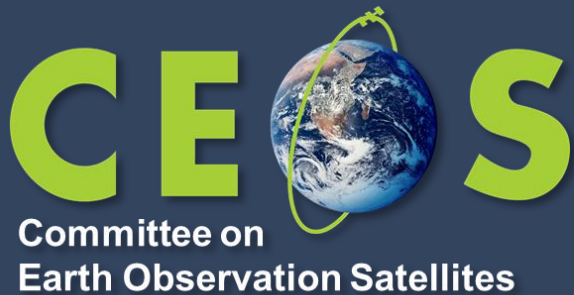


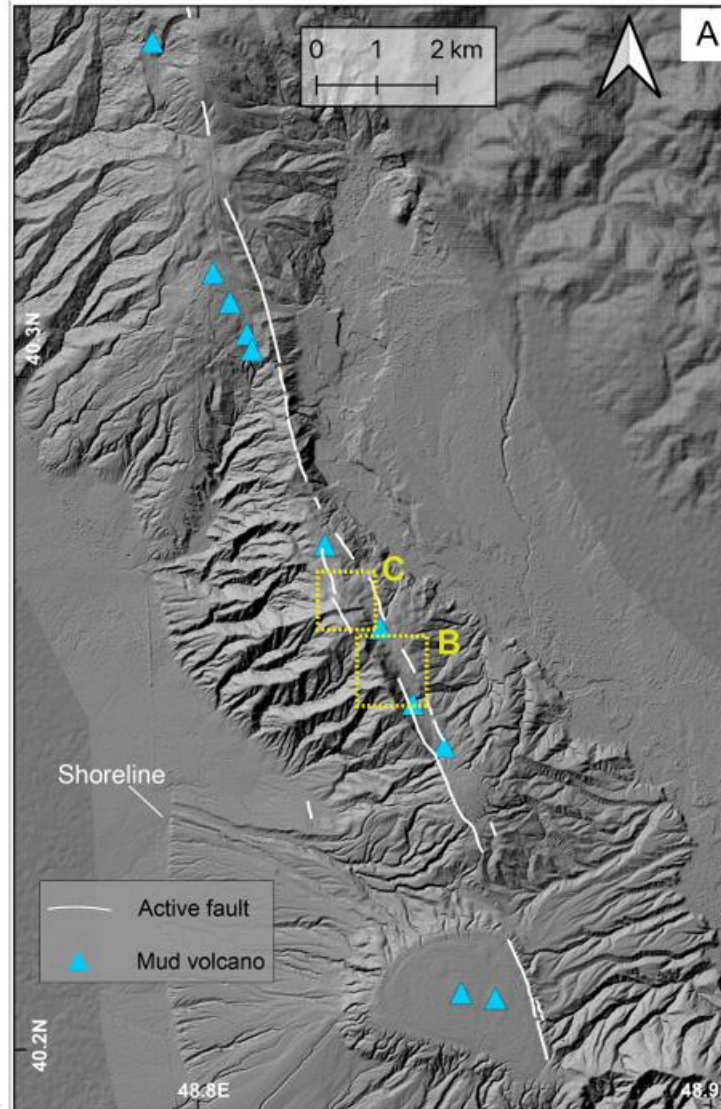
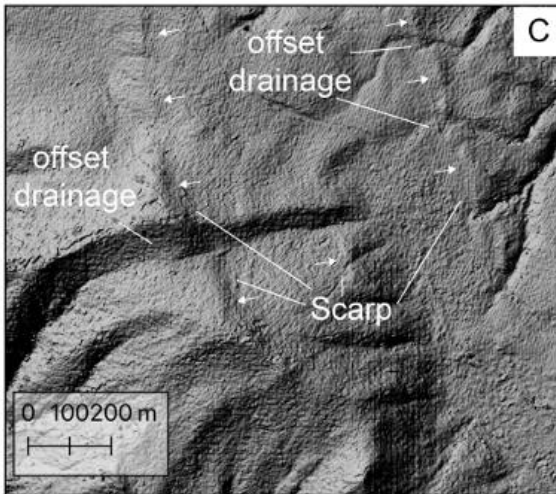
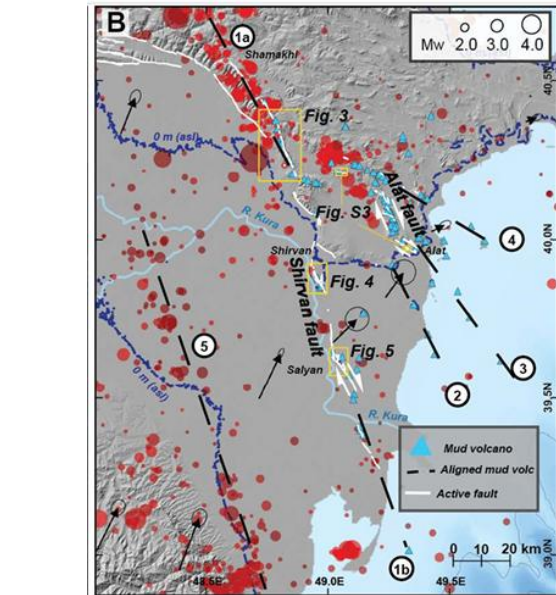
Working Group on Disasters 26 (WGD-26)

