

MATILDA-Online v1.0.1: A Cloud-based Open-Source Workflow for Modeling Water Resources in Glacierized Catchments (EGUSPHERE-2025-3461)

Response to Reviewer Comments RC1

Opening remarks

Dear Dr. Hut,

Thank you for testing MATILDA-Online and for reporting the authentication failure so clearly. The submitted instructions had become outdated after changes to the Google Cloud and Earth Engine registration process during the months between submission and review. The problem affected new users who did not already have a Google Cloud project. MATILDA-Online did not yet have a regular user base that would have brought this specific failure to our attention earlier. We have since corrected these problems as outlined below.

Since this manuscript forms the first part of a two-part publication, the review processes of both submissions affect each other to a certain extent. Part 1 describes the MATILDA model and the integrated online workflow. Part 2 applies the workflow to a glacierized catchment and presents the detailed calibration, evaluation, climate-impact analysis, uncertainty assessment, practical applicability, and limitations. The review of Part 2 is currently further advanced, but it also depends on the review of Part 1. Comments and revisions arising from that process may affect the presentation of Part 1 and vice versa. The resulting additional revisions to Part 1 are summarized in the final section, "Additional revisions."

Because no broader textual review was provided beyond the authentication comment, our response focuses on the questionnaire and that specific reproducibility issue. We hope the outlined developments provide a reliable basis for a full review of the software and manuscript, which we would greatly welcome.

Reviewer comments and ratings are shown in blue boxes. Responses follow directly below.

Respectfully,

Phillip Schuster (for all authors)

Questionnaire selections

R1-01, R1-02, and R1-04 — Ratings of “Good”

Scientific significance Does the manuscript represent a substantial contribution to modelling science within the scope of this journal (substantial new concepts, ideas, or methods)? **Selected rating: Good**

Scientific quality Are the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)? Do the models, technical advances and/or experiments described have the potential to perform calculations leading to significant scientific results? **Selected rating: Good**

Presentation quality Are the scientific results and conclusions presented in a clear, concise, and well structured way (number and quality of figures/tables, appropriate use of English language)? **Selected rating: Good**

Response: Thank you for these assessments. Without textual detail, we do not conclude any additional change requests from these ratings.

R1-03 — Scientific reproducibility

Scientific reproducibility To what extent is the modelling science reproducible? Is the description sufficiently complete and precise to allow reproduction of the science by fellow scientists (traceability of results)? **Selected rating: Poor**

Response: We accept this assessment in relation to the access failure described in the opening remarks. Our detailed response and the two current access routes are given under R1-05.

R1-05 — Earth Engine authentication and independent testing

The main point of the paper is to make climate change impact analyses in glaciated catchments globally available. However, when trying to reproduce the work following the steps provided by the authors, I get stuck at the first step: authenticating with earth engine. The step by step guide does not reflect the interfaces that I encounter (on the google side) and the generated token does not work, throwing a python error.

I encourage the authors to review the login proces of their presented work, preferably with someone not working on the project at all, and provide an updated version, before a full review can take place.

Response: Thank you for identifying this failure. The submitted instructions reflected the Google Cloud and Earth Engine interfaces available when the manuscript was prepared. Subsequent policy and interface changes made registration more difficult for new users and caused the documented authentication procedure to fail. We first updated the original tutorial and then added a second route that removes the need for users to register their own Earth Engine project.

Two versioned workflows are currently available:

1. [MATILDA-Online v1.0.2](#) is the latest stable release. It allows experienced users to work through their own Google Cloud project and Earth Engine account. This route is useful for larger workloads and for users who prefer to work with their own service quotas.

2. [MATILDA-Online v2.0.0-beta.1](#) provides a more convenient route through a hosted web service. Users do not need to register or authenticate their own Earth Engine project. However, as a shared service, this route may be subject to rate limits when several users are active.

Note: *Until final security layers are in place for public use, the web service requires an API key. We previously sent it to the handling editor for private distribution to the reviewers. Because this response will be public, we do not reproduce the key here, but we will gladly provide it again if necessary.*

Following your recommendation, an independent user tested the complete workflow both locally and through MyBinder. This test informed further corrections and simplification of the tutorial.

MyBinder remains less reliable than local execution because longer sessions can be interrupted by server disconnections and limited shared capacity. Both versions now include a Binder-specific guide that explains how to work through one notebook at a time, save intermediate output, restart an interrupted session, and restore previous results. The independent test completed the full Binder workflow using these recovery options. Local execution remains more suitable for long or computationally demanding runs, and we are continuing to investigate alternative hosting options.

Proposed changes: We will update the Technical Implementation and Code availability sections with the current releases and both access routes. We will explain the different use cases and possible rate limitations. We will also describe MyBinder's practical limitations.

Additional revisions

The software and its scientific application have continued to develop during the long review period. The review of the companion application paper (Part 2) is currently further advanced, and its first revision round provided useful lessons for presenting the two parts as distinct and self-contained contributions. The preprint and its discussion can be accessed here:

Schuster et al. (2025): *Climate Impacts on Water Resources in a High Mountain Catchment: Application of the Open-Source Modeling Workflow MATILDA in the Northern Tian Shan*, EGUsphere [preprint], <https://doi.org/10.5194/egusphere-2025-3462>, 2025.

Following the reviewer comments on the companion paper and the technical developments of the past year, we propose the following updates to keep Part 1 current:

1. We will clarify that the scientific contribution of Part 1 lies primarily in integrating established model components, public datasets, automated preprocessing, calibration support, climate projections, analysis, visualization, documentation, and online execution into one reproducible workflow. We will make the manuscript more self-contained while describing Part 2 as the detailed application and uncertainty study. We will also distinguish technical accessibility, educational value, and scientific application from demonstrated operational adoption.
2. The manuscript will also be updated to describe the software developments since submission at an appropriate level. This includes the current MATILDA core and MATILDA-Online releases, corrections made during continued testing, simplified tutorials, and the revised Earth Engine access. Detailed implementation information will remain in the versioned code and documentation, while the manuscript will provide the information needed to understand and reproduce the workflow.