Outcomes and recommendations from the Central Asian Field Workshop on earthquake geological methods and infrastructure safety

Saty, Kazakhstan, 10-20th November 2025

1) All participants recognised that active fault identification and paleoseismology are very important for hazard assessment. There are specific plans developed during the workshop that will enable integration of this type of work at institutional/national scale:

Plans by national agencies to excavate trenches near Tashkent and Dushanbe

Desire to do more of this work in Turkmenistan

Exploration of potential to apply the methods associated with specific infrastructure projects (e.g. proposed nuclear waste & nuclear power, dams, mining sites, urban centres)

2) We emphasise the need for programmes of detailed fault mapping across the region using the methods in the workshop, to update older national datasets produced prior to development of modern survey methods. By constructing these datasets now it will inform and increase resilience of future construction and infrastructure

3) Landslides are a large threat to infrastructure across central Asia, and becoming more frequent due to climatic changes. Urgency in forming effective monitoring techniques was articulated by representatives from Kyrgyzstan, Uzbekistan, Kazakhstan and Tajikistan. Combined risks to loss of life and economic activities were identified from landslides in proximity to critical infrastructure (e.g. hydropower), transnational road networks (potential to sever major international trade routes, e.g. at Naryn Kyrgyzstan), or to economic activities related to tourism (e.g. Kolsai national park, Kazakhstan).

4) Access to satellite imagery, DEMs, and UAV-based topographic surveying are all very important for undertaking earthquake geology and landslide research, and efforts should be placed in ensuring open and/or low-cost access to such data.

5) It is important to combine geophysics/seismology remote-sensing, and geological methods to achieve best results. We therefore look for ways to build interdisciplinary into projects, internationally and also nationally.

e.g. effective landslide monitoring includes cost-effective remote sensing to identify and monitor movements over wide regions combined with more expensive and time-consuming ground-based geophysical and geological observations at selected key sites.

Geophysical profiling across active faults aids the site selection for potential paleoseismic trench sites.

Geophysical methods offer important contributions to monitoring glacial change, including seismic analysis of ice quakes and remote sensing monitoring of glacial movements

6) Strong support was given to further engagement, training, and networking activities

A need for training in remote sensing survey methods was expressed (potentially held in collaboration with the Kyrgyz State Technical University)

There was support for doing more of these 'field-based' meetings, as well as undertaking further research programmes

We should look for opportunities for members of the network to attend regional conferences and discussions (such as in Tashkent and Mongolia in 2026), if financial support can be obtained.

Opportunities for students are of key importance in widening the proposed programmes, with encouragement given for regional students to apply to Oxford (2 year masters by research and 4 year PhD), and research put into finding possible scholarship funding (e.g. national scholarship competitions in Uzbekistan, Kazakhstan, Kyrgyzstan; Chevening scholarship; philanthrophy)

We will aim to build international teams during research trips, such as that planned in Kyrgyzstan in 2026, to include representatives from institutes elsewhere in central Asia.

Immediate outcomes

Two outcomes have been defined in the region local to the workshop venue: 1) Development of monitoring programme of the Kolsai landslides (joint Kazakhs/Kyrgyz collaboration), 2) Plan to erect an information board and geotrail along the 1889 ruptures (as part of the wider tourist infrastructure.

Plan to publish the workshop report (and scientific data from it) as a short paper in a subject-specific journal

Oxford collaboration with national institutes in Kazakhstan, Kyrgyzstan, Uzbekistan to introduce remote-sending-based landslide monitoring in important test cases (defined through consultation)

A project titled "Active Tectonics, Past Earthquakes and Seismic Hazards Along the Silk Road Region in Central Asia," including workshop participants from Poland, Great Britain, Uzbekistan, Kazakhstan, and Kyrgyzstan, has been submitted to the National Science Centre (Poland).

Programme

- 10th drive Almaty –Saty, geological history of the Tien Shan
- 11th Trench excavation, introduction and paleoseismology lectures, evening icebreaker
- 12th Trench first look, excursion to Kaindy lake (bedrock avalanche from 1889 earthquake)
- 13th Small group field training (trench, drone survey, fault walks). Evening data analysis (digital trench walls)
- 14th Same as previous day, with groups rotating through the activities, evening sampling strategy development
- 15th sampling training in field, afternoon lectures geomorphology and dating methods
- 16th Mini conference, afternoon fault walk, evening digital mapping exercise

- 17th Excursion to fault on north side of river, afternoon lectures digital mapping, evening banquet
- 18th Excursion to Kolsai lake and landslide, final lectures on post-event Turkiye earthquake mapping, archeoseismology
- 19th Return to Almaty

Attendee list (by nation, institute). Total 38 participants (27 Central Asia, 6 UK, 5 other)

Kazakhstan

- National Nuclear Center of the Republic of Kazakhstan (4 people)
- National Museum of the Republic of Kazakhstan (1 person)
- Kazakh National Research Technical University named after K. Satbayev (1 person)

Kyrgyzstan

- Kyrgyz State Technical University (4 people)
- Central Asia Institute of Applied Geosciences (CAIAG) (3 people)
- Institute of Seismology of the National Academy of Science of the Kyrgyz Republic (2 people)

Tajikistan

- Institute of Geology, Earthquake Engineering and Seismology of NAST (4 people)

Turkmenistan

- Institute of Seismology and Atmospheric Physics of the Academy of Sciences of Turkmenistan (4 people)

Uzbekistan

- Institute of Seismology of the Republic of Uzbekistan G.O. Mavlonov (4 people)

UK

- Oxford University Dept of Earth Sciences (6 people)

We also had attendees from Armenia (Institute of Geological Sciences of the National Academy of Sciences of the Republic of Armenia, 1 person), Georgia (Institute of Earth Sciences and The National Seismic Monitoring Center, Ilia State University, 1 person), Italy (National Institute of Geophysics and Volcanology, 2 people), USA (Arizona State University, 1 person).

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