Geophysical Research Abstracts, Vol. 7, 02983, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02983

Online monitoring of landslides using GPS

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Natural disasters caused by landslides are frequent phenomena in alpine regions. One way to observe the movement of a critical area is to implement a continuously operating monitoring system using GPS. The advantages of such a system are the high accuracy of a few millimetres, the independency of weather conditions, and the flexibility of surveying large areas. Furthermore, only a short period of time is needed to install the autonomous monitoring system. In addition, the data is collected online, allowing a near real-time determination of possible movements. The resulting precise GPS-coordinates with a high temporal and spatial resolution are an important data source for the improvement of the mathematical and physical modelling of landslides.

The CODMS (Continuously Operating Deformation Monitoring System) is presented, which has been developed in the framework of the ISDR (International Strategy for Disaster Reduction) project of the Austrian Academy of Sciences. Within this system the GPS data are processed in near real-time, using the GPS software GRAZIA.

A special feature of the CODMS is the capability to telecommand the central computer from any remote computer. Furthermore an SMS alert-system is installed, warning the operator if a station has problems sending valid data, or if a GPS station exceeds a specified threshold of movement.

In addition a consistent analysis of all GPS data collected during the past five years is presented. The achieved accuracy is discussed with respect to further applications for the landslide modelling.

Future developments aim in replacing the expensive high-end GPS stations with low-cost GPS equipment.