Reviewer Comments and Author Responses

The authors would like to thank the reviewer for the comments and suggestions. The reviewer comments are provided below in black and our response in green.

1. The authors present the results from a single model parameterisation. In a previous paper on the 1D model, Mahdiyasa et al. (2023) report modelled fluctuations of surface level of as much as 25 cm in response to variations in water-table position of about 50 cm. Such a large range in surface elevation seems generally implausible for *Sphagnum* peats, except floating mats in bog pools. In my experience, variations in surface elevation are typically a factor of four to five less than simulated by the 1D model. The authors cite Whittington and Price (2006) who report substantial changes in the position of the peat surface relative to the tubes of unanchored piezometers, but such instruments cannot be taken as reliable indicators of surface elevation.

Although this paper does not present the 1D model, the comment is worth considering. The range of surface motion simulated from 1D model of MPeat (Mahdiyasa et al., 2023b) is in agreement with the field observation from Howie and Hebda (2018), who measured the surface oscillation of the raised bog with different plant communities. The range of surface motion reported by Howie and Hebda (2018) from peatland sites dominated by *Sphagnum* is about 15-30 cm. Furthermore, it should also be noted that the actual magnitude of the surface oscillation will depend on the specific site history, which we have not yet attempted to model.

2. The parameterisation used in the current paper is different from that in Mahdiyasa et al. (2023) and the surface motion across the 2D model is not presented or discussed. However, I'd be interested in knowing what happens when the poro-elastic effect is 'dialled down'. How different are the model results? At what point does the poro-elastic effect become of secondary importance compared to the ecological and hydrological processes? I think the paper would benefit from a short section looking at model sensitivity to the degree of poro-elasticity.

We have added a short section related to the sensitivity analysis of the model. We changed the peat Young's modulus, which determines the peat stiffness and is an important variable in the poroelasticity model. A more detailed analysis of the poroelastic effect is beyond the scope of this paper as it would ideally be done relative to field measures and specific peatland types. Our objective in this paper is to present the structure of a fully coupled mechanical-ecohydrological model for peat growth in two dimensions and consider the potential implications of feedback within this model system. This is discussed throughout the manuscript, and this message is strengthened in the discussion to indicate clearly the importance of mechanical-ecohydrological processes together with the spatial variability of water table depth, plant functional types composition, and peat physical properties on peatland behaviour.

3. The authors compare the spatial pattern in their data with data from a blanket bog in Ireland. Although there is some overlap between raised bogs – which is what the authors simulate – and blanket bogs, the two peatland types can be quite different, and I am not sure it makes sense to compare the model of one type with the field results of the other. The authors also report that their simulated peat properties fall within the ranges reported in the literature. I don’t think such a comparison is that useful because properties such as hydraulic conductivity can show enormous variation across different peats – ‘peat’ is not a single soil type. This means that, almost regardless of the values simulated by the model, it will fit within the observed range.

Although the peatland type from Lewis et al. (2012) is different from our simulations, the main reason for the comparison is to demonstrate the ability of the model to produce reasonable outputs of the spatial variability on peat physical properties, including bulk density and hydraulic conductivity. We do not parameterise the model to simulate specific peatland sites and focus on developing a general peatland model. Therefore, we compare our results with the typical range of peat physical properties obtained from the previous studies.

4. A somewhat different point applies to the model-data comparison for the rate of peat and carbon accumulation. As shown by Young *et al.* (2021) (https://www.nature.com/articles/s41598-021-88766-8) it is not possible to obtain past rates of net peat and carbon accumulation from the first derivative of the age-depth curve. Studies that purport to do so are, unfortunately, in error and shouldn’t be used for model-data comparisons.

We do not take the first derivative of the age-depth curve. We calculate the long-term rate of carbon accumulation based on the total amount of carbon and the total time of simulations. After that, we compare the results with available data from the previous study.

5. The authors don’t compare their predictions of peatland shape with data. Many raised bogs approximate a hemi-ellipse in cross section, but the Mpeat2D results shown in Figures 5 and 8 show what seems to be a very different profile. I am not convinced the model has that much skill in representing overall peatland form. The authors are encouraged to compare the modelled cross-sectional shape with real raised bogs.

