

# Unveiling the Reviewer Mindset: Evidence-Based Insights into Scholarly Peer Review

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## INTRO AND MOTIVATION



“Peer review is central to scientific quality control, yet **little empirical work** has examined the actual content of **reviewer feedback**. Existing understandings of reviewer priorities are largely anecdotal.”

## OBJECTIVES

- ✓ **Classify** – Systematically categorize reviewer comments into a comprehensive taxonomy of issues.
- ✓ **Measure** – Quantify the prevalence of each issue category to identify reviewer priorities.
- ✓ **Interpret** – Provide data-driven guidance for authors, editors, and educators on manuscript preparation and scientific communication training.

## METHODS

### Data Collection & Preparation:

- ✓ Compiled reviewer comments from a large, diverse EGU manuscripts (n=5,229)
- ✓ Anonymized, pre-processed for analysis.

### Issue Categorization:

- ✓ Multi-stage thematic classification
- ✓ Expert review and hierarchical clustering to refine into 32 primary categories.

### Statistical Analysis:

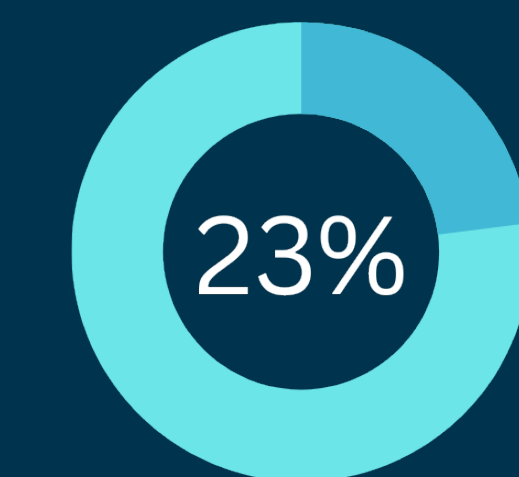
- ✓ Calculated counts and relative frequencies
- ✓ Identified major, second-tier, and lower-frequency issue groups.

## Fantastic Peer Reviews and

## Where to Find Them:

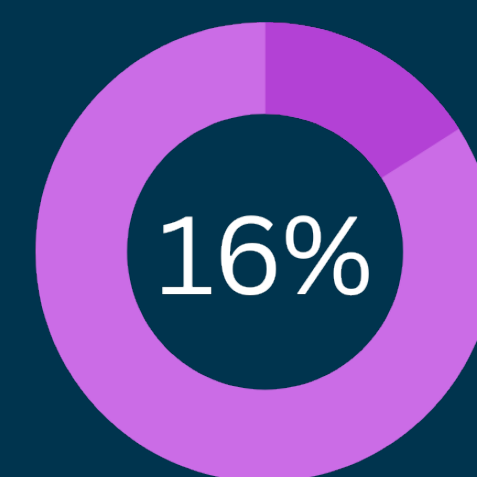
## Exploring the Future of Review with AI

Results – Major Issue, Second-Tier, and Lower-Frequency Categories (n=5,229 , Total Identified Issues=41,655)



