Review of: "Seismic intensity measure selection considering Record-to-Record and Angle-to-Angle uncertainties."

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Potential competing interests: No potential competing interests to declare.

The uploaded document appears to be a research paper titled "Seismic Intensity Measure Selection Considering Record-to-Record and Angle-to-Angle Uncertainties" by Reza Barati and Ghasem Boshrouei Shargh. The paper explores the selection of seismic intensity measures (IMs) for assessing structural performance under earthquake loading, with a particular focus on the uncertainties arising from Record-to-Record (R-to-R) and Angle-to-Angle (A-to-A) variability.

Key Points of the Document

Introduction and Background:

- The study addresses the need for probabilistic methods to understand the uncertainties in earthquake impacts on structures.
- The PEER framework is mentioned as a method to accommodate various sources of uncertainty.
- The focus is on the selection of appropriate seismic intensity measures to capture R-to-R and A-to-A variability.

Uncertainty Analysis:

- **Record-to-Record Variability**: Differences in structural response to different earthquake recordings.
- **Angle-to-Angle Variability**: Differences in structural response due to different recording angles of the same ground motion.

Methodology:

- The study involves numerical analyses of two steel frame structures (3-story and 9-story) under 100 ground motions at 10 different rotation angles.
- Various intensity measures are evaluated for their efficiency in reducing R-to-R and A-to-A variability.

Results and Findings:

- The study presents a detailed comparison of different intensity measures.
- The concept of Angular Efficiency is introduced to quantify A-to-A variability.
- Fragility functions are derived using Cloud Analysis for different limit states.
- The selection of IMs significantly impacts the variability in structural response.

Discussion:

- The study highlights the trade-off between R-to-R and A-to-A variability when selecting IMs.
- It suggests that an optimal IM should balance the reduction of both types of uncertainties.

Case Study:

- Two steel frame structures from the SAC project designed to UBC94 code are used as case studies.
- A set of 100 ground motions from the PEER and New Zealand databases is employed.
- The study evaluates 41 different ground motion intensity measures.

Conclusions:

- The research underscores the importance of considering both R-to-R and A-to-A variability in the selection of seismic intensity measures.
- The study identifies Ev as a versatile intensity measure for estimating Maximum Inter-Story Drift Ratio (MIDR) values.

Recommendations for Review

Clarity and Readability:

- Ensure that the introduction clearly states the research problem and objectives.
- Simplify technical jargon for broader accessibility, if possible.

Structure and Organization:

- Maintain a logical flow from background to methodology, results, and conclusions.
- Consider summarizing key findings in a separate section or table for quick reference.

Methodological Details:

- Ensure that the methodology section provides sufficient detail for reproducibility.
- Clarify the selection criteria for the 41 intensity measures.

Figures and Tables:

- Ensure that all figures and tables are clearly labeled and referenced in the text.
- Include descriptions and interpretations for all visual data representations.

References:

- Verify the accuracy and completeness of all references.
- Ensure that recent and relevant studies are cited to provide context and support for the findings.

If you need further detailed analysis or specific sections reviewed, please let me know!