Review comments on EGUSPHERE-2025-4567 (for Hydrology and Earth System Sciences)

Community Comment 1: Giacomo Medici, 31 October 2025

General Comment: Very good research in the field of groundwater hydrology. Please, follow my guidance and the specific comments to fix the minor issues.

- Thank you for your recognition of the value of this study, below you'll find responses to your suggestions.

Comment: Lines 76-78. "Glaciofluvial esker structures have been modelled to exert changes in the vertical movement of peat pore water, attributed to changes in the topography of the mineral sediment along the base of a bog and the hydraulic conductivity (K) contrasts between eskers and lower K peat". Insert review papers on flow heterogeneities in fluvial and glacial aquifers worldwide:

- Jansson, P., Hock, R., Schneider, T. 2003. The concept of glacier storage: a review. Journal of Hydrology, 282(1-4), 116-129.

- Agbotui, P.Y., Firouzbehi, F., Medici, G. 2025. Review of effective porosity in sandstone aquifers: insights for representation of contaminant transport. Sustainability, 17(14), 6469.

- Thank you for your comment, the current references for this statement have been retained due to specificity in the peatland environment rather than larger scale glacial sediment/sandstone aquifers.

Comment: Line 97. Clearly state the general aim of your research at the end of the introduction.

- Please find the research question addressed in this manuscript defined in Line 87 to Line 88.

Comment: Line 97. Describe the 3 to 4 general objectives of your research by using numbers (e.g., i, ii, and iii).

- Please find the research question addressed in this manuscript defined in Line 87 to Line 88.

Comment: Lines 99-139. Insert quantitative information on thickness of your sedimentary deposits.

- Thank you for your suggestion, currently thicknesses for the variable glacial deposits are not available for these specific sites.

Comment: Lines 99-139. Insert quantitative information from cores on proportion of sand, clay and gravel in your sedimentary deposits.

- Thank you for your suggestion, currently grain size proportions from cores of the variable glacial deposits are not available for these specific sites.

Comment: Line 679-690. Expand the conclusion. The general meaning/impact of your hydro-geophysical research is not evident in these lines.

- Thank you for your suggestion, the text has been retained to discuss the potential influences of such groundwater sources on the larger peat bog ecosystems rather than emphasizing the hydrogeophysical contribution.

Comment: Figure 2. Location not evident. Please, insert coordinates.

- The location of the patterned pools in Thousand Acre Bog is presented in Figure 1.

Comment: Figures 3 to 5. Distinguish a Figure A and B.

- Thank you for your suggestion, the figures have been retained due to the simple geospatial reference the maps provide.

Comment: Figure 6. The difference between Figure A and Figure B is not clear.

- Boxes around Figure 6a and Figure 6b have been emphasized to clarify the two different sections.

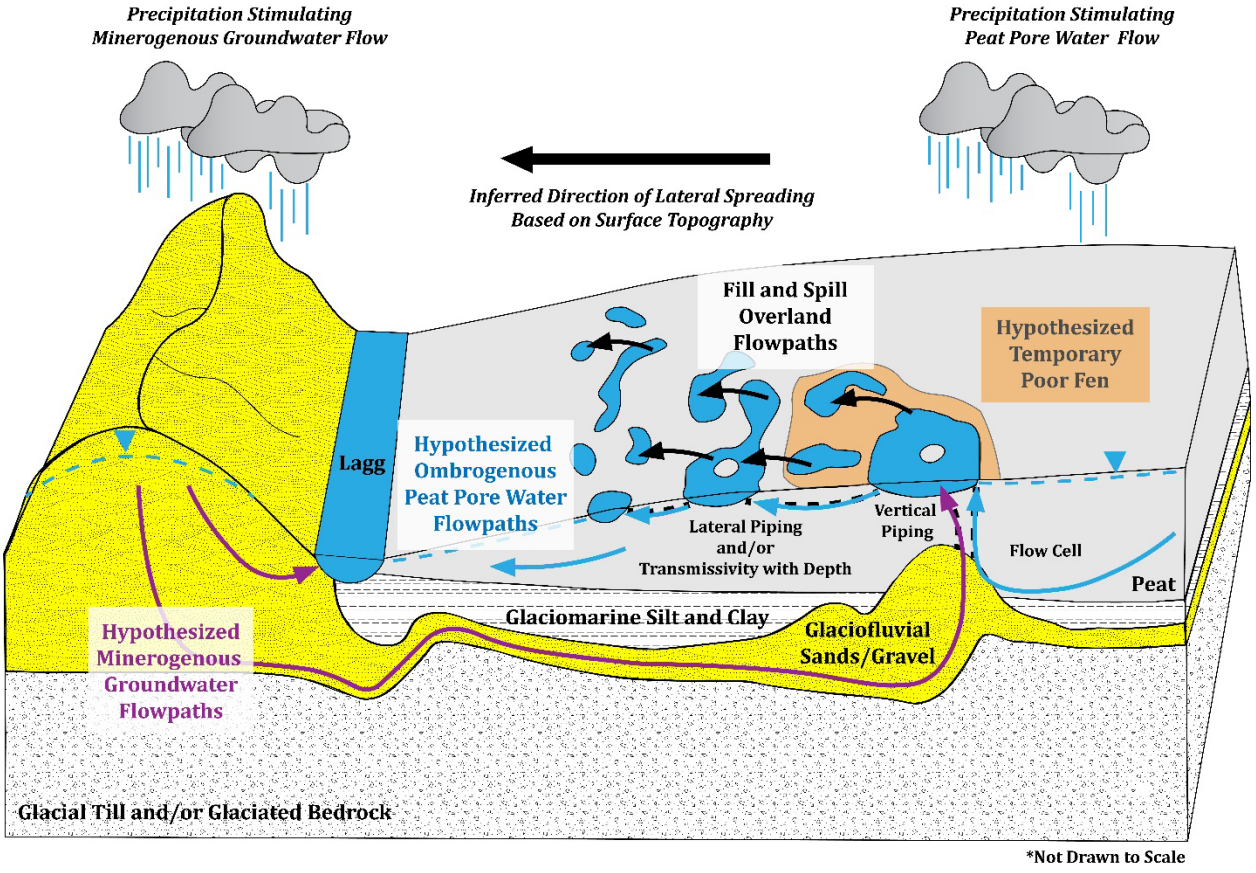
Comment: Figure 10. Insert a spatial scale.

- Thank you for the recommendation, a note has been added that the conceptual model is not drawn to scale.

Comment: Figure 10. Specify if a vertical exaggeration if present.

- Thank you for the recommendation, a note has been added that the conceptual model is not drawn to scale.

- Figure 10:


Precipitation Stimulating Minerogenous Groundwater Flow
Precipitation Stimulating Peat Pore Water Flow
Inferred Direction of Lateral Spreading Based on Surface Topography
Fill and Spill Overland Flowpaths
Hypothesized Temporary Poor Fen
Lagg
Hypothesized Ombrogenous Peat Pore Water Flowpaths
Lateral Piping and/or Transmissivity with Depth
Vertical Piping
Flow Cell
Peat
Glaciomarine Silt and Clay
Glaciofluvial Sands/Gravel
Hypothesized Minerogenous Groundwater Flowpaths
Glacial Till and/or Glaciated Bedrock
*Not Drawn to Scale