Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04376, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04376
EGU General Assembly 2008

The Bunzkögele kink band slump

J.Th. Sausgruber (1), A. Preh (2) and R. Poisel (3)

(1) Austrian Service of Torrent and Avalanche Control (thomas.sausgruber@die-wildbach.at/++43 512 584200 37) (2) A. Preh, Institute of Engineering Geology, Vienna University of Technology (alexander.preh@tuwien.ac.at/++43 1 58801 20399) (3) R. Poisel, Institute of Engineering Geology, Vienna University of Technology (rainer.poisel@tuwien.ac.at/++43 1 58801 20399)

The deep seated landslide of the mountain Bunzkögele near Matrei, Eastern Tyrol, Austria is characterised by a failure mechanism which exhibits to normal faulting in the upper part, and S-shaped deformation structure in the lower part of the slope and flexural toppling at its toe. This mechanism was already described and termed “Sackung” by Zischinsky 1966. Landslides with the same failure mechanism had been described by Nemcok et.al. 1972 and Kieffer 1998. The latter called this kink-band-slumping.

The mountain Bunzkögele lies at the southern border of the tectonic Tauern Window. It is build up of the Bündner Shist sequence (mainly calcareous shists and phyllites with some intercalations of metamorphic volcanic rocks) and rocks of the Matreier Zone (tectonic melange zone of Phyllites with slices of marble, quartzite, anhydrite etc.) which were originally deposited in the realm of the South Penninic Ocean. The onset of the subduction in early upper cretaceous time (Frisch 1976) mark the beginning of the Alpine Orogeny and causes the sediment sequences to be intensively folded and faulted accompanied by a regional metamorphism with its maximum between 40 to 35 Ma. (Frank et.al. 1987).

Essential for the slope failure mechanism are, that: (1) shistosity strikes parallel to the mountain slope; the direction of dip of shistosity is the same one as the line of dip of the slope but inclines steeper than it. (2) both, the strength of the rock mass and the joints are reasonably low. (3) glacial erosion during the last ice age and subsequent

fluvial erosion there after produced a sufficient high mountain relief.

The Universal Distinct Element Code UDEC (Itasca Consulting Group) was used to model the described failure mechanism of the mountain slope and to benefit the strong anisotropy of the rock mass (parallel rock lamellae). The choice of the constitutive model was the Mohr-Coulomb plasticity model, which yields when subjected to shear loading and is able to record large plastic deformations. The discontinuity strength was simulated by the Coulomb slip model.

The calculations have shown large shear displacements between the rock lamellae and a viscoplastic behavoir of the rock mass itself in accordance to the way as it was mapped in the field. The direction of the displacement vectors at the head of the landslide is parallel to the inclination of the joints, what points at pure slumping. By the way no extension structures can be observed in this region. The analysis has also shown that the mechanism is self-stabilizing.