

# Flying high

Aaron Berger and colleagues leapt out of helicopters in the snow and fog in their quest to understand the effects of glacial erosion on mountain formation.

**What was the objective of the work?**

We wanted to investigate the interplay between climate, plate tectonics and mountain evolution in a natural system. Climate–tectonic interaction has been an area of intense research and debate over the past few decades. Under the St Elias Erosion and Tectonics Project (STEEP), we set out to examine the impact of the onset of glacial conditions on erosion and the activity of major faults within Alaska’s St Elias mountain range. With the results of our research, we were able to record what we believe to be a first-rate example of climate–tectonic interactions, which has previously only been observed in model simulations.

**Why did you choose this particular location for fieldwork?**

The St Elias region has long been recognized as the most heavily glaciated active mountain belt on Earth. In the mid-1990s it was becoming apparent that temperate glaciers were, at least locally, the most intense erosional agents on the planet. At the same time, the scientific community was beginning to look seriously at the complex interplay between erosion and tectonics, and it quickly became apparent that St Elias was a premier site to examine these interactions.

**How long did it take to plan the work?**

In one sense it took about 30 years, because the area presents some of the greatest logistical challenges on Earth, and were it not for the experience of the principal investigators we could never have done the project. More specifically though, planning for the STEEP project began in earnest in the late 1990s, when the

National Science Foundation Margins workshop

serendipitously brought our research group together, and helped lay the groundwork for the present study. Once the project was



Helicopter towering over a cliff face in the St Elias mountain range in Alaska.

underway, each field season took about six months to plan, in order to accomplish the serious multitasking involved.

**Did you encounter any difficulties?**

The weather was the biggest obstacle encountered throughout the field component of the research. The prevailing winds from the Gulf of Alaska, coupled with the highest coastal relief on Earth and the large ice fields in the mountains, resulted in intense year-round rain, snow and freezing fog. For long stretches of time, all operations were forced to come to a halt until the weather cleared. Owing to these adverse conditions, it became evident that to achieve our goals we had to work as a united team, and constantly re-evaluate our scientific priorities, goals and objectives. Being stuck inside a tent, however, turned out to be an amazing opportunity to brainstorm and share ideas.

**Did you have any encounters with dangerous animals?**

Brown and black bears were common throughout the field area. On several helicopter flights we spotted around twenty bears. Even more were seen along the coast during the berry and salmon season. Because the topography is steep, and bears prefer flat terrain, ‘bear highways’ unfortunately tended to

coincide with suitable landing sites. We managed to avoid serious accidents, but the scientific equipment did not fare so well; it’s amazing how efficiently a brown bear can damage a piece of fortified scientific equipment. What’s more, it seemed that the bears truly delighted in their accomplishments.

**Was anything particularly memorable about the expedition?**

I will never forget flying in a helicopter through some of the most rugged and glaciated landscapes on Earth. The experience gave me a completely new understanding of geological processes and rates of geological change. During the project I also had the distinction of working with extremely competent pilots, whom I quickly realized I had to entrust with my life. When I needed a sample from the most treacherous mountain around, the pilots would find a way, even if that meant that I had to climb out of a perfectly good helicopter hovering over a knife ridge in the fog. Without the expert capabilities of the helicopter pilots, it is safe to say that the entire project, and indeed my life, would have been jeopardized on numerous occasions.

*This is the Backstory to the work by Aaron L. Berger and colleagues, published on page 793 of this issue.*

