

Two PhD positions in **geomorphology/glaciology and remote sensing** within the project: “Global assessment of glacier-landslide interactions and associated geo-hazards” funded by the Polish National Science Centre.

Project context and motivations: Disappearing ice masses are iconic images often used to illustrate global climate warming. Glacier fluctuations are commonly applied as indicators of climate changes; however, ice masses respond not only to changes in climate but also to other events in the local environment (e.g., mass movements, tectonic activity) (Fig. 1). In this project, we focus on glacier-landslide interactions and associated hazards by studying their distribution at a global spatial scale. We will investigate how landslides impact glacier dynamics by delivering large quantities of debris onto their surface, which can be one of the potential causes of glacier instability. The main research problem we are trying to solve is the role of landslide-induced changes in glacier extent compared to pure climatically-driven glacial changes.

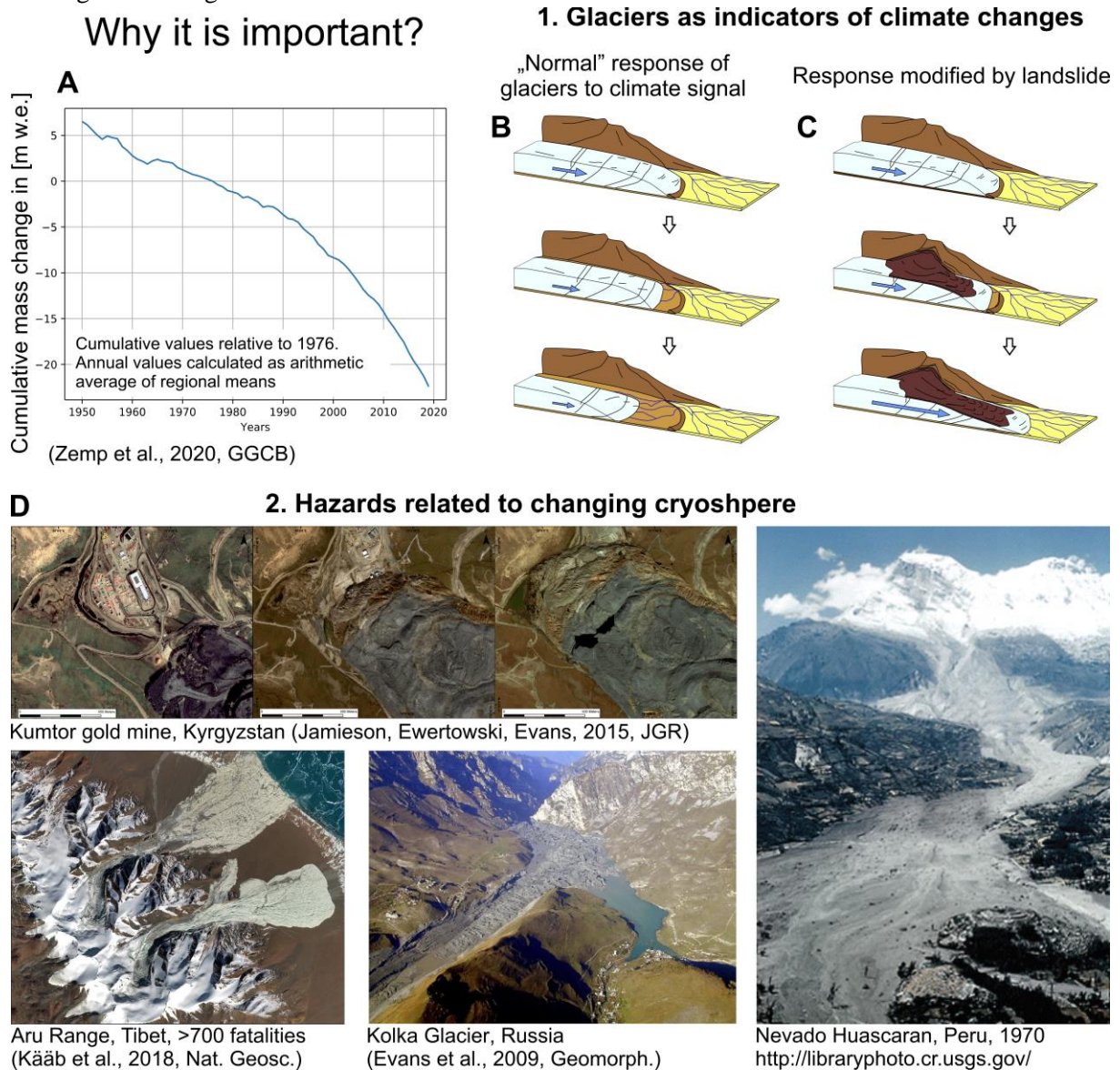


Fig. 1. (A) Worldwide glacier retreat is observed for most glaciers (Zemp et al., 2020); (B) Retreat of glacier margins and decrease in ice volume is regarded as a "normal" response of glaciers to climate warming; (C) however, in case of some glaciers, their response to climate changes is modified by other factors, e.g., large landslides; (D) Examples of hazards related to interactions between mass movements and glaciers.