The hemi-ellipse shape of the peatland in the cross-section is proposed by Ingram (1982) through the Groundwater Mound Hypothesis (GMH). This shape is obtained by assuming constant hydraulic conductivity throughout the profile, which is not true because the field observation from Baird et al. (2008) and Lewis et al. (2012) showed that hydraulic conductivity changes in the vertical and horizontal directions. Armstrong (1995) modified the GMH by proposing non-uniform hydraulic conductivity that exponentially decreases with depth, showing different predictions of peatland shape and thickness. This model produces a lower hydraulic gradient at the margin, which is in agreement with our model MPeat2D. Comparing MPeat2D with the shape of a real raised peatland requires specific parameterisation of that site, including peat physical properties, substrate characteristics, and information about peatland age, which might reduce the generalisation obtained from MPeat2D simulations. Note that the primary purpose of this paper is to present a method that can then be developed for a wide range of purposes.

6. I understand the desire of the authors to produce some ‘generic’ model results, but it would also be useful, whether in this paper or a follow-up paper, to apply the model to a particular site to see how well it simulates overall peatland shape, peat properties, and the age-depth curve.

We agree with the referee’s comments that a comparison with the particular site would also be useful. However, we believe the site comparison should be conducted after the conceptual and generic model is developed.

7. In the discussion section the authors compare their model’s predictions with those from DigiBog. I can’t be sure, but they seem to have used an early prototype of DigiBog from 2012 which has long been superseded (since 2014). More recent versions of DigiBog produce a more realistic margin to raised bogs. The authors do not indicate how DigiBog was parameterised, so it is unclear what is being compared here. The DigiBog team, of which I am a member, would be happy to share more recent model code with the authors should they want to use it. Finally, the comparison with DigiBog should be reported in the Model Implementation and Results sections, and not just the Discussion; it is odd to report results in a discussion section.

We compare MPeat2D with the earlier version of DigiBog because both models have similar characteristics, including the flat and impermeable substrate with the symmetric assumption of peatland growth. Moreover, both models also assume that water ponding was lost immediately to the margin. We have tried to use more recent versions of DigiBog by contacting the DigiBog team. However, because of the different and complex parametrisation and setup, the more recent DigiBog versions produce incomparable simulation results to the MPeat2D. The more recent DigiBog versions employ a layer lumping system after some specific time and thickness. This approach results in faster simulation because it reduces the number of layers that become the domain of calculation. However, the different parametrisation of the layer lumping appears to change the results and stability of the DigiBog. Furthermore, the more recent version includes the parameter of mineral soil and water ponding thickness, which also influences the model outputs. These additional features and parameters lead to incomparable conditions with MPeat2D. We agree that the comparison with DigiBog should be reported in the Model Implementation and Results sections.

8. When building a model, modellers usually try and include all the key processes, leaving out those to which the model is not sensitive. There are many ways in which models such as DigiBog might be improved, such as the decay routines which are heavily empirical. The decision on what to include and exclude is also dependent on how much is known about a process. If information on the process is sparse then it will be difficult to include. I welcome the authors looking at the effects of poro-elasticity on peatland development, but I think there remains considerable uncertainty about the importance of the process.

Peat is a mechanically weak poroelastic material due to the low value of Young's modulus (Dykes, 2008; Mesri & Ajlouni, 2007), shear, and tensile strength (Boylan et al., 2008; Dykes, 2008; Dykes & Warburton, 2008; Hendry et al., 2011; O'Kelly, 2015). As a result, the changes in peat pore structure, which significantly influence hydraulic properties, are not only determined by progressive decomposition (Moore et al., 2005; Quinton et al., 2000) but also compression. Hydraulic conductivity decreases when the water table drops due to the mechanical deformation in the pore structure (Whittington & Price, 2006), an important process that can reduce water discharge from peatland. In addition, compression also reduces peat volume, causing the peatland surface to drop. This drop in the peat surface acts to maintain the relative position of the water table, which in turn helps sustain PFTs associated with wet surface conditions (Schouten, 2002; Waddington et al., 2015). The detailed explanation related to the importance of poroelasticity on peatland development is presented in the Mahdiyasa et al. (2022) and Mahdiyasa et al. (2023b).

