We thank the editor and reviewers for providing feedback on this work. Our responses to these comments are provided below.

Reviewer's comments:

Could the authors briefly discuss whether their methodology could be applied to examine trends in the occurrence of cold spells?

Response: The intention is to examine trends in the occurrence of cold spells. Some examples are provided in the manuscript. We are currently compiling a detailed study of past and current trends, which will be reported in a further study. In addition, we are investigating dynamical and thermodynamical drivers using clustering techniques to extract meaningful signals.

Editor's comments:

1. Line 5 and Line 93, 401: this summary sentence of the advection method can be further clarified by explaining the meaning of "tropospheric mean wind". Particularly, does the "mean wind" indicate daily mean or vertical mean (as in the method only horizontal wind is considered)?

Response: This is now changed, see lines 5-6.

2. Caption in Figure 2: "column 1", "column 2" should be "left column", "right column", respectively.

Response: This has now been fixed.

3. Figure 3: from my computer screen, I can't tell which lines and texts are in green color.

Response: Figure 3, green lines and text are now blue, for better visibility.

4. Paragraphs in Line 408-415, 366, 93-94, 83-84 and so on: these paragraphs only include one or two sentences. It may be better to combine them with nearby paragraphs.

Response: We have followed the recommendation.

5. Line 421: I'm wondering whether the results on Rocky mountains as the main pathways of cold spell are reliable, given that your method only use the horizontal winds. Maybe some discussions are needed.

Response: These results are robust. For the advection method presented here, the vertical component of the wind is much smaller than the horizontal component (we have clarified this in line 71). In addition, CETAs over orography would generally still be captured since the algorithm is based on two-meter temperature.