

# Standardized monitoring of permafrost thaw: a user-friendly, multi-parameter protocol

**Lead authors:** Julia Boike<sup>1,2</sup>, Sarah Chadburn<sup>3</sup>, Julia Martin<sup>1,4</sup> and Simon Zwieback<sup>5</sup>

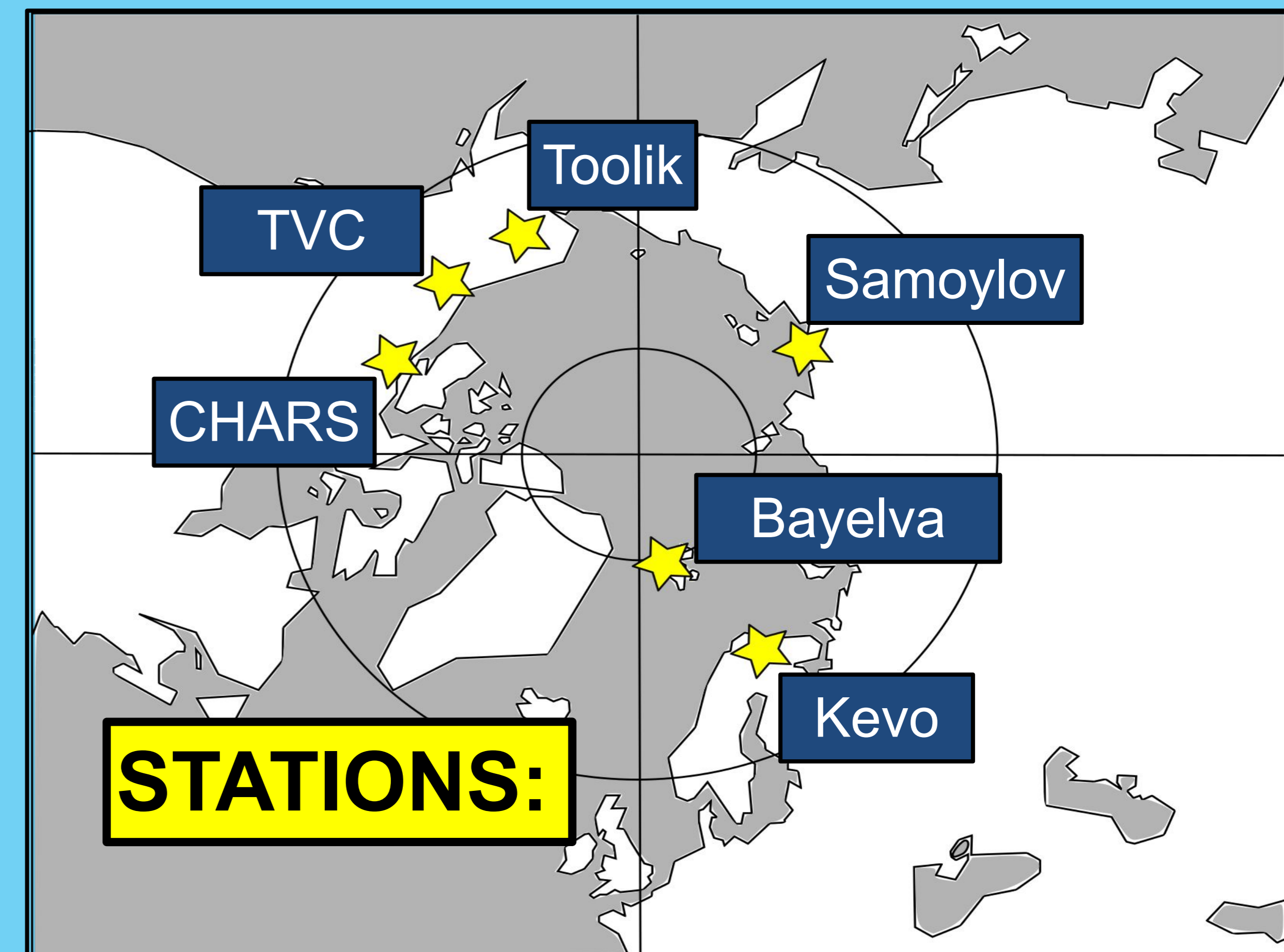
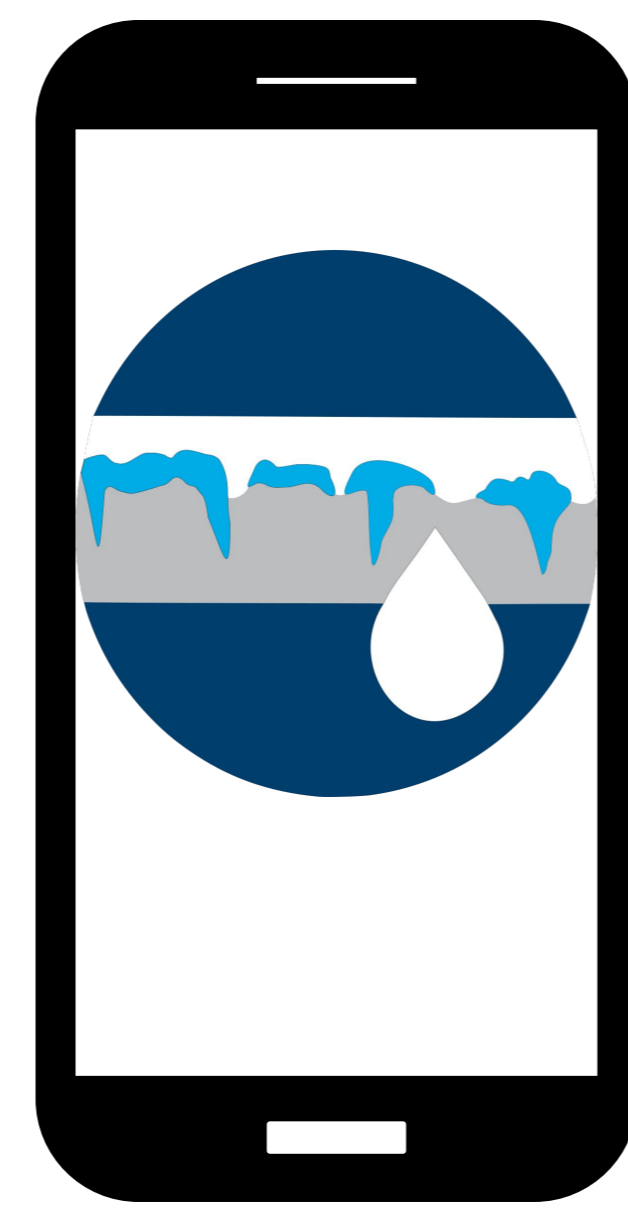
**Co - authors:** Inge H.J. Althuisen<sup>6</sup>, Norbert Anselm<sup>7</sup>, Lei Cai<sup>8</sup>, Stéphanie Coulombe<sup>9</sup>, Hanna Lee<sup>6</sup>, Anna K. Liljedahl<sup>10</sup>, Martin Schneebeli<sup>4</sup>, Ylva Sjöberg<sup>11</sup>, Noah Smith<sup>3</sup>, Sharon L. Smith<sup>12</sup>, Dmitry A. Streletskiy<sup>13</sup>, Simone M. Stuenzi<sup>1,2</sup>, Sebastian Westermann<sup>14</sup> and Evan J. Wilcox<sup>15</sup>