9. Other processes about which quite a lot is known include the build up, release, and dissolution of biogenic gas bubbles below the water table on an annual cycle. Bubbles may occupy more than 20% of the total peat volume, blocking pores and reducing the peat's hydraulic conductivity, and also making the peat more buoyant. To me, these

effects would seem to equal or perhaps exceed the effects of poro-elasticity and I would be interested in hearing, via the discussion section, what the authors thought about this possibility.

We agree that entrapped gas bubbles could have a significant influence on the peatland behaviour. The entrapped gas bubbles influence hydraulic conductivity (Baird & Waldron, 2003; Beckwith & Baird, 2001; Reynolds et al., 1992) and pore pressure (Kellner et al., 2004), which results in variations of effective stress. Consequently, the mechanical deformation of peat pore space, including the shrinking or swelling, is also affected by the presence of gas bubbles. The simulation from Reeve et al. (2013) suggested that a higher gas content results in a more significant peatland surface deformation. We could expand the poroelasticity formulation below the water table to accommodate more than one fluid, for example, water and gas mixture (Kurzeja & Steeb, 2022). This modification requires generalisation in Biot's theory of consolidation to model multiphase fluid saturation. We added a paragraph to provide a brief discussion related to this possibility.

10. I have made more comments on a pdf of the paper and this is posted separately for the authors and the editor. Some of the points made on the pdf are covered in the comments above, but the authors are encouraged to respond to those that aren't. Of particular importance is that Equation (17) is given wrongly – as reproduced, it is non-homogenous – I think specific storage should be replaced with specific yield.

We changed specific storage with specific yield in Equation (17) to solve this issue.

11. Line 13 Influence of these on what exactly?

On the peatland behaviour.

12. Line 27 This is a non sequitur. The significance of the effect can only be obtained by comparing models with the real world. It's necessary to compare two models - MPeat2D and a model that doesn't have poroelastic effects - to real-world data.

The comparison with the real-world data requires specific characteristics of the site that could limit our understanding related to the importance of mechanical-ecohydrological feedback. Therefore, to clearly analyse and evaluate the significance of this process, we need to compare it with the other conceptual model that does not include mechanical feedback. We provide comparisons between MPeat2D with real-world data of spatial heterogeneity in peat physical properties, including bulk density, active porosity, and hydraulic conductivity. These comparisons indicate that MPeat2D can produce reasonable outputs of peat physical properties profile, which becomes the limitation of the stiff model without mechanical feedback.

13. Line 51 Spatial variations are also predicted in models that don't have poro-elastic effects.

We agree that some of the 2D peatland development models that ignore mechanical feedback also predict spatial variabilities. However, these spatial variabilities are obtained from empirical relationships or only applied to the specific variable. For example, in the model from Borren and Bleuten (2006), the spatial variations in the bulk density and hydraulic conductivity are developed based on the empirical relationship between different peatland types, consisting of bog, throughflow fen, and fen. DigiBog (Baird et al., 2012; Morris et al., 2012) predicts the spatial variations of hydraulic conductivity but assumes constant active porosity and bulk density throughout the peatland area. In order to provide a more comprehensive analysis of peatland spatial variations, a fully coupled model that incorporates mechanical, ecological, and hydrological feedback is required.

14. Line 60 Two things are being suggested and both don't apply to all of the cited papers.

We rephrased the sentence to clarify the issue.

15. Line 70 The key point here is whether poro-elastic effects are important enough as factors in peatland development for them to be included in a model. I am not sure they are.

This is discussed in detail in the comment above (No. 8).

16. Line 210 This equation is dimensionally inhomogeneous. Specific storage should be specific yield which is dimensionless.

We changed specific storage with specific yield in Equation (17) to solve this issue.

