Core surprise

Brett Carpenter and colleagues got more than they bargained for when cleaning the mud off a metre-long piece of core from the San Andreas Fault.

What was the objective of the work?

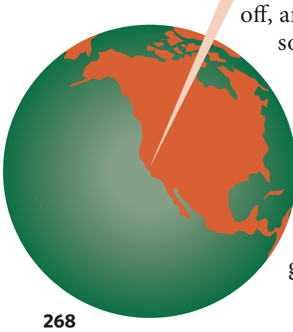
Our work formed part of the San Andreas Fault Observatory at Depth project — a multiphase programme designed to answer key questions about the factors controlling faulting and earthquake generation on a plate boundary fault. The objective of our particular project was to drill through and retrieve rock from an active section of the fault, and a nearby section that repeatedly generates M_w 2 earthquakes. In so doing, we hoped to learn why some sections of fault creep, whereas others generate earthquakes.

How did you get involved in the project?

I applied for a summer internship with the drilling team. After several months of discussions, and an interview with some of the science team, it was decided that I would be the final student on site. The official interview lasted only a fraction of the time that we actually met, and much of the conversation focused instead on how the project could help move my work forward. In the span of the interview I felt like I went from hired hand to part of the science team. That was a new feeling for me.

What was the highlight of the expedition?

The highlight of my time on site turned out to be cleaning the famed 'G27' core. This seven-metre core was brought up on deck and cut into one-metre sections. Another student and I began cleaning it without much fanfare — that lasted about five minutes. The cores come up covered in drilling mud, so it is not always evident what you have. Cleaning this core started similar to any other, but then myself and the other student noticed that at one end of the core the mud didn't wash or scrape off, and the core was softer. Eventually, we revealed a thin segment of serpentine alongside the active fault section — quite a sensation, given that the



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Top: Collecting cuttings. Bottom: The famed G27 core.

presence of serpentine in faults has long been debated. The serpentine we saw indicated the beginning of the active fault zone, and the softer material indicated the presence of pulverized rock in the fault core, so-called fault gouge. Within a couple of minutes the cleaning unit — usually consisting of two to three people — was overflowing with twenty-plus excited scientists falling over each other to take a look at the core.

Any low points?

Collecting 100 °C rock samples covered in calcium-chloride-based mud (dries out the hands quickly) in the rain, after a 16-hr working day.

Any awkward moments?

Each morning the science and drilling teams would discuss the drilling plan for the day ahead. The drillers would tell the science team what was possible, and the reasons behind a specific operation, and the science team would tell the drillers what they needed. There was often a disconnect between what the science team needed and what was physically possible. As a result, the discussions were sometimes heated. But middle ground was usually found following a deeper explanation of the concerns on both sides. Everyone left with an appreciation of why things were heading in the direction they were.

Any ideas for future projects?

I am now involved in a number of other drilling projects, including the Deep Fault Drilling Project in New Zealand. One aim is to examine an earthquake-generating continental fault, with the goal of determining the conditions and material in which earthquakes occur. In the San Andreas project we sampled an actively creeping fault at depth, but missed out on hitting the earthquake section. The project in New Zealand will hopefully help to close that gap in knowledge.

This is the Backstory to the work by B. M. Carpenter et al., published on page 251 of this issue.