



## *Global Fertility Responses to Climate-related Hazards Depend on Population Disruption, Lethality, and Hazard Type*

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This review verifies the reproducibility of the exhibits included in the paper “*Global Fertility Responses to Climate-related Hazards Depend on Population Disruption, Lethality, and Hazard Type*”.

### **Contents in this review:**

1. Main findings
2. List of exhibits and reproducibility status
3. Reproduction Environment

### *Main findings*

- **Every exhibit in the main section of the paper and 10 randomly selected exhibits in the appendix were reproduced accurately**
- The code was successfully executed on a new computer after:
  1. Opening the rproject.
  2. Recovering the environment using `renv::restore` and following the prompts.
  3. Running the master R script.
- The output demonstrates consistent stability across multiple runs. Specifically, executing the code two times consecutively yielded identical results.
- The code takes approximately 40 minutes to run.
- We conducted our reproducibility analysis based on the paper shared by the authors by email on February 5.
- **Verification Process and Data Handling:**
  - The reproducibility package relies on 2 types of data: open and accessible (public but not included in the reproducibility package).
  - Open data is included in the public reproducibility package.
  - Reviewers used accessible data provided directly by the authors to conduct the reproducibility verification, and this is not included in the public reproducibility package.

- *data\_hash\_report.csv* lists the SHA256 hashes of all files in the Data folder to support data integrity checks. Users who acquire the accessible data can use this file to verify that the data has not been altered.
- **Reproducibility Summary:**
  - **Data:** All data sources are publicly available, but not all are included in the reproducibility package.
  - **Code:** All code files (from cleaning to analysis) are included in the reproducibility package.
  - **Outputs:** All outputs are generated by code included in the reproducibility package.
  - **Dependencies environment:** The reviewers reproduced an existing environment for dependencies using dependency files or an environment metadata file provided by the authors.

### *List of exhibits and reproducibility status*

#### **Results in the Main Section of the Paper**

- **Figure 1** Reproduced. Verified.
- **Figure 2a** Reproduced. Verified.
- **Figure 2b** Reproduced. Verified.
- **Figure 2c** Reproduced. Verified.
- **Figure 2d** Reproduced. Verified.
- **Figure 2e** Reproduced. Verified.
- **Figure 2f** Reproduced. Verified.
- **Figure 3a** Reproduced. Verified.
- **Figure 3b** Reproduced. Verified.
- **Figure 4** Reproduced. Verified.
- **Figure 5a** Reproduced. Verified.
- **Figure 5b** Reproduced. Verified.
- **Figure 6a** Reproduced. Verified.
- **Figure 6b** Reproduced. Verified.

#### **Results in the Annex**

For the Appendix, we did not review every exhibit. Instead, we randomly selected 10 exhibits from the remaining datasets to assess the appendix. Our review was based on those 10 exhibits. Since they were chosen randomly, we are assuming that if all randomly selected exhibits are reproducible, then the rest should be as well. The seed used to generate the random selection was 5685625, the Stata version used was 19, and the exhibits selected were: Table A.1, Figure A.2.a, Figure A.8.f, Figure A.8.h, Figure A.8.l, Figure A.8.n, Figure A.8.r, Figure A.8.u, Figure A.9.d, Figure A.9.m

- **Table A.1** Reproduced. Verified.
- **Figure A.2.a** Reproduced. Verified.
- **Figure A.8.f** Reproduced. Verified.
- **Figure A.8.h** Reproduced. Verified.
- **Figure A.8.l** Reproduced. Verified.
- **Figure A.8.n** Reproduced. Verified.
- **Figure A.8.r** Reproduced. Verified.
- **Figure A.8.u** Reproduced. Verified.
- **Figure A.9.d** Reproduced. Verified.
- **Figure A.9.m** Reproduced. Verified.

### *Reproduction Environment*

Paper exhibits were reproduced on a computer with the following specifications:

- OS: MacOS Tahoe M4 pro
- Memory available: 497 GB
- Software version: R version 4.5.2