*The use of high-resolution satellite-
derived elevation data
in earthquake hazard
detection and mitigation*



Richard Walker, Oxford University
International Workshop 16th Sept
WGDisasters 2026
ASI, Rome, Italy
14-18 September 2026

Mapping active faults



Active fault maps and detailed site-specific active fault investigation underpin environmental impact assessment, construction policy, and risk mitigation for a range of sectors (urban planning, national and transnational transport networks, critical infrastructure such as energy pipelines, hydro- and nuclear power facilities)

High-resolution topography has revolutionised the ability to identify and characterise active faults in many regions

Satellite-derived topographic models have an important role in widened access to such data types, and hence aiding hazard identification/risk reduction, particularly in the global south

Applications in:

Probabilistic hazard assessment

Deterministic (scenario-based) hazard assessment

Fault displacement hazard assessment

Marshall et al., 2026

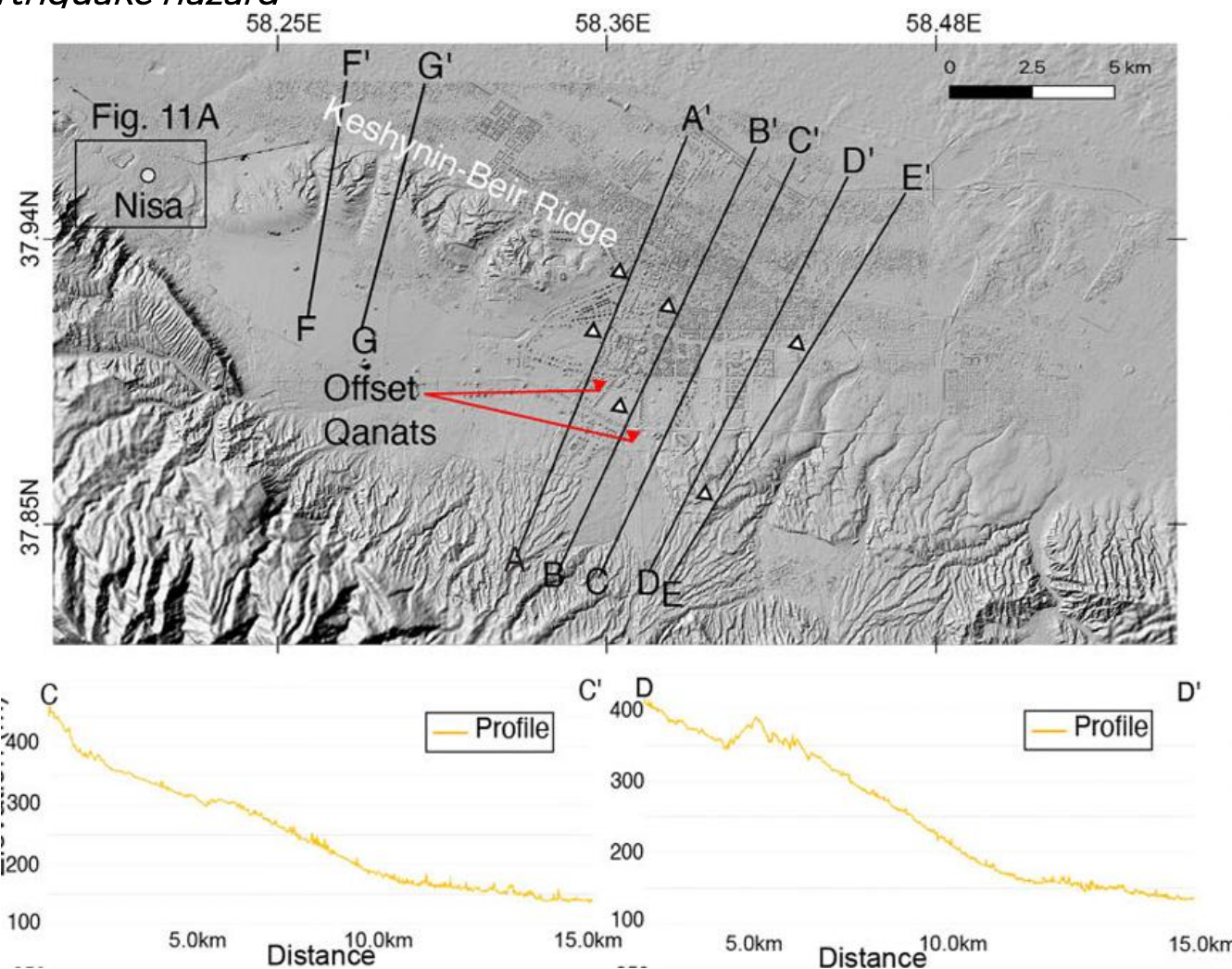
Reconstructing past disasters



Marshall et al., 2024



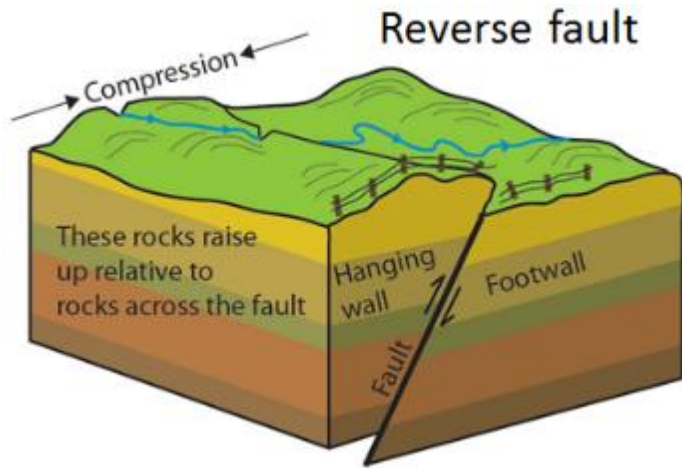
- 6 October 1948 at 01:12AM
- M7.3 and intensity X (Extreme)
- Up to 120,000 people killed (almost 10% of Turkmenistan's population at the time)
- Nearly all brick built buildings collapsed
- Little reporting of the impact of the earthquake limits understanding of what actually happened.
- Understanding the location and style of the earthquake is important at local and regional scales.