17. Line 217 Is surface water lost from the model solution? Is that realistic?

We assume the ponded water above the peatland surface will flow as surface water. This would appear to be a realistic assumption because we do not simulate patterned peatlands.

18. Line 225 How does this equation compare to what is revealed in the meta-analysis of Morris et al. (2022)?

The Equation (19) in the MPeat2D is developed based on the exponential relationship between hydraulic conductivity and active porosity through the generalized Kozeny-Carman equation. The basic idea for this relationship is that changing active porosity due to compression affects hydraulic conductivity because water cannot move easily as the pore size becomes smaller. Contrastingly, Morris et al. (2022) developed a linear model to predict hydraulic conductivity from other independent variables, including depth, bulk density, von Post score, and categorical information.

19. Line 288 Why was this used? Why not use a more realistic palaeo climate?

We employ a sinusoidal function with some noise for non-constant climates to capture wet and dry conditions. We do not use the palaeo climate reconstruction model because we want to keep it as simple as possible while also maintaining the effect of variable climate on the peatland growth over millennia.

20. Line 293 It would be better if the parameter values were based on actual data. See again Morris et al. (2022) referred to in an earlier comment.

We use these parameters to produce results that are comparable with the one-dimensional model MPeat (Mahdiyasa et al., 2023b; Mahdiyasa et al., 2022).

21. Line 347 Here and in Figure 5, the shape of the peatland doesn't look that realistic. How does the shape compare to real peatlands which tend to follow (approximately) a hemi-ellipse in section?

This is discussed in detail in the comment above (No. 5).

22. Line 349 Is mean annual water-table depth shown in Figure 9?

Figure 9a shows the variation in mean annual water table depth between the centre and margin under a non-constant climate.

23. Line 353 This could be confused with how BP is used in palaeo studies to denote 1950.

We use BP as a general term for before the present and do not indicate a specific year. As such it will not matter how this is interpreted.

24. Line 356 'm-2'?

We had changed the unit.

25. Line 378 Just this? DigiBog simulates something similar, with the lower K values at the margin being due to the peat being more decayed.

We agree that the spatial variation of hydraulic conductivity is also affected by the degree of decomposition, as shown by DigiBog. However, DigiBog cannot capture the spatial variations of bulk density and active porosity due to the omission of mechanical feedback. Therefore, the spatial variations of peat physical properties are not only affected by decomposition but also by compaction. We had rephrased the sentence to clarify this issue.

26. Line 382 Okay, but the cross-sectional shape predicted by MPeat doesn't look very realistic.

This is discussed in detail in the comment above (No. 5).

27. Line 389 'between peatland microforms'

We had applied the referee's suggestion.

28. Line 392 I don't quite follow what is being said here. I recommend re-phrasing.

We had rephrased the sentence to clarify this issue.

29. Line 396 I don't think this paper is cited correctly here. Clymo (2004) actually shows bulk density being constant while K declines with depth, which is contrary to what is predicted by MPeat.

In the manuscript, we cite Clymo (1984), who provides the data of bulk density with depth, as shown by Figures 1, 8, and 16. The bulk density profile from Clymo (1984) is in agreement with MPeat2D simulations, which indicates an increasing value from the top surface to the bottom layer.

30. Line 414 'based their finding on a sensitivity analysis of a steady-state groundwater model.'

We had applied the referee's suggestion.

31. Line 422 I don't think this makes sense; it is not a comparison of like with like. The simulations were for a raised bog and not a blanket bog.

This is discussed in detail in the comment above (No. 3).

32. Line 431 Peats are enormously variable (in the same way that mineral soils are). Therefore, there is a very wide range of reported peat physical properties. Just because the model falls within that very wide range does not provide validation that its predictions are sound or good.

This is discussed in detail in the comment above (No. 3).

33. Line 439 But the cross-sectional shape of the peatland doesn't seem to be.

This is discussed in detail in the comment above (No. 5).

34. Line 442 Unfortunately, these cannot be used to give past rates of net C accumulation as explained by Young et al. (2021): https://www.nature.com/articles/s41598-021-88766-8. It would be better to simulate a real site and compare the age-depth curves from the model and real peat profile.

