Close to home we are working the Ordovician paleontology, stratigraphy and K-bentonite correlation and age dating. Norlene Emerson, Liz Leslie and Blair Tormey in collaboration with Brad Singer (Rare Gas Geochronology Lab) and John Fournelle (Electron Microprobe Lab) have been able to fingerprint the chemistry in the apatites found in the Ordovician ash beds and change the traditional stratigraphic correlations.
$^{40}Ar/^{39}Ar$ geochronology of sanidine crystals in the same ash beds is giving a much older age for these strata. The integrated approach has changed the way we view the oceanography of an ancient continental epeiric sea.

The Wolfcampian (Lower Permian) of West Texas is Leo Piccoli's PhD topic. His work integrates sedimentology, stratigraphy, petrography, and forward-model seismic to determine the spatial variability of facies, internal architecture of sequences, nature of bounding discontinuities, and seismic features of carbonate platforms developed during the Wolfcampian. He is collaborating with Nik Christensen measuring velocities and densities of the rock succession. An interesting side of his work is the abundance of resedimented carbonates in the basin. His detail correlation seem to indicate that these basinal restricted wedges of allochthonous carbonates are the result of the collapse of highstand platforms and the product of platforms that grew downslope detached from the highstand platform.

The Cretaceous La Luna Formation of Venezuela was Olga Rey's project while in Madison. Her work has demonstrated a temporal general trend of increase in oxygenation at the sea floor associated with smaller frequency cycles that control the variations in terrigenous dilution and carbonate productivity. These cycles are probably due to obliquity. We are continuing our collaboration in the Cretaceous of Venezuela.

The Oligocene and Neogene is probably the more diverse of all the different projects; Kate McColgin, Michelle Stoklosa and Jana Van Alstine are working the Oligocene and Miocene of SE Spain, Essam Sharaf in collaboration with Martin Shields (A. Carroll) are studying the Oligo-Pleistocene of eastern Java, and Nancy Slatter studied (completed her MS degree) the Pleistocene of southern Australia. Cenozoic carbonate platforms are widespread and have many types of morphologies. The variability is in part because they form attached to growing structures, such anticlines and faulted uplifted blocks, during the closure of the Tethys. The students are investigating platform morphologies and facies to infer depositional processes, tectonic influence, and past climate and oceanography.

❖ Brad Singer

Last year was extraordinarily busy with several major projects underway and 13 abstracts presented at meetings in 2001. **Monica Relle** finished her MS thesis in May, won an outstanding presentation award at Spring AGU, and we have a paper in press in *JGR-Solid Earth* that establishes new temporal constraints on the behavior of the geomagnetic field during the last 820 ka. We coined the term Geomagnetic Instability Timescale (GITS) as yet further surprises in the palomagnetic record were encountered. I visited the remote Ascension Island—100 km from the mid-Atlantic ridge—for two weeks in June as part of my geomagnetic project to examine field behavior over the past 5 m.y. During his month-long visit to Madison last summer, former PhD student **Fidel Costa** and I completed a paper on the origin of compositionally zoned magma erupted at Volcan San Pedro, Chilean Andes. **Mike Smith** defended his MS thesis in December and we have a paper with **Alan Carroll** nearly ready to submit indicating that the ancestral lake Gosiute existed 3-4 million years earlier, and was much longer-lived, than previously thought. These geochronologic results will reshape our understanding of climatic influences on the lake and move the Green River Formation to the forefront of terrestrial archives of early Tertiary climate and tectonics. While investigating the timing of Aleutian arc magmatic processes for his MS thesis, **Brian Jicha** collected some exciting new $^{40}Ar/^{39}Ar$ dates from many Aleutian island arc lavas—some as young as 30 ka are the youngest and most difficult materials that we have dated in the Rare Gas Geochronology Lab (for a summary of lab activities go to: **http// www.geology.wisc.edu/~raregas**). Brian continues also to help lead our effort to establish U-Th isotope disequilibrium methods in the Radiogenic Isotope Lab together with **Clark Johnson** and **Brian Beard.** PhD student **Danny Douglass,** Weeks Post-doc **Mike Kaplan** and I traveled to Patagonia twice in 2001 to undertake mapping and sampling of the spectacular moraine sequence at Lago Buenos Aires. Two papers, nearly completed, that use geologic mapping and $^{40}Ar/^{39}Ar$ and cosmogenic ^{10}Be and ^{26}Al dating now constrain the glacial history in the southern Andes between 1.01 Ma and 15 ka. Two new students, **Miriam Barquero-Molina** from Oveido Spain, and **Melissa Harper** from the University of Maine joined the research group in September. Miriam's PhD focuses on Caribbean silicic Large Igneous Provinces of the Eocene and Miocene. In October, Miriam and I visited our collaborator Haraldur Sigurdsson at the University of Rhode Island to obtain archived samples from ODP cores and Central America for geochronology. Melissa is paralleling **Brian Jicha**

