Tracking Alpine rockfalls

Balancing their instruments on precarious cliff faces and braving intense media and public attention, Thierry Oppikofer and colleagues monitored the evolution of a rockslide along the eastern flank of the Eiger peak in the Swiss Alps.

Why did you choose this particular location for the fieldwork?
On 11 July 2006, we began monitoring a fast-evolving rockslide along the eastern flank of the Eiger peak in the Swiss Alps using a terrestrial laser scanner. An immense spur along this flank had begun to move in June 2006, and was deforming rapidly, providing a unique opportunity to study landslide processes. This turned out to be quite timely: we received a phone call on that first day from a private company who had been asked by local and federal authorities to monitor the rockslide, requesting us to deploy our scanner at the Eiger site. They had been using regular surveying equipment to monitor the spur, including reflectors within the rock wall, but these rapidly fell down or were destroyed by rockfalls. Our technique was the only way to track the evolution of this rockslide.

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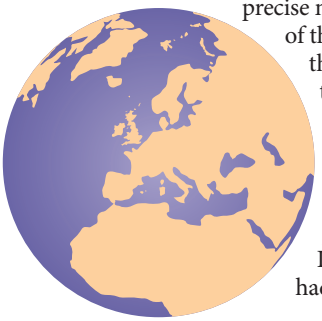
Viewpoint for collapse. Thierry Oppikofer with his terrestrial laser scanner against the backdrop of the eastern flank of the Eiger mountain.

What was the objective of the work?
We were asked to provide timely information on the movements associated with the rockslide. As a result, we had to analyse that component of the data as rapidly as possible, generally on the day of acquisition. However, we were aware that our unique data could eventually help yield important insights into the mechanisms of failure and deformation of the rockslide, so after the rush of providing first results, we decided to take our time to exploit the data for an overall understanding of the evolution of the rockslide.

What kinds of data were you after and how did you go about acquiring those?
Our goal was to understand how the rock spur on the eastern flank of the Eiger moved in three dimensions. We had to make precise measurements of the surface of the rockslide through time, which entailed scanning the rockslide from different perspectives. Ideal viewpoints had to be accessible on foot and offer a clear view of the rockslide — a combination that was not easy to find. We were often forced to place the instrument on barely stable and precipitous edges. Sometimes we secured the equipment with ropes to prevent it from tumbling down the cliffs!



What was the highlight of the fieldwork?
The rate at which the Eiger rockslide evolved and the frequent spectacular rockfalls that occurred were amazing. It was also interesting to witness the public attention this rockslide generated. A catastrophic rockfall event on the Gotthard highway, which killed two people in May 2006, brought the Eiger collapse to the attention of the public and media all over the world. Hundreds of tourists and many TV and newspaper reporters watched the mountain for entire days, waiting for the next rockfall event. We probably spent less time on fieldwork than on explaining the event to the crowds and giving numerous interviews to the media.

Any close misses and surprises?
We missed observing the main collapse that occurred in the evening of 13 July 2006. We had completed our fieldwork for the day and were heading back to the office when we heard of the event on the radio. Of course we were very disappointed to have missed the stunning event, but this situation is quite common for researchers in natural hazards — it always happens when you're not there.

We are surprised that two years after the partial collapse, and after more than 20 metres of total movement, part of the rock spur is still in place! Many specialists at the site in July 2006, including ourselves, predicted that the whole spur along the eastern Eiger flank would soon collapse. That we were wrong just shows how hard it is to forecast how a rockslide will evolve.

Did the trip give you any ideas for future research projects?
Using our experience with terrestrial laser scanning of the Eiger rockslide, we turned our attention to modelling the evolution of rockslides. We also began monitoring rockslides that do not evolve as rapidly as the Eiger one. For that purpose, we had to develop new techniques of analysis and perform experiments on the minimum movement that can be detected by terrestrial laser scanning.

This is the Backstory to the work by Thierry Oppikofer and colleagues, published on page 531 of this issue.