This is discussed in detail in the comment above (No. 4).

35. Line 456 An old version of DigiBog seems to have been used here - this version was superseded in 2014. I recommend using a more recent version of the model, which the DigiBog team will be happy to share with the authors. This later version of DigiBog has a greater slope at the margin with a less dramatic 'cliff'.

This is discussed in detail in the comment above (No. 7).

36. Line 460 What parameterisation was used for DigiBog? What bulk density was used, and was K set to be comparable to the values used in MPeat2D?

We used the parameterisation from Morris et al. (2012) with the value of bulk density equal to $100\ \mathrm{kg\ m^{-3}}$ and the hydraulic conductivity parameters a and b equal to $1 \times 10^{-5}\ \mathrm{m\ s^{-1}}$ and 8, respectively.

37. Line 463 Is this reasonable, however? What do water-table reconstructions using testate amoebae reconstructions of water-table depth show from real bogs? Do real bogs also show systematic changes in vegetation with time associated with wetting? Some do undoubtedly, but I am not sure such change is anywhere near universal. The opposite has also been observed.

We agree that the site characteristics might affect the relationship between the water table and vegetation composition on the peatland. However, our results are obtained from the first principle that a lower water table position supports the growth of shrubs, while the higher position of the water table increases the proportion of *Sphagnum* in the peatland vegetation communities. Therefore, our approach to simulate the changes in vegetation composition during the development process of the peatlands is theoretically reasonable and in agreement with the field observation.

38. Line 470 I don't think MPeat2D produces realistic peatland profiles which tend to be quite well approximated by a hemi-ellipse, which has a steep margin. Also, the simulations here are from an old, and no longer used, version of DigiBog - see my earlier comment. Finally, the cliff effect is partly an artefact of the discretisation used and the choice of model boundary condition.

This is discussed in detail in the comment above (No. 5 and 7).

39. Line 503 It's not clear that it does. As Baird et al. (2017) note, the very high K is negated by the very low hydraulic gradients in tropical peatlands.

We had rephrased the sentence to clarify this issue.

40. Line 521 Possibly, but patterns occur across bog plateaus with low surface gradients where the peatland can be expected to be mechanically stable.

The peatland surface patterns might appear due to the tensile or compressive failure condition (Briggs et al., 2007; Dykes, 2008) that dominantly occurs under a low slope angle (Dykes & Selkirk-Bell, 2010). Furthermore, mechanical instability can also be linked to wrinkling thresholds and internal stress states. Until such ideas are tested, the mechanical influence on surface patterning remains unknown.

References

Armstrong, A. C. (1995). Hydrological model of peat-mound form with vertically varying hydraulic conductivity. *Earth Surface Processes and Landforms, 20*(5), 473-477. https://doi.org/ https://doi.org/10.1002/esp.3290200508

Baird, A. J., Eades, P. A., & Surridge, B. W. J. (2008). The hydraulic structure of a raised bog and its implications for ecohydrological modelling of bog development. *Ecohydrology, 1*(4), 289-298. https://doi.org/ https://doi.org/10.1002/eco.33

Baird, A. J., Low, R., Young, D., Swindles, G. T., Lopez, O. R., & Page, S. (2017). High permeability explains the vulnerability of the carbon store in drained tropical peatlands. *Geophysical Research Letters, 44*(3), 1333-1339. https://doi.org/10.1002/2016GL072245

Baird, A. J., Morris, P. J., & Belyea, L. R. (2012). The DigiBog peatland development model 1: rationale, conceptual model, and hydrological basis. *Ecohydrology, 5*(3), 242-255. https://doi.org/ https://doi.org/10.1002/eco.230

Baird, A. J., & Waldron, S. (2003). Shallow horizontal groundwater flow in peatlands is reduced by bacteriogenic gas production. *Geophysical Research Letters, 30*(20). https://doi.org/https://doi.org/10.1029/2003GL018233