Kyle Roberts, Haijiang Zhang and Karl Rittger installing the last real-time telemetered seismic station for Cliff Thurber's seismic field project near Parkfield, CA. Photo by Neal Lord.

with a study of the timescales of arg magmatic processes through a study focused on Puyehue volcano in the southern Andes of Chile. Finally, so that I can continue to maintain these diverse activities in the lab, **Kyle Min** (PhD UC-Berkeley) was offered the new Assistant Scientist position and will become the lab's manager in 2002.

❖ Clifford Thurber

I had a busy and exciting year in 2001. Our seismic field project around Parkfield, CA continued and expanded this year. Over the summer, we enlarged our real-time telemetered seismic array from 15 to 59 stations, all within about 10 km of the San Andreas fault zone drilling site. Drilling for a 2-km pilot hole will begin in late spring 2002, to be followed by a series of active-source seismic experiments aimed at setting the stage for drilling the main fault-crossing hole ("SAFOD") as part of the Earthscope project. In the meantime, we are refining our 3-D model of the seismic velocity structure around the drill site, and are steadily improving the accuracy with which we can determine the location of a cluster of small earthquakes (magnitude about 2) that are a target of the SAFOD drilling. Lee Powell, grad student Kyle Roberts, and new post-doc Shirley Baher are participating in this project. In the fall, we wrapped up a three-year nuclear explosion monitoring (CTBT) project and immediately started in on a major new CTBT project, involving post-doc Charlotte Rowe, grad student Haijiang Zhang, and Assistant Scientist Bill Lutter. My volcano seismology research continued along two fronts. The initial phase of our study of the deep structure of Kilauea volcano's East Rift Zone is complete, with one paper published in GRL and an MS thesis completed by Megan Mandernach this year. Work on Kilauea velocity and attenuation tomography is being continued by grad student Samantha Hansen. The other volcano seismology project, on high-precision location of volcanic earthquakes, is being led by Charlotte Rowe. She has produced dramatic improvements in the determination of the locations of numerous earthquake clusters, each with dozens to hundreds of similar events, at the Soufriere Hills volcano, Montserrat, and is completing similar work for Redoubt volcano, Alaska, and Mount Pinatubo, the Philippines. Charlotte and I also obtained a new NSF grant to work on high-precision earthquake location in the New Zealand and Japan subduction zones. I continued my heavy involvement in managing the IRIS Consortium this year, including my membership on the executive committee, participation on the instrumentation subcommittee, and as a regular member of the IRIS Board of Directors. I also finished my third year as an associate editor for *JGR-Solid Earth*, and was just reappointed for another three-year term. All this resulted in quite a bit of travel for me this year, including three IRIS executive committee meetings and the annual IRIS workshop, two Department of Defense CTBT meetings, two lengthy trips to Parkfield, and a trip to the fall AGU meeting where my research group had six presentations. Another major highlight of the year was a successful faculty search in seismology, which brought Richard Allen to Madison in January 2002.

❖ Basil Tikoff

It has been a busy year for structural geology. The highlight was probably the combined sedimentology/structural geology fieldtrip to the Pyrenees last spring. With Toni Simo's expert guidance (both geological and gastronomical), we saw some great geology and enjoyed ourselves.

Research keeps going along. **Cheryl Waters** (PhD candidate) put in another field season in central Australia, looking at deformation of lower-crustal granulites. The project on a mid-crustal plate boundary exposed in western Idaho, worked on by **Scott Giorgis** (PhD candidate), is also going well. I can't say I particularly enjoyed, at the time, carrying all the 40 lb. water containers and the rock drills up the mountains of Idaho with Scott. However, writing this in Madison in winter (Winter? Is this really winter?), I want to head back to Idaho. I hear that they at least have snow there.

Eric Horsman decided to work on intrusion of laccoliths in the Henry Mountains, Utah, for his Master's dissertation. I believe that the Henry Mountains were the last mountain range named in the lower 48. Regardless,