

Response to Xiaomeng Huang

We thank the topic editor for reviewing the manuscript and greatly appreciate the comments. We believe that the review process has resulted in an improved manuscript. Below, we provide responses to all the comments.

1. *Introduction and Background: The introduction provides a good start, but it could more explicitly state the research gap that ESGF-VA aims to fill. The background section is comprehensive, yet consider reorganizing it to flow more smoothly into the discussion of ESGF-VA. For example, group related information about climate data challenges and existing solutions more coherently.*

We have reorganized the Introduction and Background sections to better highlight the research gap that ESGF-VA aims to address. The revised introduction emphasizes the current challenges faced by the ESGF infrastructure and outlines how we propose to address them. Additionally, the background section has been restructured to ensure a more natural flow within the overall text.

2. *Methodology and Implementation: The description of ESGF-VA's methodology and implementation is detailed, but some steps could be further broken down for clarity. For instance, in the search and aggregation processes, use sub-sections or bullet points to highlight key operations and how they contribute to the overall functionality.*

We have restructured the Implementation section to provide greater clarity regarding the ESGF-VA's implementation. Bullet points have been added to introduce the two main implementation components of ESGF-VA, preceding the subsections. These bullet points are intended to highlight the scope of both operations in generating the virtual aggregations within ESGF-VA.

3. *Results and Discussion: When presenting the results, it would be beneficial to have a more in-depth analysis of how they directly support the claims about ESGF-VA's advantages. In the discussion section, better connect the findings back to the broader context of climate data analysis and future research directions. Additionally, consider adding a subsection that summarizes the key takeaways from the study.*

We have reorganized the Conclusions section to better distinguish the research findings from the discussion of various topics related to ESGF. To enhance clarity, we have introduced two subsections: *Summary of Findings* and *Discussion*. The *Summary of Findings* describes how ESGF-VA integrates into the broader ecosystem and emphasizes its specific contributions. The *Discussion* subsection provides insights for the ESGF community on ways to further enhance the federation beyond file search and download, drawing on the experience gained during the development of ESGF-VA.