

Ambient seismic noise measurements at the sea floor were conducted along two 300 m long profiles from the shoreline to shallow marine area close to Tuktoyaktuk Island (Canada). In total 21 measurements points were taken on 24 August 2018 (see Table 1 and Figure 1). The measurements were taken from a small boat.

Table 1: Coordinates and time windows of all measurement points along the 2 profiles.

Sample	Date	Latitude	Longitude	Start time	Stop time	Notes
2	24.08.2018	N 69.45797	W 133.00755	17:08:42.513	17:13:03.683	start transect 1
3	24.08.2018	N 69.45748	W 133.00678	17:21:36.513	17:25:31.000	
4	24.08.2018	N 69.45704	W 133.00592	17:34:59.813	17:38:58.000	
5	24.08.2018	N 69.45665	W 133.00470	17:47:51.953	17:52:48.000	
6	24.08.2018	N 69.45627	W 133.00398	18:00:56.393	18:05:37.000	near borehole
7	24.08.2018	N 69.45639	W 133.00371	18:16:38.683	18:21:27.000	at borehole 2
8	24.08.2018	N 69.45625	W 133.00357	18:26:26.433	18:31:49.983	
9	24.08.2018	N 69.45615	W 133.00343	18:35:06.913	18:39:19.000	

10	24.08.2018	N 69.45611	W 133.00335	18:42:33.773	18:47:57.000	on beach
11	24.08.2018	N 69.45604	W 133.00325	18:50:44.833	18:55:19.000	on beach
12	24.08.2018	N 69.45599	W 133.00300	18:58:03.383	19:04:12.423	at bluff base
13	24.08.2018	N 69.45725	W 133.01345	19:20:43.763	19:25:15.000	start transect 2
14	24.08.2018	N 69.45659	W 133.01231	19:52:05.543	19:56:34.000	
15	24.08.2018	N 69.45611	W 133.01224	20:07:06.303	20:11:10.000	
16	24.08.2018	N 69.45557	W 133.01067	20:20:35.763	20:24:15.000	
17	24.08.2018	N 69.45500	W 133.01025	20:31:46.243	20:36:08.000	
18	24.08.2018	N 69.45487	W 133.01008	20:41:32.413	20:45:54.103	
19	24.08.2018	N 69.45475	W 133.00992	20:50:12.713	20:56:15.000	
20	24.08.2018	N 69.45468	W 133.00977	20:59:28.853	21:04:40.000	on beach

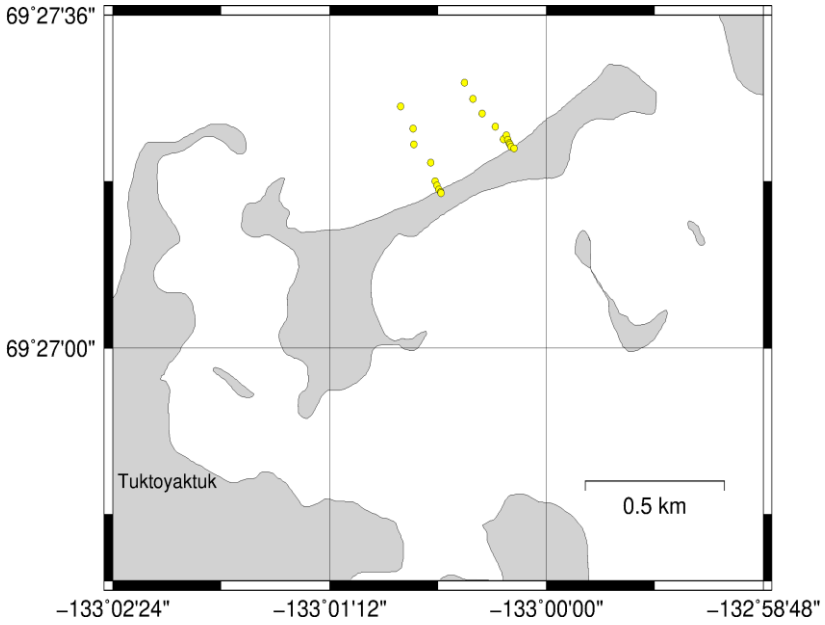

Figure 1: Map showing the measurement points (yellow circles) off Tuktoykatuk Island (gray: land; white: water).

2.2 Instrumentation

To record the ambient seismic wave field the “Mobile Ocean Bottom Seismometer” (MOBSI) system was used (see Figure 2). The system consists of 1) an intermediate bandwidth seismic sensor (type Nanometrics Trillium Compact 20 s seismometer) housed – together with a Omnirecs/DIGOS Cube digitizer - in a watertight casing, 2) a manual winch with 100 m steel cable, and 3) a surface acquisition unit with a small computer. The MOBSI system allows real-time quality data control as well as control of the tilt of the sensor.

2.3 Acquisition parameters

For data acquisition a Cube data logger (24 bit, 3-channel, GPS synchronized) was used (S/N AG6). Sample frequency was set to 100 samples per second at gain 4. Data was marked as valid if the tilt of the seismic sensor was below 5° (operational range of broad band sensor). The time windows, i.e. when the data was marked as valid (also known location), are listed in Table 1 and can be used for further processing (extraction etc.).

Figure 2: “Mobile Ocean Bottom Seismometer” (MOBSI) system: cable drum (right), broad band seismic sensor & data logger (middle) and control unit/computer (left).

3. Data Processing
For the data contained in this dataset, no processing has been performed except for the format conversion using the GIPPtools by Christof Lendl (https://www.gfz-potsdam.de/gipp → Software → GIPPtools).

4. Data Description
This data set contains raw data in original Cube format as well as in standard MSEED format (FDSN, 2012). Directory RAW contains raw data in original Cube format (continuously; one file), directory MSEED contains the converted MSEED data (three files exAG6180824000000.pri? for the three components; pri0 indicating the vertical component, and pri1 and pri2 the two un-oriented horizontal components, respectively).

5. Data Quality/Accuracy
Positions were taken by handheld GNSS with an estimated accuracy of 3 to 5 m.

6. Data Availability/Access
Data are archived at the GIPP Experiment and Data Archive (GIPP) where they will be made freely available for further use after 1. September 2020 (embargo) under a “Creative Commons Attribution 4.0 International Licence” (CC BY 4.0). When using the data, please cite the dataset below.

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