**ABSTRACT:**

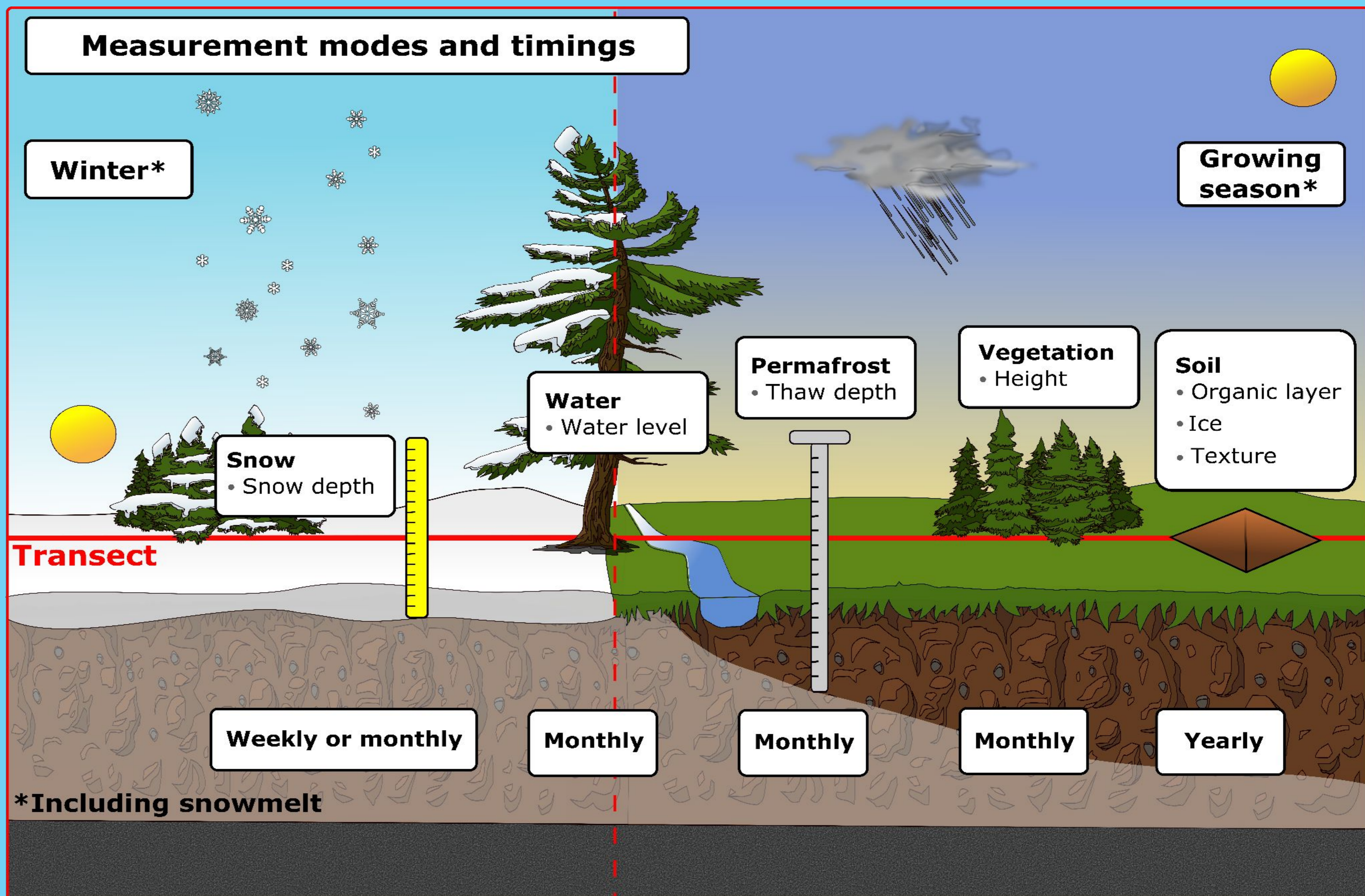
Climate change is destabilizing permafrost landscapes, affecting infrastructure, ecosystems and human livelihoods. The rate of permafrost thaw is controlled by surface and subsurface properties and processes, all of which are potentially linked with each other. Yet, no standardized protocol exists for measuring permafrost thaw and related processes and properties in a linked manner. We developed a protocol, for use by non-specialist scientists and technicians, citizen scientists and indigenous groups, to collect standardized metadata and data on permafrost thaw. Our protocol addresses the need to jointly measure permafrost thaw and the associated surface and subsurface environmental conditions. The parameters measured along transects are: snow depth, thaw depth, vegetation height, soil texture, and water level. The metadata collection includes data on timing of data collection, geographical coordinates, land surface characteristics (vegetation, ground surface, water conditions), as well as photographs. Our hope is that this openly available dataset will also be highly valuable for validation and parameterization of numerical and conceptual models, thus to the broad community represented by the T-MOSAIC project.

**SCAN ME:**



**STATIONS:**

Fig.: Spheres (snow, water, permafrost, vegetation, soil) with the associated parameters, measurement modes and observation timings along one transect over one seasonal cycle.



**Data contributors:** Mayra Melendez (Toolik Field Station), Brampton Dakin (Trail Valley Creek Arctic Research Station), Stéphanie Coulombe (Cambridge Bay, Canadian High Arctic Research Station), Katya Abramova (Samoylov Research Station), Mariasilvia Giamberini (Dirigibile Italia - Italian Research Station, RIS 117560), Fieke Rader (French-German Arctic Research Base), Otso Suominen (Kevo Subarctic Research Station)

