Christophe Cudennec Review:

The article presents a highly valuable setup for new observations, a comprehensive presentation of pre-existing / newly acquired / proxy data on all involved compartments and processes, in an area which is one of the most emblematic ones in terms of glacier retreat - yet much unknown and ungauged so far. The articles elaborates on the new data acquired and related ones to propose first quantification and a conceptual model.

I think the observation/data rationale and the initial database presented, as well as the conceptual model are very relevant and timely results. Quantifications presented in the paper are an interesting initial assessment which will definitely be refined and deepened in the next steps thanks to additional months of data, adjustments/improvements allowed by the loop back from the conceptual model to the field and data reanalysis, and eventual modellings. The full transparency about the data is a strong quality of this paper, which paves the way to precise next steps and will thus become a seminal paper for anyone in the future using the full original open database. Yet, actual uncertainties and future steps about quantification should be made more explicit here, so that the paper is clearer about the strong achievements, the first quantifications proposed, and the future steps.

Uncertainties have been added systematically to all values measured or calculated when they were not explicit.

The conceptual model in Figure 13 could be detailed a bit further to make the scheme more complete. In particular the elevation above sea level could be added and the fresh/marine groundwater interfacing could be addressed/questionned.

The figure 13 has been modified, it now includes the elevation above sea level. The fresh/marine groundwater interface is discussed in further detials in the discussion section.

I wonder about the quantification of some meteorological terms: 1) is'nt there any estimate of the snow depth over the ice cap / glaciers to complement the met stations located in the Hofn neighbourhood, which is close to sea level and so leads to issues about representativeness?

To our knowledge there is no estimate of the snow depth over the glaciers; but the snow cover (total/partial/inexistant) observed from Höfn is provided for the plain and for the mountain.

2) how are evapotranspiration methods parameterized in such a particular, lowly vegetated environment?

About the evapotranspiration methods: we used Thornthwaite and Penman Monteith methods, with parameters adapted to the latitude. We chose classic methods, as from the literature there is no specific method proved more representative for Iceland. It has been made explicit in the text of the paper. For the calculation of the effective rainfall, the parameter describing the soil is adapted. It should be noted too that about half the plain is cultivated, on former wetland providing thick soils.

Looking forward to see the revised version, C. Cudennec

Anonymous Review:

Global corrections done:

- Introduction: clarification that the objectives of the paper are the understanding of the whole hydrogeological system as a whole, including the recharge, as well as the geometry and hydraulic parameters of the aquifers;

- Methodology and results: we are now focusing first on the available water for surface flow and groundwater flow (effective rainfall in the plain, total of subglacial melt and effective rainfall under the glacier), and discuss its contribution to recharge afterwards, in the Discussion section;

- The conceptual model presented in section 5.3 is described and discussed more in details.

The authors present a study aiming at achieving the quantification of the groundwater recharge under the glaciers and in the plain and proposing a hydrogeological conceptual model. Overall, the topic is interesting and the authors provide new data about groundwater dynamics. However, the paper is more of a descriptive write up for the observation data. The manuscript is analyzing the characteristics of the groundwater level, temperature, EC, and aquifer information, and giving rough estimation results of groundwater recharge. Two parts of new data analysis and recharge estimation are relatively independent. The paper doesn't have enough novelty and it doesn't satisfy the required standards for the journal

1. I have some doubts on the validity of the calculations in section 5.1 and 5.2. Half of the glacier melt water is considered to infiltrate to the aquifers under the glaciers. A scaling coefficient of 0.5 is applied to the effective rainfall to obtain the recharge rate in the plain. The ranges of the surface runoff in the glacier hillslope and plain area of four glacial catchments are wide in different seasons. The authors are encouraged to carry out a simple quantitative water balance analysis (both in the glacier and the plain area) to assess the uncertainties in the data and the reliability of conclusions they make regarding the negligible impact of the change in the surface runoff etc

1. See global corrections underway mentioned above. In the current version of the paper see ll.176-181 and ll.391-397.

2. Even if the calculations are accepted, I think that the authors do not give additional discussion on the comparison with the previous studies, from which the readers can already obtain the same conclusion: recharge under the glacier is much higher than the one on the plain. The authors should give more discussions on the new findings in this paper and the comparisons with previous researches.