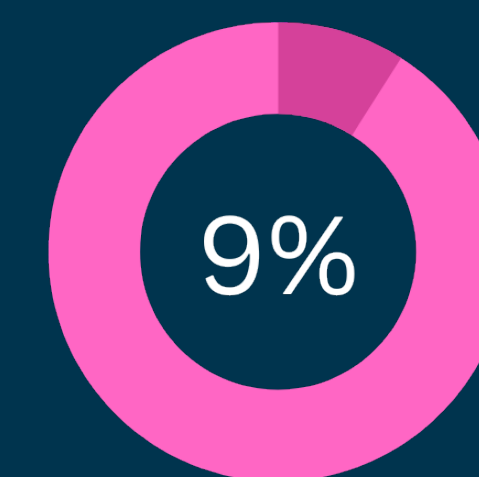
Methodology: 23%

Issues with study design, data collection, and reproducibility



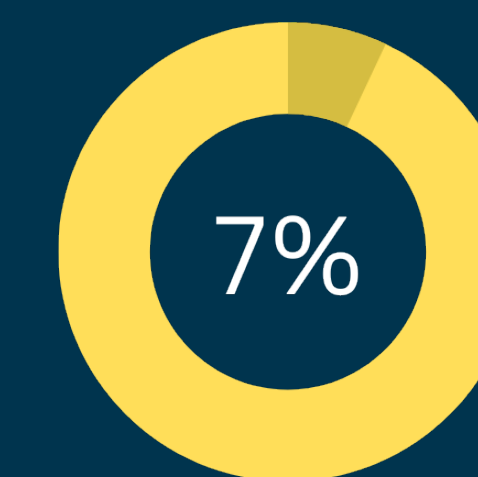
Figures & Tables: 16%

Issues with clarity, formatting, and integration of visuals



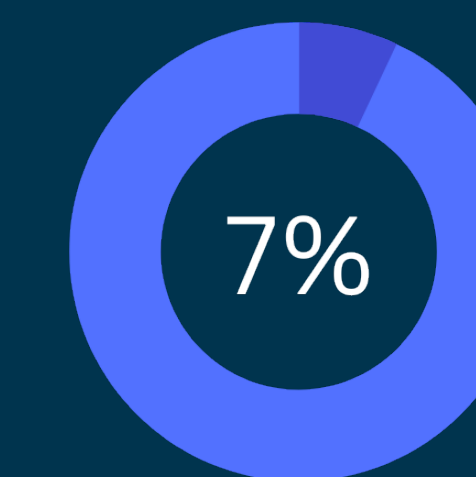
Discussion: 9%

Issues with interpreting results and broader implications



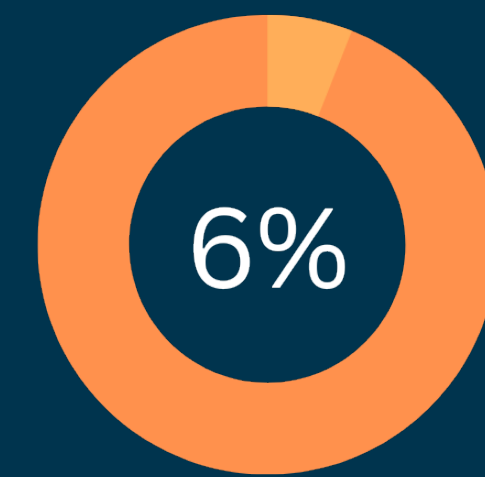
Grammar & Style: 7%

Issues with language clarity, tone, sentence structure, & readability



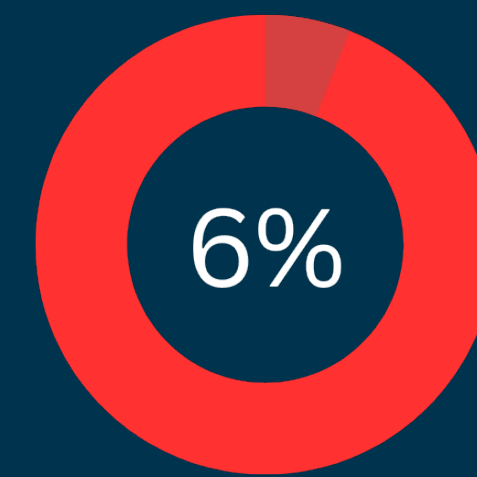
Data Analysis: 7%

Issues with interpretation of results and insufficient analytical clarity



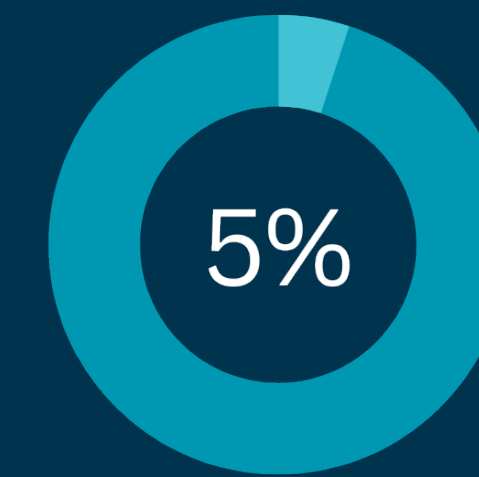
Limitations & Biases: 6%

Issues with unaddressed biases, missing limitation discussions



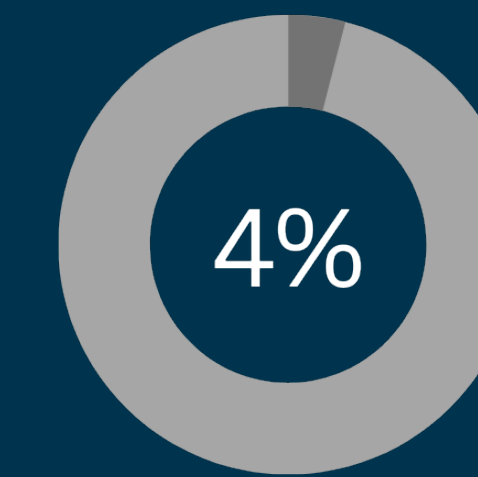
Results: 6%

Issues with unclear result presentation, incoherence, insufficient details



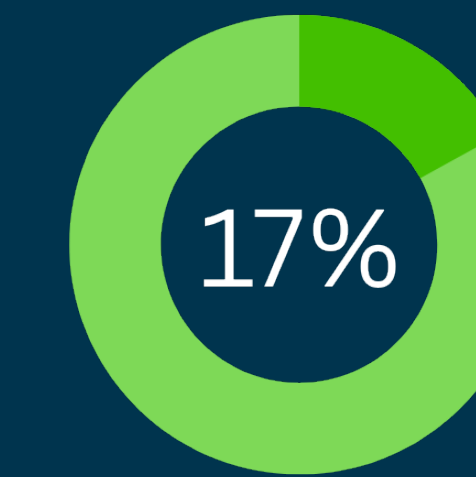
References & Citations: 5%

Missing citations, outdated references, or incorrect formatting



Structure & Org: 4%

Issues with disjointed flow, poor transitions, or missing section cohesion



Others: 17%

Minor issues with introduction, conclusion, citations, ethics, & more.



## DISCUSSIONS

- **Issue #1:** Detailed protocols and justifications dominate reviewer feedback.
- **Suggestion #1:** Integrated feedback platforms can flag gaps in methods sections early, guiding authors to provide transparency (data, modeling, reproducibility)
- **Issue #2:** Clarity, labeling, and narrative integration of figures/tables are frequent concerns.
- **Suggestion #2:** Automated visualization diagnostics can refine visuals for accuracy and consistency.
- **Issue #3:** Over 20% of comments target discussion, results interpretation, and limitations.
- **Suggestion #3:** Narrative analysis tools can flag weak contextualization.
- **Issue #4:** Substantive issues outweigh technical polish; grammar and wording receive less focus.
- **Suggestion #4:** Language checkers can streamline final edits.
- **Issue #5:** Low-frequency topics like ethics, data sharing, and acknowledgments still matter
- **Suggestion #5:** Embedded checklists can ensure nothing is missed.

## ACKNOWLEDGEMENTS

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