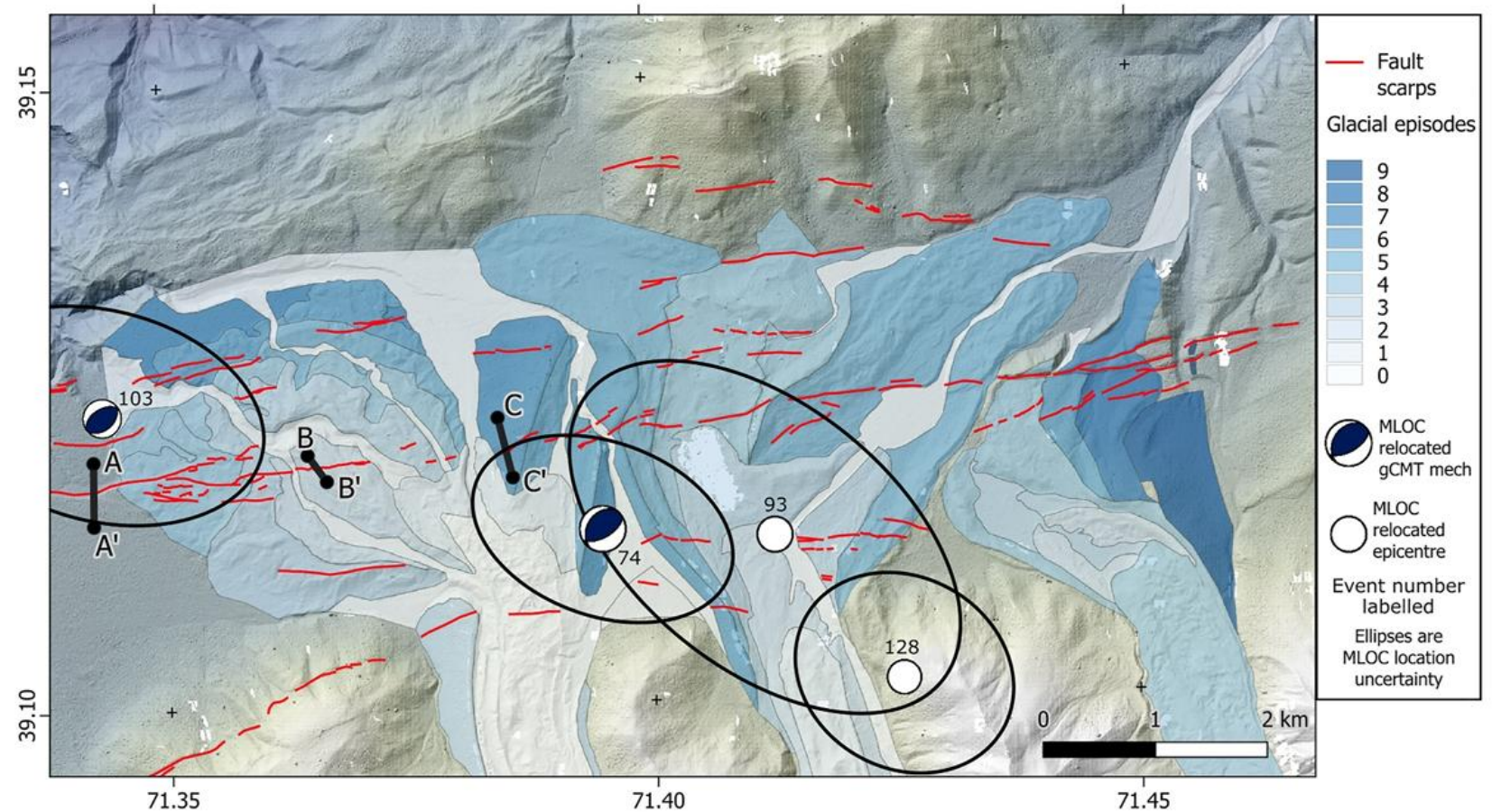
Exploring the deeper past



- ❖ Landscapes contain evidence for fault movements over longer periods than represented in history

