

# ***Interactive comment on “Winter tourism and climate change in the Pyrenees and the French Alps: relevance of snowmaking as a technical adaptation” by Pierre Spandre et al.***

**Pierre Spandre et al.**

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## **1 General comments**

The authors present a very interesting and innovative study on the effects of climate change on winter tourism in the Pyrenees and French Alps. The presented manuscript goes one step beyond most other publications in this field, by including technical snow in a detailed way on a larger scale. The modeling approach behind the study is cutting edge, no further comments needed here. Several simplifications in the definition of parameters related to technical snow production, as used in this study, cannot be

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avoided in such a large-scale overview analysis.

*We thank the reviewer for constructive and useful feedback. Please find below some detailed replies on the specific comments:*

## 2 Specific comments

The only major critical comment I have is, that on the one hand economic analysis is excluded and adaptation options are restricted to snow-making and grooming, but on the other hand the authors interpret the results of the study in terms like skiing resorts being “at risk”. This kind of interpretation should be avoided, since the risk is in this case an economic risk, which cannot be analyzed by a pure scientific-technical study, which additionally lacks a comprehensive analysis of adaptation options. Tourist resorts have many options to adapt to new conditions, not only snow-making and grooming. A study like this (on snow reliability) can be very valuable for tourist resorts as background information for developing long-term strategies, but it cannot conclude about the risk the resort is at. Therefore, the authors should rephrase the interpretation of their results and be careful with the term “risk”. However, this is only a minor revision, since it affects only the phrasing of a few sentences in the manuscript (in the abstract, section 3.2 and conclusions).

*We agree that the term risk, in the climate change literature, and in IPCC assessments, encompasses the three dimensions of climate change hazard, vulnerability and exposure. Here we mainly focus on the climate change hazard (change in snow conditions), for which snowmaking is an adaptation measure affecting the hazard level. The study does not address the vulnerability component, nor the exposure (ski resorts remain at the same location). We have thus rephrased the text, where the term "risk"*

*appeared, for better clarity, and added a concluding paragraph which better reflects on all dimensions of the socio-ecological risks under climate change.*

As the other reviewer pointed out, the term “mitigation” should be strictly avoided in this context, since mitigation is commonly use to denote activities that aim to avoid or minimize climate change. Technical snowmaking can rather be called an adaptation to climate change.

*Similar to the response to Reviewer #1, we agree that the term "mitigation" needs to be replaced, in order to not create confusion with the use of the term in the climate change literature..*

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-253>, 2018.

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