The manuscript "Invited perspectives: The ECMWF strategy 2021-2030 Challenges in the area of natural hazards" provides a very interesting concise overview of the ECMWF strategy in respect to natural hazards. The description of the envisaged step changes necessary to tackle the identified key challenges for the future are interesting for the international scientific community also beyond Europe. The challenges are quite generic and relevant not only for ECMWF but for many organisations dealing with forecasting weather and resulting natural hazards, as well as with climate reanalyses and projections. The described step changes can inspire scientific studies and advancements in various domains related to natural hazards.

We thank the reviewer for reading our manuscript and these comments

From my point of view, this manuscript is already valuable and well written, however, with a stronger harmonization of terms, an even more clear structure, particularly a closer link between the identified challenges and the envisaged solutions, this manuscript can become significantly more interesting for the scientific community. Thus, I suggest the following:

Abstract: I would find it more convincing if first the challenges are listed, and then afterwards the goals (which are set to tackle these challenges). When reading the goals, I would expect, that you/ECMWF see the additional challenges of designing user specific products and means of communication and decision support under high uncertainties (or similar).

We have changed the abstract and put the challenges first and added a sentence on products & decision making

I suggest to group the goals into the three pillars already in the abstract, this would prepare better for what is coming later. Additionally, I suggest to use harmonized terms, not all interchangeably "goals", "step changes", "vision".

Removed goals from text, but felt that step change and vision are two separate things

I suggest to provide a closer link between the challenges and the envisaged solutions. E.g. in the part 2 science and technology:

Line 43: "parts of the Earth system are inadequately observed (Beven et al 2020)." -> would be good to mention which ones, so that one has at least an idea without needing to read the paper by Beven.

Removed line in response to other reviewer

Line 43: "However, finite computing and requirements to produce timely forecasts will only allow a limited number of ensemble members to represent these uncertainties." -> are there other means of representing uncertainties, considering uncertainties besides ensembles? What it's the suggestion or idea how to tackle this challenge?

This is an excellent question, the short answer is that, we will need significant more research and careful research design to address the question. A chaotic, flow depended system will always have to rely on presenting uncertainties within some sort of Monte

Carlo type framework, future challenges do need to include not only research into ways how uncertainties are presented but also how large such ensembles have to be to adequately represent tails of the climate and forecast distribution. Other methods such as post-processing or AI will be able to represent such uncertainties to some degree and a careful balance between these methods has to be found. Thank you for the clarification – we fully agree that there is an importance in establishing the number of ensemble members or better represent uncertainties. This will be worked into the relevant paragraph of the document.

Line 47: "Initialising the snowpack on a global scale which is important for flood forecasts is an example of such a challenge." -> would be great if first ideas of how to tackle this challenge can be presented.

Done

Part 3 Impacts:

Line 63: "ECMWF will aim to provide detailed Earth system simulations of the past, present and future with a particular focus on extreme events for several weeks ahead" – This sentence is confusing. I guess that you have two separate tasks, one is rather long-term simulations of the earth system in the past and future, e.g. providing climate change projections for the future, also future scenarios of natural hazards, etc. The other one is early warning of natural hazards and for this the aim is to extent the lead time to more than two weeks. In case this is correct, it would be good to write this more clearly in the manuscript, and structure the impacts part accordingly.

Thank you – separated the sentence which should make it more clear

In this respect, I also guess, that you have different user groups for these two activities? It would be good if you could write a sentence about who your user groups are (and maybe for which products).

This is a good point, but nearly impossible. The separation is less on time scales and we have many customers and users who use both intermixed. So we don't really agree in classifying them as two activities. Example: reanalysis is used to establish return periods, which are used for detecting weather time anomalies for forecasting or risk based decision on climate projections or just on their own for a risk analysis. We actually believe that it is a mistake to make such a crisp distinction. However, we will extend the paragraph to make some more clear statements on the type of usage.

The idea of a user-oriented evaluation seems interesting, it would be interesting to know how this could be realized and how it would influence your work/products. Is it meant to be further developed towards co-design of products together with the users?

One has to be careful from separating user centric design and user centric evaluation, which overlap but are not the same. User centric evaluation is about trust and decision making based. It focuses on *the profile of accuracy and value through the forecasting, warning & communication chain with an emphasis on the information required by decision makers to build their trust in the information they receive*" (HiWeather Research Theme, User oriented Evaluation, http://hiweather.net/Lists/59.html) – added context and references

Lines 77-86 seem to belong more to the technology part, or it needs to be more focused on the visualization and communication aspect.

The paragraph will be spilt and rearranged to reflect the excellent reviewers comment

Line 85 "model chain" not "model change"

Changed – thank you

The part 4 on people is limited to the identification of the challenge. Any ideas for the way forward?

Paragraph will be extended highlighting a way forward, which range from training, communication and sense of belonging to one organisation. We will also highlight the important role the wider European Meteorological Infrastructure plays to foster and maintain talent.