

Overview

The manuscript presents a new tool to attribute local temperatures to climate change. The authors show results of their method for the region Fennoscandia and the heatwave in 2025. They further compare their results to existing results on the same heatwave by the World Weather Attribution scientific report.

Overall, the manuscript is very well structured and well written. I particularly liked the authors discussion of uncertainties. I recommend the authors review their text in case they were using AI and manually validate the references and remove unwanted residuals. I further think it would help the reader to understand what the presented tool brings to the table in comparison to other already existing tools.

The manuscript is well suited for GMD and I would recommend publication after major revisions, concerning the novelty and intercomparison to other tools, and minor revisions, concerning code availability and use of AI-tools.

Major comments

1. Novelty of the operational level

In their introduction the authors give an extensive summary on previous work on the topic. Here, I had an issue with the sentence “and is increasingly approaching operational level” (line 25). In my understanding their cited article from Gilford et al. (2022) already resulted in an operational web interface.

<https://csi.climatecentral.org/climate-shift-index?cityId=56088&firstDate=2025-07-12&lat=69.79414&lng=34.01367&mapType=temperature&zoom=4>

Clearly, high-level reports (referenced by the authors themselves) and in particular low-barrier webpage tools available to the public already exist to assess heat waves. In this context I find the claim of “enabling” in the abstract misleading: “The presented method enables real-time attribution of climate change on observed temperatures and can support operational meteorologists in climate change communication”.

2. Intercomparison to other approaches

I further think it would help the reader to understand what the presented tool brings to the table in comparison to other already existing tools. Please outline their tool’s edge more clearly

Minor comments

3. Code accessibility

The code is very well documented with some shortcomings in software repository structure. These should not affect the final decision on the manuscript, in my opinion. Please see “Comments on the code repository” below.

4. Use of AI-tools

I have the impression that AI tools were used during text preparation of the manuscript. I may be wrong, but residuals like unusual dashes (line 449) or seemingly empty references (see specific comment on line 25) may hint towards it.

Specific comments on the manuscript

Line 6: Add brief information on the region “Fennoscandia”. This might help readers to identify more quickly where this is located. E.g. “... Fennoscandia, encompassing Finland, Norway, Sweden and Russia, for two 14-day...”

Line 15-16: “Extreme weather events, which often have the largest societal and economic impacts, are also viewed by the general public as evidence of anthropogenic climate change.” I am not sure this is the case. I propose to soften and rephrase this claim. E.g. for Finland only if this claim is factual there.

Line 25: The reference in the list of references for “Nature Climate Change, 2025” is basically unfilled.

Figure 1: I propose to explain the data sets used here briefly in the figure caption. Are they from models or observations, etc.

Line 280: Remove (C3S) and (WMO) from citations to avoid double parentheses.

Line 416: The whole paragraph should be removed in my opinion. The article describes your experiments and should not cover future individual research directions. The discussion in the previous paragraph (lines 410-415) suffices to highlight this source of uncertainty.

Line 434: “were made” sounds strange. I propose something along the line of “Our results show that ... are 1.5 to 2.4° C warmer ...”

I would like to point out that although I have experience in temperature attribution methods, I lack a deeper background in attribution methods to climate change. Hence, my review did not focus on the authors methodology in detail.

Comments on the code repository:

I have three comments to the authors they will encounter again if they should continue to publish software.

1. The repo mixes references into the executable scripts. A separate treatment in the README.md or an individual file explicitly for references is advisable.
2. You state in the repository that the tool is limited to selected temperature observations. It would help for users to understand in which format data has to be provided for the tool to be made applicable to other temperature observation sources.
3. The authors should know that their Zenodo accounts can be linked to GitHub to create persistent identifiers better suited for references in published articles. This requires public software releases in their GitHub repository preferably following semantic versioning. Additionally, choosing a license and thinking about it carefully is recommendable here. Here is a list of links for some background information:

- <https://docs.github.com/en/repositories/archiving-a-github-repository/referencing-and-citing-content>
- <https://choosealicense.com/>
- <https://semver.org/>