**Table S1.** Description of the studied circumpolar regions.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | |  |  |  |  |  |
| **Number** | **Region**  **(Site)** | **Ponds studied** | | **Pond type** | **Coordinates** | **Site Description** | **Type of permafrost** |
|  |  |  | |  |  |  |  |
|  |  |  | |  |  |  |  |
| 1 | Toolik1,2 | 8 | | tundra | 68° 38' N 149° 36' W | Shrub tundra | Continuous |
|  |  |  | |  |  |  |  |
| 2 | McKenzie Delta3 | 7 | | thaw | 69° 42' N 134° 28' W | Peatland tundra | Continuous |
|  |  |  | |  |  |  |  |
| 3 | Cambridge Bay4 | 5 | | tundra | 69° 07' N 105° 01' W | Shrub tundra | Continuous |
|  |  |  | |  |  |  |  |
| 4 | Resolute Bay5 | 4 | | bedrock | 74° 41' N 94° 49' W | Desert tundra | Continuous |
|  |  |  | |  |  |  |  |
| 5 | Coral Harbour6 | 35 | | tundra | 64° 00' N 82° 05' W | Shrub tundra | Continuous |
|  |  |  | |  |  |  |  |
| 6 | Bylot Island7 | 57 | | thaw | 73° 09' N 79° 59' W | Peatland tundra | Continuous |
|  |  |  | |  |  |  |  |
| 7 | Kuujjuarapik |  | |  |  |  |  |
|  |  |  | |  |  |  |  |
|  | KW8 | 19 | | bedrock/tundra | 55° 17' N 77° 44' W | Rocky shore/forest tundra | Sporadic |
|  |  |  | |  |  |  |  |
|  | SAS8 | 17 | | thaw | 55° 13' N 77° 41' W | Peatland tundra | Sporadic |
|  |  |  | |  |  |  |  |
|  | KWK9 | 34 | | thaw | 55° 20' N 77° 30' W | Peatland forest tundra | Sporadic |
|  |  |  | |  |  |  |  |
| 8 | Umiujaq |  | |  |  |  |  |
|  |  |  | |  |  |  |  |
|  | Tasiapik10 | 5 | | thaw | 56° 33' N 76° 28' W | Peatland shrub tundra | Discontinuous |
|  |  |  | |  |  |  |  |
|  | BGR11 | 14 | | thaw | 56° 37' N 76° 13' W | Peatland shrub tundra | Discontinuous |
|  |  |  | |  |  |  |  |
| 9 | Ward Hunt12 | 2 | | bedrock | 83° 04' N 74° 10' W | Desert tundra | Continuous |
|  |  |  | |  |  |  |  |
| 10 | Hazen13 | 4 | | tundra | 81° 50' N 70° 25' W | Shrub tundra | Continuous |
|  |  |  | |  |  |  |  |
| 11 | Kangerlussuaq14 | 9 | | bedrock/tundra | 67° 00' N 50° 40' W | Shrub tundra | Continuous |
|  |  |  | |  |  |  |  |
| 12 | Zackenberg15 | 7 | | bedrock/tundra | 74° 30' N 20° 40' W | Desert tundra | Continuous |
|  |  |  | |  |  |  |  |
| 13 | Kilpisjärvi16 | 16 | | bedrock/tundra | 69° 02' N 20° 50' E | Birch forest/shrub tundra | Sporadic |
|  |  |  | |  |  |  |  |
| 14 | Seida17 | 10 | | thaw | 67° 03' N 62° 56' E | Peatland tundra | Sporadic |
|  |  |  | |  |  |  |  |

1Nelson et al. (1985); 2Neff and Hooper (2002); 3Pienitz et al. (1997); 4Johnson (1962); 5Rautio and Vincent (2006); 6Mallory et al. (2006); 7Fortier and Allard (2004); 8Arlen-Pouliot and Bhiry (2005); 9Bouchard et al. (2012); 10Provencher-Nolet et al. (2014); 11Calmels and Allard (2004); 12Villeneuve et al. (2001); 13Bronwyn et al. (2007); 14Wimpenny et al. (2010); 15Christoffersen et al. (2008); 16Rautio (1998); 17Sjöberg et al. (2013).

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