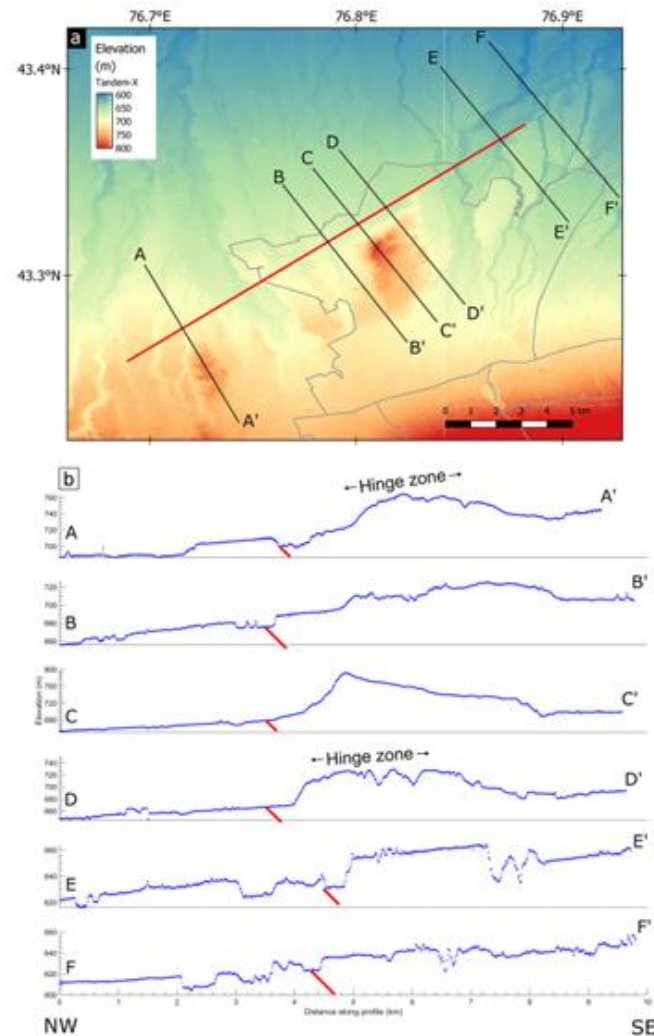


- Fault locations can be mapped
- Estimates of depth, length, dip, amount of slip help