Beckwith, C. W., & Baird, A. J. (2001). Effect of biogenic gas bubbles on water flow through poorly decomposed blanket peat. *Water Resources Research, 37*(3), 551-558. https://doi.org/https://doi.org/10.1029/2000WR900303

Borren, W., & Bleuten, W. (2006). Simulating Holocene carbon accumulation in a western Siberian watershed mire using a three-dimensional dynamic modeling approach. *Water Resources Research, 42*(12). https://doi.org/ https://doi.org/10.1029/2006WR004885

Boylan, N., Jennings, P., & Long, M. (2008). Peat slope failure in Ireland. *Quarterly Journal of Engineering Geology and Hydrogeology, 41*(1), 93-108. https://doi.org/ https://doi.org/10.1144/1470-9236/06-028

Briggs, J., Large, D. J., Snape, C., Drage, T., Whittles, D., Cooper, M., Macquaker, J. H. S., & Spiro, B. F. (2007). Influence of climate and hydrology on carbon in an early Miocene peatland. *Earth and Planetary Science Letters, 253*(3), 445-454. https://doi.org/ https://doi.org/10.1016/j.epsl.2006.11.010

Clymo, R. S. (1984). The limits to peat bog growth. *Philosophical Transactions of the Royal Society of London. B, Biological Sciences, 303*(1117), 605-654. https://doi.org/ https://doi.org/10.1098/rstb.1984.0002

Clymo, R. S. (2004). Hydraulic conductivity of peat at Ellergower Moss, Scotland. *Hydrological Processes, 18*(2), 261-274. https://doi.org/ https://doi.org/10.1002/hyp.1374

Dykes, A. P. (2008). Tensile strength of peat: laboratory measurement and role in Irish blanket bog failures. *Landslides, 5*(4), 417-429. https://doi.org/ https://doi.org/10.1007/s10346-008-0136-1

Dykes, A. P., & Selkirk-Bell, J. M. (2010). Landslides in blanket peat on subantarctic islands: causes, characteristics and global significance. *Geomorphology, 124*(3), 215-228. https://doi.org/ https://doi.org/10.1016/j.geomorph.2010.09.002

Dykes, A. P., & Warburton, J. (2008). Failure of peat-covered hillslopes at Dooncarton Mountain, Co. Mayo, Ireland: analysis of topographic and geotechnical factors. *CATENA, 72*(1), 129-145. https://doi.org/ https://doi.org/10.1016/j.catena.2007.04.008

Hendry, M. T., Barbour, S. L., & Martin, C. D. (2011). An evaluation of real-time deformation monitoring using motion capture instrumentation and its application in monitoring railway foundations. *Geotechnical Testing Journal, 34*(6), 602–612. https://doi.org/https://doi.org/10.7939/R3TH8C26V

Howie, S. A., & Hebda, R. J. (2018). Bog surface oscillation (mire breathing): A useful measure in raised bog restoration. *Hydrological Processes, 32*(11), 1518-1530. https://doi.org/https://doi.org/10.1002/hyp.11622

Ingram, H. A. P. (1982). Size and shape in raised mire ecosystems: a geophysical model. *Nature, 297*(5864), 300-303. https://doi.org/ https://doi.org/10.1038/297300a0

Kellner, E., Price, J. S., & Waddington, J. M. (2004). Pressure variations in peat as a result of gas bubble dynamics. *Hydrological Processes, 18*(13), 2599-2605. https://doi.org/https://doi.org/10.1002/hyp.5650

Kurzeja, P., & Steeb, H. (2022). Acoustic waves in saturated porous media with gas bubbles. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 380*(2237), 20210370. https://doi.org/doi:10.1098/rsta.2021.0370

Lewis, C., Albertson, J., Xu, X., & Kiely, G. (2012). Spatial variability of hydraulic conductivity and bulk density along a blanket peatland hillslope. *Hydrological Processes, 26*(10), 1527-1537. https://doi.org/ https://doi.org/10.1002/hyp.8252

Mahdiyasa, A. W., Large, D. J., Muljadi, B. P., & Icardi, M. (2023b). Modelling the influence of mechanical-ecohydrological feedback on the nonlinear dynamics of peatlands. *Ecological Modelling, 478*, 110299. https://doi.org/https://doi.org/10.1016/j.ecolmodel.2023.110299

