MSc Thesis Project in Engineering Geology

Topic:
Failure Mechanisms and predisposition factors of the Medji Rockslide (Mattertal, Wallis)

Project Framework:
Several slope instabilities have occurred recently on the steep western flank of the Matter Valley (Wallis). A research project is currently underway in the Chair of Engineering Geology to better understand the failure mechanisms and geological factors controlling the temporal evolution of slope stability in the area. In 2002, a mass of 130'000 m^3 moved in the neighborhood of St. Niklaus, 100 m north of the alpine pasture "Medji". About 70'000 m^3 finally fell down and was deposited mainly within the ravines. Several major blocks – one of ca. 1'500 m^3 – reached the valley floor. These were stopped by an emergency rock-fall protection berm that was under construction. The landslide area is situated within the massive granitic augengneiss of the so-called Siviez-Mischabel-Decke. The landslide type was described as toppling and kinking but the actual failure mechanisms and causes of the instability are still not completely understood.

MSc Thesis Project Goals and Approach:
The purpose of the project is to determine the failure mechanism(s) and predisposition factors responsible for the failure of the Medji rock slope. The work will involve a detailed analysis of the data collected before the final collapse of the slope (geological descriptions, displacement monitoring data, groundwater conditions, precursor events,…). The existing data will be supplemented by field investigations to collect information about the geometry of the failure surface, about the geological and geomechanical characteristics of the rock mass, etc… The analysis of the resulting dataset will then be used to develop hypotheses about the failure mechanisms and kinematics of the movements. These assumptions might be validated through a back-analysis of the failure using the discrete element code UDEC.

MSc Thesis Project Supervisors:
Prof. Simon Löw
Dr. Frank Lemy