to estimate shaking from scenario earthquakes

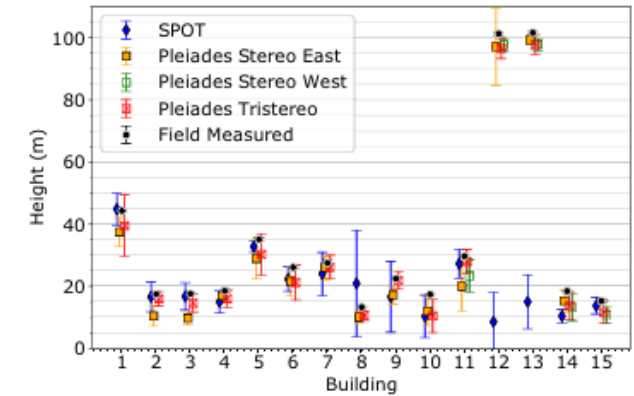
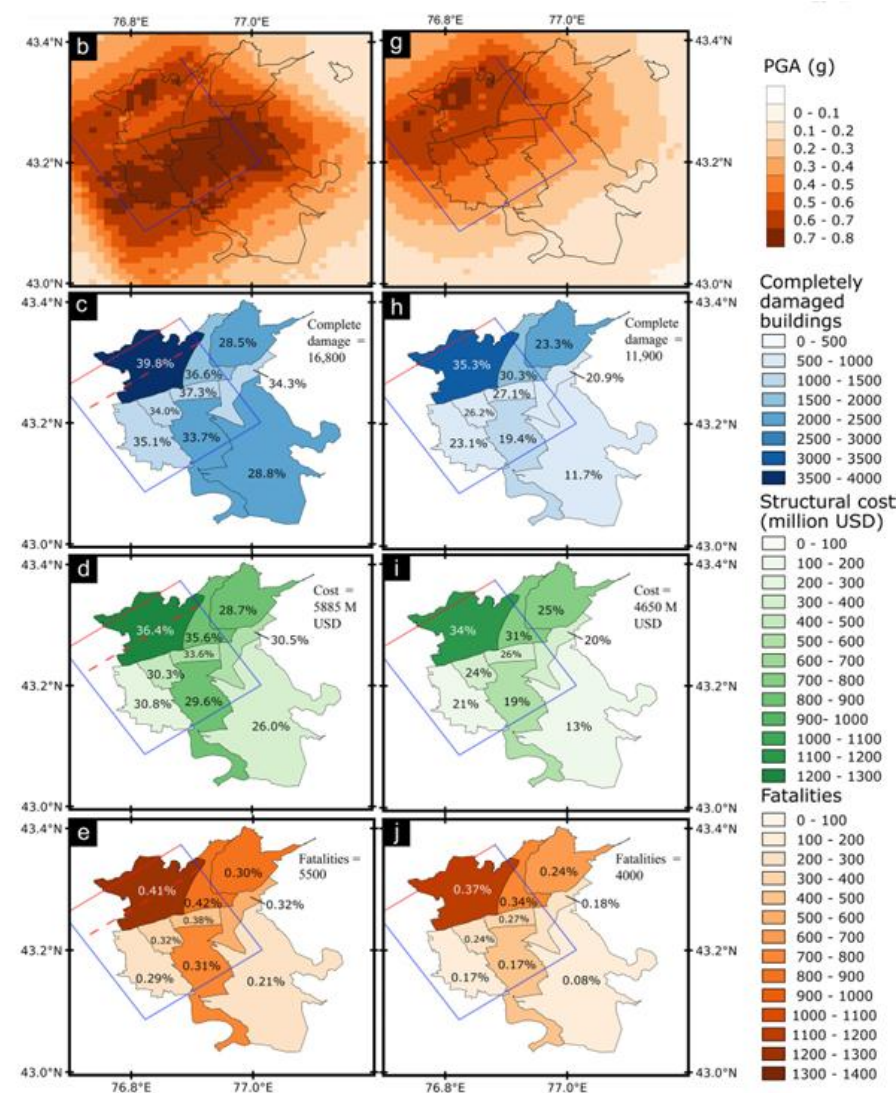