Mahdiyasa, A. W., Large, D. J., Muljadi, B. P., Icardi, M., & Triantafyllou, S. (2022). MPeat—A fully coupled mechanical-ecohydrological model of peatland development. *Ecohydrology, 15*(1), e2361. https://doi.org/https://doi.org/10.1002/eco.2361

Mesri, G., & Ajlouni, M. (2007). Engineering properties of fibrous peats. *Journal of Geotechnical and Geoenvironmental Engineering, 133*(7), 850-866. https://doi.org/ https://doi.org/10.1061/(ASCE)1090-0241(2007)133:7(850)

Moore, T. R., Trofymow, J. A., Siltanen, M., Prescott, C., & Group, C. W. (2005). Patterns of decomposition and carbon, nitrogen, and phosphorus dynamics of litter in upland forest and peatland sites in central Canada. *Canadian Journal of Forest Research, 35*(1), 133-142. https://doi.org/https://doi.org/10.1139/x04-149

Morris, P. J., Baird, A. J., & Belyea, L. R. (2012). The DigiBog peatland development model 2: ecohydrological simulations in 2D. *Ecohydrology, 5*(3), 256-268. https://doi.org/https://doi.org/10.1002/eco.229

Morris, P. J., Davies, M. L., Baird, A. J., Balliston, N., Bourgault, M.-A., Clymo, R. S., Fewster, R. E., Furukawa, A. K., Holden, J., Kessel, E., Ketcheson, S. J., Kløve, B., Larocque, M., Marttila, H., Menberu, M. W., Moore, P. A., Price, J. S., Ronkanen, A.-K., Rosa, E., Strack, M., Surridge, B. W. J., Waddington, J. M., Whittington, P., & Wilkinson, S. L. (2022). Saturated Hydraulic Conductivity in Northern Peats Inferred From Other Measurements. *Water Resources Research, 58*(11), e2022WR033181. https://doi.org/https://doi.org/10.1029/2022WR033181

O'Kelly, B. C. (2015). Case studies of Vacuum Consolidation Ground Improvement in Peat Deposits. In B. Indraratna, J. Chu, & C. Rujikiatkamjorn (Eds.), *Ground Improvement Case Histories* (pp. 315-345). Butterworth-Heinemann. https://doi.org/https://doi.org/10.1016/B978-0-08-100192-9.00011-9

Quinton, W. L., Gray, D. M., & Marsh, P. (2000). Subsurface drainage from hummock-covered hillslopes in the Arctic tundra. *Journal of Hydrology, 237*(1), 113-125. https://doi.org/https://doi.org/10.1016/S0022-1694(00)00304-8

Reeve, A. S., Glaser, P. H., & Rosenberry, D. O. (2013). Seasonal changes in peatland surface elevation recorded at GPS stations in the Red Lake Peatlands, northern Minnesota, USA. *Journal of Geophysical Research: Biogeosciences, 118*(4), 1616-1626. https://doi.org/https://doi.org/10.1002/2013JG002404

Reynolds, W. D., Brown, D. A., Mathur, S. P., & Overend, R. P. (1992). Effect of in-situ gas accumulation on the hydraulic conductivity of peat. *Soil Science, 153*(5), 397-408.

Schouten, M. G. C. (2002). *Conservation and restoration of raised bogs: Geological, hydrological, and ecological studies*. The Government Stationary Office.

Waddington, J. M., Morris, P. J., Kettridge, N., Granath, G., Thompson, D. K., & Moore, P. A. (2015). Hydrological feedbacks in northern peatlands. *Ecohydrology, 8*(1), 113-127. https://doi.org/https://doi.org/10.1002/eco.1493

Whittington, P. N., & Price, J. S. (2006). The effects of water table draw-down (as a surrogate for climate change) on the hydrology of a fen peatland, Canada. *Hydrological Processes, 20*(17), 3589-3600. https://doi.org/ https://doi.org/10.1002/hyp.6376