Supplementary Information

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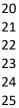
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35° 45° 55° 65° Barents Sea Naryan-Mar work area Arctic Circle Mezen 65° Arkhangelsk Bolshezemelskaya tundra sketch of the tributaries or research context main river permafrost stream thermokarst peatbog depression depression permafrost stream tributaries or main river (Pechora river) thermokarst lake

Fig. S1. The map of studied hydrological continuum and ground photos of sampled aquatic systems.



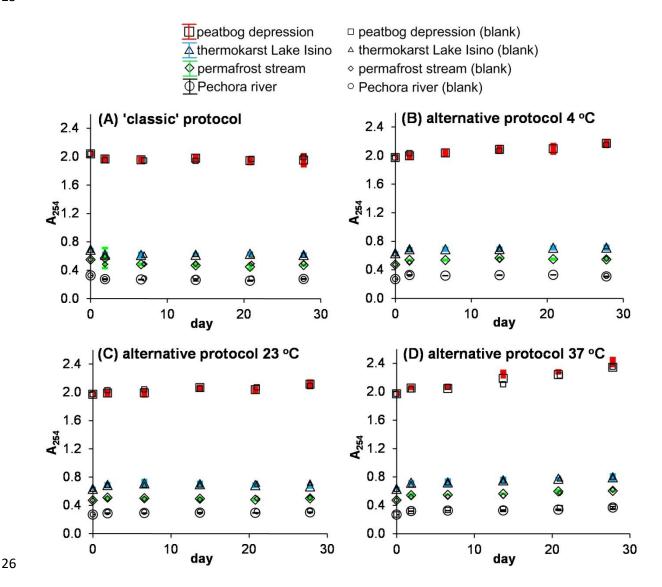


Fig. S2. UV absorbency at 254 nm in biodegradation experiments. The error bars are 1 s.d. of triplicates.

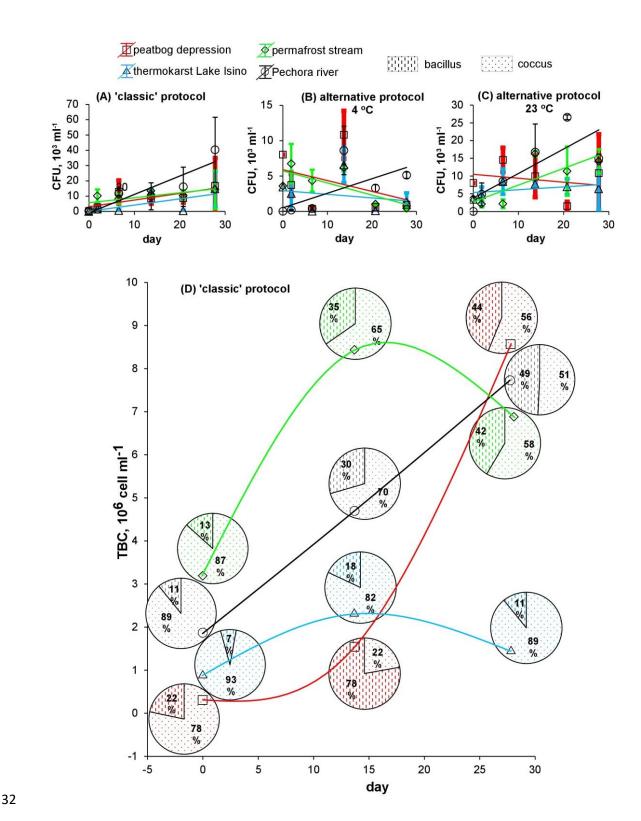


Fig. S3. Number of colony-forming units of oligotrophic bacteria at 23°C in GF/F-filteration experiment of 'classic' protocol (**A**), at 4°C and 23°C in alternative (3 μm – filtration) protocol (**B** and **C**, respectively), and total bacterial count (DAPI-based) in GF/F-filtration experiment (**D**), where bacterial morphological structure (cocci and rods) is shown. The error bars are 1 s.d. of triplicates.

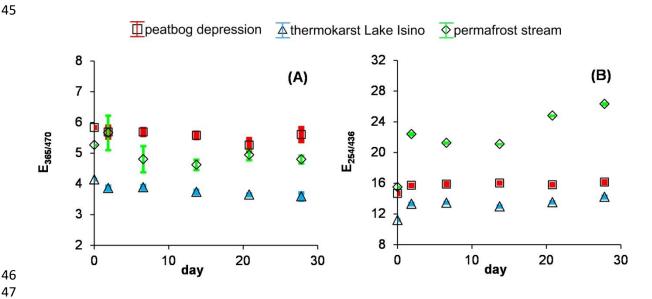


Fig. S4. The optical properties of DOC during photodegrdation experiments: E_{365}/E_{470} ratio corresponding to UV/vis absorbing functional groups (**A**), and the E_{254}/E_{436} ratio, corresponding to autochthonous vs. terrestrial DOM (**B**). The error bars are 1 s.d. of triplicates.