Johnson et al., 2025

Urban hazard



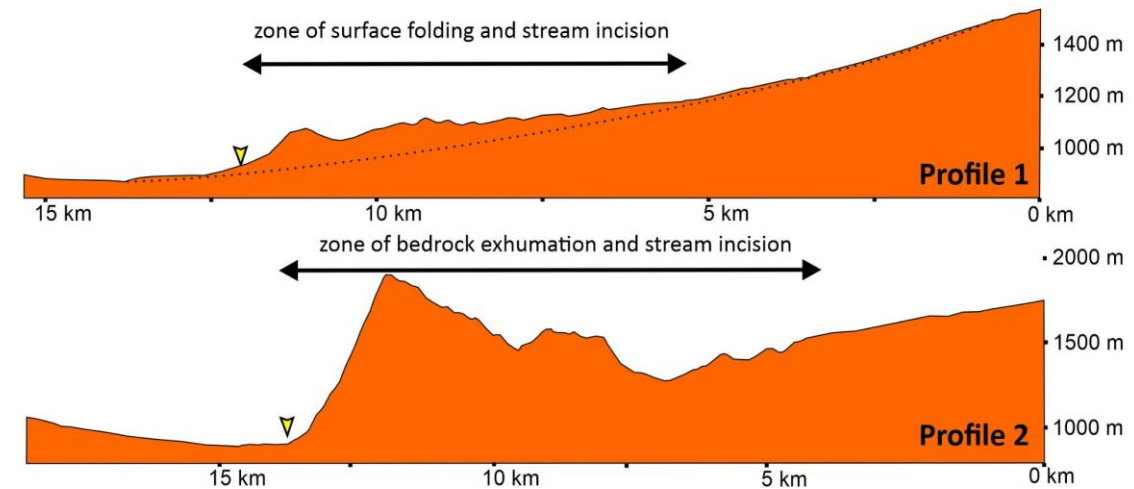
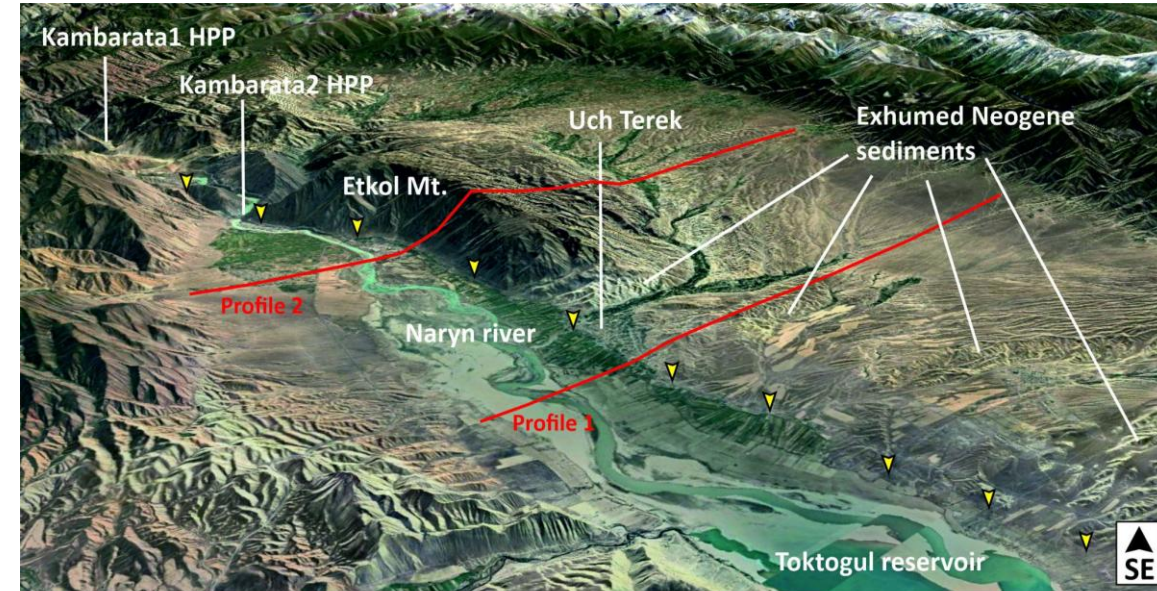
Amey et al., 2021