2. A Discussion section has been created, including such discussion.

3. The manuscript doesn't address how the complex and dynamic relationships between the groundwater recharge and geological conditions. The newly measured geological conditions and groundwater dynamic processes in this study are interesting but without a more targeted purpose for this paper.

The water exchange between two aquifers (drawn in Figure 13) is not mentioned and discussed in the manuscript.

3. See global corrections mentioned above. The upward leakage is discussed in the current version of the paper ll. 398-403.

4. The paper is limited to the presentation and simple analysis of various collected data. The reviewer feels that the title "A hydrogeological conceptual model of aquifers in catchments headed by temperate glaciers" does not reflect the content of the paper.

4. See global corrections mentioned above.

Here, some detailed comments are listed:

1. Chapter 1-introdution: What's the current study progress on the research objectives? including the groundwater recharge in glacial catchments and the hydrogeological conceptual model. In addition to the lack of data, what are the deficiencies in the study of the hydrogeological conceptual model, and what is the new development of this research?

1. The introduction has been detailed on those aspects.

2. Regarding the first goal of "proving whether or not meltwater from the glacier recharges the aquifer(s) beneath the icesheet", there is very little reflection on this. The authors assumed that half of the melt infiltrated to the aquifers (P.9, L.175). Proof is given ll.391-397 + J.Hart data, from which the 50% quotient is deduced (ll.176-181). revoir redaction methodo: we need estimation of subglacial melt and of % of melt infiltrating; appuyer sur difference echelle et plus incertitude

2. See global corrections mentioned above and ll.391-397.

3. Section 3.2 Data analysis: "if Pi + Si < PETi , RETi = max(Pi + Si ; PETi)"(P.8, L.156-158), is this correct? The authors have to carefully check these equations that are used to calculate the effective rainfall.

3. Equations checked.

4. The contents of section 4-New data and section 5.2-Aquifers characteristics can be merged together to show results of monitored data.

4. Indeed, they were separated to avoid a too long section in 5.2 by presenting the raw data earlier.

5. The authors spend a lot of time introducing the aquifer thickness, hydraulic conductivity, storage coefficient, and electro-conductivity. However, all these monitored data have nothing to do with the research objective of estimating the recharge process. What is the impact of geological conditions on the recharge?

5. See global corrections mentioned above.

6. It is wrong for the format of "Gardner et al 2013"(P.2, L.28), "Einarsson 1994"(P.6, L.97), "Torfason 1979" (P.6, L.100), "Jóhannesson and Sæmundsson 1998" (P.6, L.103), etc.

6. References format have been corrected when necessary.

7. P.8, L.159: "EvapoTranspiration"should be corrected.

7. Typo correction done.

8. P.8, L.160: "SW is initially estimated at 50mm", what is the mean of SW?

8. SW is the same as S, erroneous double notations, corrected.

9. Figure 7: the colors are not clear to distinguish the results of different boreholes. The "bgl"in the figure should be corrected as "b.g.l.".

9. Typo correction done.

10. P.14, L.283: "Subglacial recharge, estimated from SNMELT variable", what is the mean of SNMELT?

10. SNMELT is the melt in the PISM-ICRA model, sentence clarified.

11. P.15, L.292: "The monthly variation of the effective rainfall, based on the Potential Evapotranspiration (PET)", however, the Potential Evapotranspirationfirst appears in L.152.

11. Evapotranspiration (PET) now written l.152.

12. P.21, L.433-435: "Recharge under the glacier is 4 times higher than the one onthe plain, which is consistent with studies claiming a high recharge of the till and glacio-fluvial deposits aquifer by themelting of the glaciers (Sigurðsson, 1990; Xiang et al., 2016)." The references should be removed in the section of Conclusion.

12. References moved from the conclusion to the discussion section.