Your responsibilities - There are two PhD positions planned in the project:

(A) PhD-1 – PhD Student 1 will be responsible for researching glacier dynamics based on remote sensing data. The tentative scope of the PhD thesis is "Quantification of landslide-induced changes in glacier dynamics based on time-series of high-resolution satellite imagery". The project will be supervised by Marek Ewertowski (Adam Mickiewicz University, <https://publons.com/researcher/1323555/marek-ewertowski/>) and carried out in collaboration with internal co-supervisor Dr Jakub Małcki (Adam Mickiewicz University, <https://glacjoblogia.wordpress.com/autor/>) and external supervisors Professor David Evans (Durham University, UK <https://www.durham.ac.uk/staff/d-j-a-evans/>) and Professor Jamie Shulmeister (University of Canterbury, New Zealand <https://www.canterbury.ac.nz/science/contact-us/people/jamie-shulmeister.html>). Tasks of PhD student 1 will include:

- Selection of benchmark glaciers
- Acquisition of high-resolution satellite data
- Development of time-series of digital elevation models and orthoimages to quantify landslide-induced changes in glacier dynamics
- Quantification of pre- and post-landslide volume changes (mass balance)
- Calculation of pre- and post-landslide velocities in different parts of glacial systems using feature tracking algorithms

(B) PhD-2 – PhD Student 2 will be responsible for the modelling approach to study glacier-landslide interaction. The tentative scope of the PhD thesis is "Modelling of landslide impacts on glacier dynamics based on high-resolution satellite imagery, UAV-generated data and field-based observations". The project will be supervised by Marek Ewertowski (Adam Mickiewicz University, <https://publons.com/researcher/1323555/marek-ewertowski/>) and carried out in collaboration with internal co-supervisor Dr Jakub Małcki (Adam Mickiewicz University, <https://glacjoblogia.wordpress.com/autor/>) and external supervisor Professor Stewart Jamieson (Durham University, UK <https://www.durham.ac.uk/staff/stewart-jamieson/>). Tasks of PhD student 2 will include:

- Theoretical identification of different processes related to landslide-derived debris loading (e.g., increase in driving stress, increase in the amount of meltwater, ablation reduction)
- Numerical modelling of landslide impacts on glacier dynamics
- Verification of modelling results using field-based observations and remote sensing data
- Comparison of glacier dynamics between landslide-affected and "normal" glacial landsystems

Your profile: We invite applications from candidates interested in remote sensing, GIS, geomorphology and glaciology. Applicants must hold a Master's degree at the time of document submission. Demonstrated experience in working with remote sensing data and GIS is preferred. If you have additional knowledge of glacial geomorphology and glaciology, or previous field experience, that is a further advantage. The successful applicants must be able to work independently and in a structured manner and demonstrate good collaborative skills.

What we offer:

We offer a 4-year PhD full-time position (with internal evaluation after the second year) starting on 1st October 2023 at the earliest. The scholarship funded from the project is 5000 PLN gross per month (about 3700 PLN net per month) for 48 months. PhD candidates are enrolled at Adam Mickiewicz University (AMU) Doctoral School of Natural Sciences (<https://phdstudies.amu.edu.pl/snp/?lang=en>), which provides education, contact with other PhD students and opportunities to gain additional skills (courses are taught in English).

The successful applicant will join the Faculty of Geographical and Geological Sciences at Adam Mickiewicz University in Poznań, Poland (wngig.amu.edu.pl). Our Faculty is located just next to the AMU Sports Centre (swimming pool, sports halls, gym), and neighbouring parks and communal forests offer perfect opportunities for walking/running – so there is plenty of options for recreation during breaks or after work. Full research training in appropriate techniques (remote sensing, GIS, numerical modelling, field surveys) will be provided depending on the student's interests and needs. We will assist you in preparing grant applications and establishing cooperation with renowned research centres in Poland and abroad. You will also have the opportunity to participate in international conferences, courses and workshops to further improve skills related to the project and develop your future scientific career.

Application:

Application is through the recruitment system:

<https://usosirk.amu.edu.pl/en-gb/offer/SD-2023/programme/SD-NZS-G3/>

Application deadline: 14 July 2023

Additional information:

For more information, please get in touch with Marek Ewertowski (evert@amu.edu.pl)



Fig. 2. Drone image of landslide on Svínafellsjökull, Iceland.