Application to hydropower



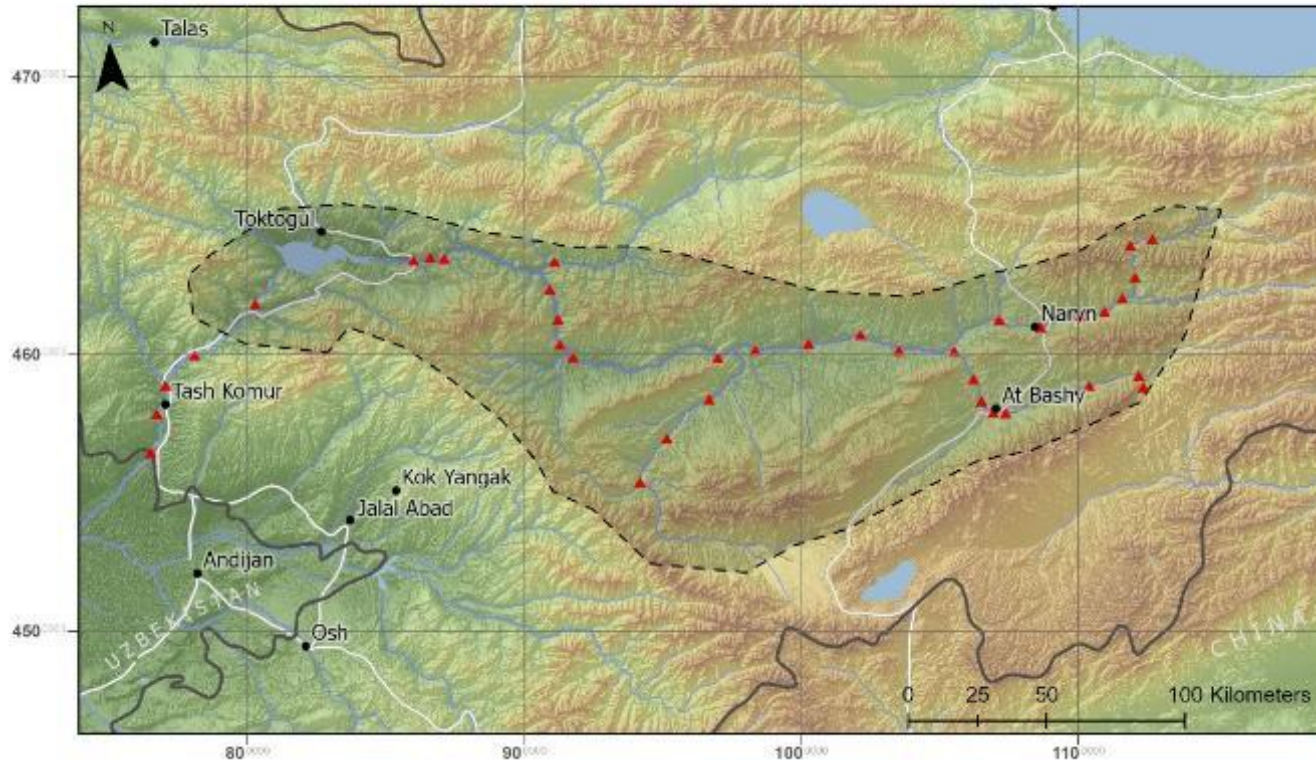
Marshall et al., in review



Application to hydropower



NARYN RIVER BASIN



- Uses very-high-resolution elevation products derived from satellite images
- Cost-effective means of producing detailed maps at regional scale
- Used as the basis to produce active fault, landslide, glacial lake flood assessments

Case studies enabled us to leverage support from UK government

Direct pipeline to impact / incorporation of results in siting and design

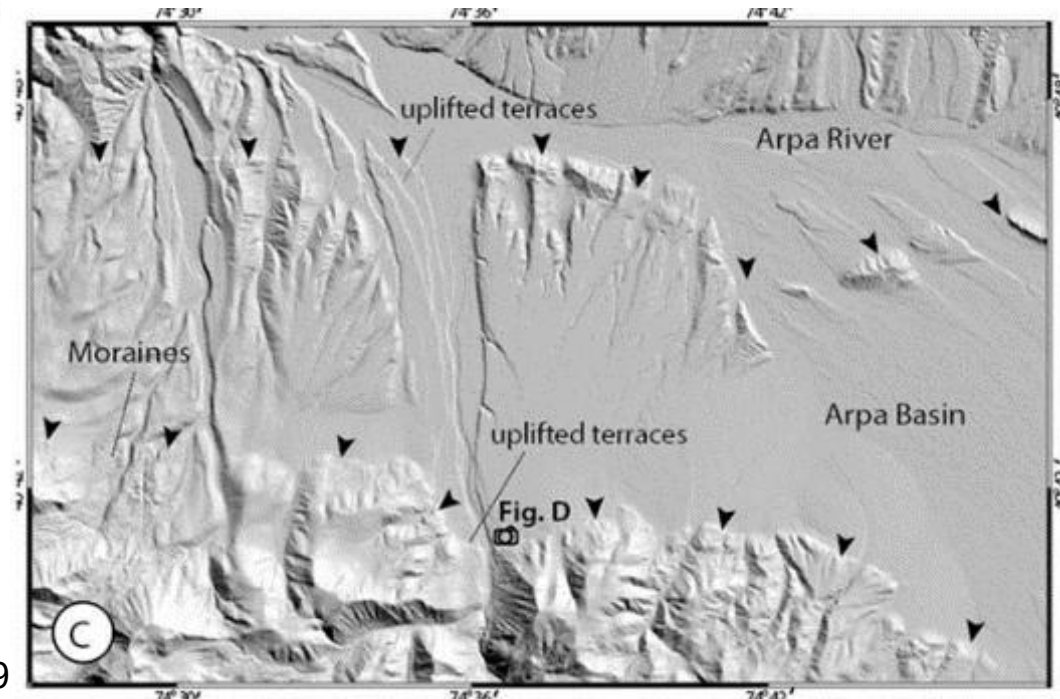


Foreign, Commonwealth
& Development Office



UK International
Development

Partnership | Progress | Prosperity



Rizza et al., 2019

General conclusions

Useful to produce these underpinning datasets regionally, and at the earliest opportunity
Valuable for energy infrastructure, transport and trade, urban resilience

Combined with capacity strengthening and training activities with appropriate national institutes
We are now defining several collaborative projects on defining urban hazard in central Asia
We are providing support for partners to define CEOS data requests

Important to define pathways from research through to end-user implementation