Geophysical Research Abstracts, Vol. 9, 06413, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06413

1 Tectonic controls on the frequency-magnitude distribution of rock-slope failures

T. Preuth (1), F. Schlunegger (2)

(1) Swiss Federal Research Institutes WSL/SLF, Flueelastrasse 11, 7260 Davos, Switzerland (email: preuth@slf.ch, phone: +41(0)81-4170359)

(2) Institute of Geological Sciences, Baltzerstrasse 1-3, 3012 Bern, Switzerland (email: fritz.schlunegger@geo.unibe.ch, phone: +41(0)31-6318767)

Large rock slope failures are a common phenomenon in high mountain areas. Although many events are triggered by rainfall and earthquakes some other dispositional factors are unknown.

We propose that in areas of moderate uplift ($<$2mmy^{-1} like in the central European Alps) and less intense seismicity the hillslope stresses increase slightly and the forces to compensate these stresses also increase moderately which shows in less frequent, high-magnitude rock-slope failures. In areas of high uplift (+10mmy^{-1} like in New Zealand) and frequent and intense seismicity, local relief and hillslope stresses are high. This results in high compensation pressure and thus in high frequency and medium to low magnitude rock-slope failures. Indeed, in the central European Alps it is apparent, that some of the largest rock-slope failures are located in the Rhine and Rhone Valley (e.g. Flims (12km^3, app. 8.5kyr b.p.), Tamins (1.6km^3, app. 9kyr b.p.) and Sierre (app.1km^3, app.13kyr b.p.)). The range of deposit volume ranges from 0.1 to 12.000*10^{6}m^3 with a mean value of 561*10^{6}m^3. In contrast, mass failure deposits in the southern Central Alps of New Zealand are of much lower magnitudes between 0.1 and max 500*10^{6}m^3 (Goldney Stream 373yrbp.) with a mean value of 31*10^{6}m^3.