



## **Extremely Large Rockslides and Rock Avalanches in the Tien Shan, Kyrgyzstan**

A. Strom (1), **O. Korup** (2), H.-B. Havenith (3) and K. Abdrakhmatov (4)

(1) Institute of Geospheres Dynamics, Moscow, Russia, (2) Swiss Federal Research Institutes WSL/SLF, Flüelastr. 11, CH-7260 Davos, Switzerland, (3) Swiss Seismological Service, Institute of Geophysics, ETH Zurich, CH-8005 Zurich, Switzerland, (4) National Academy of Sciences of the Kyrgyz Republic, Kyrgyz Institute for Seismology, 720020 Bishkek, Kyrgyzstan (korup@slf.ch)

Most systematic research on large rock-slope failures is geographically biased towards reports from Europe, the Americas, the Himalayas, and China. Although there are several reports on large rockslides and rock avalanches in the territory of the former Soviet Union, they are not readily available, and few translations have been made. To begin closing this gap, we describe here preliminary data from field reconnaissance, remote sensing and geomorphometric analysis of nine extremely large rock-slope failures within an area of  $<50,000 \text{ km}^2$  of the tectonically active Tien Shan ranges of central Kyrgyzstan.

Each of these catastrophic and prehistoric failures exceeds an estimated  $1 \text{ km}^3$  in deposit volume, and two of them involve about  $10 \text{ km}^3$ . Failure of rock slopes in wide valleys favoured the emplacement of hummocky long-runout deposits, often spreading out over  $>10 \text{ km}^2$ , and blocking major rivers. The occurrence of these gigantic slope failures is not tied to any specific rock type or lithology, and most are located on or near active faults. Their spatial clustering and the high seismic activity in the Tien Shan support the hypothesis that strong seismic shaking caused or triggered most of these large-scale rock-slope failures.

Nevertheless detailed field studies and laboratory analyses will be necessary to exclude hydroclimatic trigger mechanisms (precipitation, fluvial undercutting, permafrost degradation), and to determine their absolute ages, frequency of occurrence, and to assess the hazard of similarly large rock-slope failures in the region.