MEETING

Drilling, Sampling, and Monitoring the Alpine Fault

Deep Fault Drilling Project—Alpine Fault, New Zealand; Franz Josef, New Zealand, 22–28 March 2009

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Several fundamental geological and geophysical phenomena are associated with the midcrust. These include the transitions from brittle to ductile behavior and from unstable to stable frictional sliding; earthquake nucleation; maximum crustal stresses; and mineralization associated with permeable fractures. However, knowledge of deformation, seismogenesis, and mineralization in the midcrust is based largely on remote geophysical observations of active faults and direct geological observations of fossil faults.

The Alpine Fault is a major dextral-reverse fault that is thought to fail in large earthquakes ($M_w \approx 7.9$) every 200–400 years and to have last ruptured in 1717 C.E. Ongoing uplift has rapidly exhumed a crustal section from 20- to 30-kilometer depths, yielding a young (<~1-million-year-old), well-preserved sample of structures currently active at depth. The Deep Fault Drilling Project (DFDP) proposes to drill, sample, and monitor the Alpine Fault to better understand processes of rock deformation, seismogenesis, and mineralization.

A workshop funded by the International Continental Scientific Drilling Program was held in New Zealand to plan for the DFDP project by addressing the state of knowledge of the Alpine Fault; the significance and feasibility of a multinational program of drilling and aligned science; and the preliminary steps required for site characterization, preparatory drilling, and longer-term science planning.

The workshop was held astride the Alpine Fault and was attended by 61 researchers from seven countries. Participants visited several field sites during the week, including Gaunt Creek, where mylonites (a type of rock formed by ductile shearing) overthrust late Quaternary (approximately 12,000- to 15,000-year-old) fluvioglacial gravels, and Harold Creek, a location renowned for pseudotachylytes, which are rocks indicative of frictional melting during high-speed slip.

Three principal scientific themes were discussed at the workshop: (1) evolution of a transpressive (oblique dextral-reverse-faulting) orogenic system; (2) ductile and brittle deformation mechanisms and their interaction; and (3) seismogenesis and the habitat of earthquakes. The discussions highlighted the opportunities the Alpine Fault provides to relate real fault rocks and in situ measurements to models of earthquake rupture and mesothermal mineralization.

Participants noted that what is unusual, and possibly unique, about the Alpine Fault among active continental faults is the potential for linking drilling observations to surface outcrops along exhumation trajectories. In the central portion of the fault, where exhumation rates are highest (6–9 millimeters per year), several sites can be identified at which rocks encountered at depth in boreholes would correspond to well-studied outcrops, enabling progressive geological deformation and petrological changes to be studied as functions of space and time along the transport path. Moreover, it was noted that drilling here may be able to target the critical phenomena highlighted above more readily than in locations where uplift rates are lower and the processes occur at greater depths.

At the meeting, three working groups were established to undertake site characterization studies, shallow (~150-meter-deep) drilling for core characterization and instrument deployment, and hydrogeological sampling and modeling. A fourth group will be convened in late 2009 to develop sample handling protocols.

A longer report on the workshop and the DFDP project will appear in *Scientific Drilling* (Townend, J., et al. (2009), Deep Fault Drilling Project—Alpine Fault, New Zealand, *Sci. Drill., 8,* 75–82, doi:10.2204/iodp.sd.8.12.2009). For more information, including details of the working groups, visit http://drill.gns.cri.nz/nzcdp/dfdp/index.html.

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ABOUT AGU

AGU International Award Recognizes Outstanding Science in Developing Countries

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One of AGU's major programs is its honors program, which includes the Union medals and awards, fellowships, and section and focus group awards. The program seeks to recognize outstanding contributions made by AGU members and other individuals to the advancement of the Earth and space sciences; service to the community; and excellence in education, outreach, and science journalism.

The International Award, the most recent addition to the Union's honors program, this year was presented for the third time, and nominations are being sought for the 2010 award. This award for international research cooperation was established to recognize an individual scientist or a small team for making an outstanding contribution to furthering the Earth and space sciences and using science for the benefit of society while laboring under adverse circumstances with limited resources in less favored nations.

Outstanding Awardees

The International Award was first presented in 2007 to Uppugunduri Aswathanarayana, from the Mahadevan International Centre for Water Resources Management in India, at the Joint Assembly in Acapulco, Mexico. Aswathanarayana was cited in the ceremony program for "serving science and society in less developed countries by training geoscience personnel and developing geoscience infrastructure to promote self-reliance in these countries" (see full citation and response in *Eos, 88*(27), 281, 3 July 2007).

The 2008 award recipient was Laike Mariam Asfaw, from the Addis Ababa Geophysical Observatory at Addis Ababa University, Ethiopia. The award was presented at the Joint Assembly in Fort Lauderdale, Fla. Asfaw was cited for "selflessly devoting himself to running the Geophysical Observatory…for 30 years, including through politically turbulent times, so that today it provides the highest-quality geomagnetic, seismological, and GPS data, and for promoting education, natural hazard mitigation and awareness, and the careers of his colleagues" (see full citation and response, *Eos, 89*(31), 282–283, 29 July 2008).

The 2009 International Award was presented to Alik Ismail-Zadeh, of Karlsruhe University, Germany, at the Joint Assembly in Toronto, Ontario, Canada, on 26 May. The award winner was cited for "successfully investing both his time and energy in promoting and fostering geophysics between Eastern European scientists and their colleagues worldwide" (see full citation and response, *Eos, 90*(28), 244, 14 July 2009).