

EGU25-9242, updated on 10 Sep 2025

<https://doi.org/10.5194/egusphere-egu25-9242>

EGU General Assembly 2025

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## Closing Biodiversity Monitoring Gaps: A Workflow for Validation and Quality Assessment of Citizen Science Location Data for Amphibian and Reptile Monitoring in Private Gardens

**Anna Iglseder**<sup>1</sup>, Christoph Leeb<sup>2,3</sup>, Florian Danzinger<sup>4</sup>, Claudia Meixner<sup>5</sup>, Dominik Linhard<sup>5</sup>, Christian Lettner<sup>6</sup>, and Markus Hollaus<sup>1</sup>

<sup>1</sup>TU Wien, Department of Geodesy and Geoinformation, Vienna, Austria

<sup>2</sup>Austrian Society of Herpetology, Vienna, Austria

<sup>3</sup>Natural History Museum, Vienna, Austria

<sup>4</sup>University of Vienna, Department of Botany and Biodiversity Research, Vienna, Austria

<sup>5</sup>Global 2000, Vienna, Austria

<sup>6</sup>Biodiversity-Hub Austria, c/o University for Continuing Education Krems, Department for Knowledge and Communication Management, Krems an der Donau, Austria

Worldwide, amphibians and reptiles are among the most threatened animal classes. In Austria, more than half of the 21 amphibian and 15 reptile species are classified as endangered, critically endangered, or at risk of extinction, primarily due to habitat loss and destruction. Close to nature designed and managed gardens can serve as valuable refuges, yet they remain largely unexplored in systematic monitoring.

The “BIOM-Garten” project leverages citizen science to collect monitoring data from private properties in Austria, which are otherwise inaccessible to conservation scientists, helping to close critical gaps in amphibian and reptile monitoring. Citizen scientists use a browser-based reporting platform to submit data on species occurrence, including location, address, photos, details of sightings, and detailed descriptions of their gardens. However, inaccuracies or ambiguities in user-reported locations can hinder the scientific usability of the data.

To address these issues, we developed a workflow that integrates reported data with OpenStreetMap as well as cadastral and municipal datasets to optimize geolocation and assess data quality. By combining address information, pinned map locations, and image data of reported species recorded by cameras and mobile phones, we optimize the point location of each entry and assign uncertainty levels and a quality class to ensure scientific accuracy for subsequent environmental modeling.

In the first project year, following the platform's launch in June 2024, we received more than 700 reports. These submissions were successfully processed, geocoded, and classified, showcasing the platform's effectiveness in engaging citizen scientists and generating high-quality research data. Of the valid reported species sightings, 63% could be located at the parcel level, 29% at the municipality level, and 8% of the data had to be discarded due to insufficient localization.