Authors' Response to Reviewer Comments

We thank the reviewer for their thorough and constructive feedback on our revised manuscript. We greatly appreciate the positive assessment of our revisions and are pleased that the changes have improved the clarity of the paper. We have carefully addressed all the minor remarks raised in this review, as detailed below. We believe these final corrections have further strengthened the manuscript.

Detailed remarks:
- 18: "Improve our subsurface data coverage": with regard to what ? Consider rephrasing.

We rephrased the sentence to: "*Together these legacy drillhole datasets have the potential to significantly enhance constraints on regional 3D geological models and improve our understanding of subsurface architecture, but have limited use in their current form as many if not most drill logs lack stratigraphic information, containing only lithological descriptions.*"

- 46: "Drillhole data serves" : serve ?

Yes, we corrected it.

- 165: could be appropriate to also reference a stable url (DOI).

We added a reference to ASUD with an url.

- 174: This sentence is unclear at this stage, and the process become clearer in Sec. 2.2 Maybe add a reference to that section?

We changed this sentence to: "*Together steps a and b ensure consistent lithological terminology across drillhole logs and geological map units, enabling subsequent stratigraphic unit matching (Section 2.2).*"

- 285: Adding an equation number could make it easier to reference this equation in Section

We added equation numbers.

- 387-394: The first sentence of this paragraph is a bit ambiguous (the reader needs to guess that the problem is on the map contacts). Mention that this concerns the connectivity constraint.

We change the sentence to: "*To account for incomplete exposure of geological contacts at the surface, we relax the map-based connectivity constraint by allowing the algorithm to "jump" over intermediate units in the global connectivity graph Γ.*"

- 402: the term "in seconds" is vague and may be incorrect for huge data bases. Given the following nice section on computational complexity, I suggest removing it at this stage of the paper.

We removed that part, as suggested.

- 417: Use exponent notation.

We applied the exponent notation.

- 483: "unconformities or erosion surfaces": erosions surfaces are unconformities.

We removed “erosion surfaces”.

- 488: referencing the w_h equation would help.

We added a reference to the w_h equation.

- 522: Reminding the |S| is the number of solutions would be good. "n drill holes" should read H drillholes.

We adjusted the sentence to: “*The algorithm achieves $O(H^2 \times S_{avg})$ complexity when correlating solutions across all H drillholes, where S_{avg} represents the average number of solutions per drillhole.*”

604: "geology maps": geological maps?

We corrected this.

670 "for this" unclear to me.

We changed that part to: “*Vague lithological descriptions are a major limitation. In many areas, the lithological descriptions of stratigraphic units are quite vague, and successive stratigraphic units in a group might have very similar lithological descriptions.*”

We have also revised the manuscript title to better reflect the methodology and contributions of our work. The new title is: 'Automated stratigraphic interpretation from drillhole lithological descriptions with uncertainty quantification: litho2strat 1.0'. We believe this more accurately conveys the automated nature of the approach and the focus on uncertainty quantification.