

GERMANY

Academic Reform Law Made More Flexible

BERLIN—Bowling to pressure from young researchers, politicians, and the press, Germany's science minister has agreed to amend the recently passed university reform law to give young academics more time to finish their training. The change would remove what is seen as a serious flaw in otherwise

needed reforms, and it may lead to a cease-fire in a drawn-out battle over the legislation.

The law, which took effect on 23 February, is a major overhaul of university employment rules. It attempts to curb the practice of keeping young researchers in an indefinite state of uncertainty by setting a limit of 6 years for students to finish a Ph.D., followed by 6 years to land a permanent position in a university. Several national

organizations—including the German research funding agency (DFG) and the German conference of university rectors and presidents (HRK)—supported the overall reforms but worried that current students may not have enough time to complete their training. Students and academic staff went on strike at Bielefeld University (*Science*, 1 February, p. 781), and some protesters called for Research Minister Edelgard Bulmahn to resign.

In response, Bulmahn announced on 22 March that she would “clarify” the law by providing an extension to February 2005 for those now in the system who might bump up against either time limit. The clause will be added to a bill that would prevent universities from charging student fees. A ministry spokesperson said that she expects parliament to approve the new legislation by early summer, but others say that the fees may spark a more extended debate. “I doubt that it will be ready by the summer,” says Kurt Kutzler, acting president of the Technical University of Berlin and a vice president of HRK.

Bulmahn's modification doesn't address a second pressing issue, however. Under the new reforms, researchers who have finished their Ph.D. and Habilitation (a more regulated version of the postdoctoral fellowship) but fail to snag a permanent faculty position

within 12 years (15 years for medical students) can be hired only under temporary contracts that comply with Germany's general employment law. But university administrators feel that the law's complex hiring and firing requirements are ill suited to research. They also worry that universities may avoid such contracts because the law gives temporary employees the right to sue an employer for a permanent post.

“We still need a satisfactory solution for researchers who have finished their training but are waiting for a suitable post as full professor,” says Christoph Gusy, assistant rector of Bielefeld University. Researchers will be watching closely to see whether the new law adds to the strain on this important talent pool.

—ADAM BOSTANCI AND GRETCHEN VOGEL

SEISMOLOGY

Deep Quakes Slow But Very Steady

When it comes to quakes, Earth doesn't have much rhythm. Tens of kilometers below the surface, faults rupture with a chaotic unpredictability that has stumped seismologists and sometimes caught cities off guard. On page 2423, however, a team of geophysicists led by Meghan Miller at Central Washington University (CWU) in Ellensburg reports that a strange kind of temblor, called a slow earthquake, goes off silently about every 14 months in the Pacific Northwest.

Such a rigid schedule is “quite surprising,” says Alan Linde of the Carnegie Institution of Washington in Washington, D.C. Geophysicists don't yet know why the slow earthquakes—so called because of their leisurely pace and the absence of seismic waves—occur so regularly, but they hope to deploy instruments to study them in greater detail and learn more about the boundaries of major tectonic plates called subduction zones. Slow earthquakes could even turn out to herald a season of heightened risk for larger quakes.

Typical earthquakes announce themselves in a battery of shaking as a jammed and stressed fault suddenly breaks loose. In the Pacific Northwest, the culprit is the Juan de Fuca plate trying to ram its way beneath the edge of North America. Every 500 years or so, the locked fault tears free and

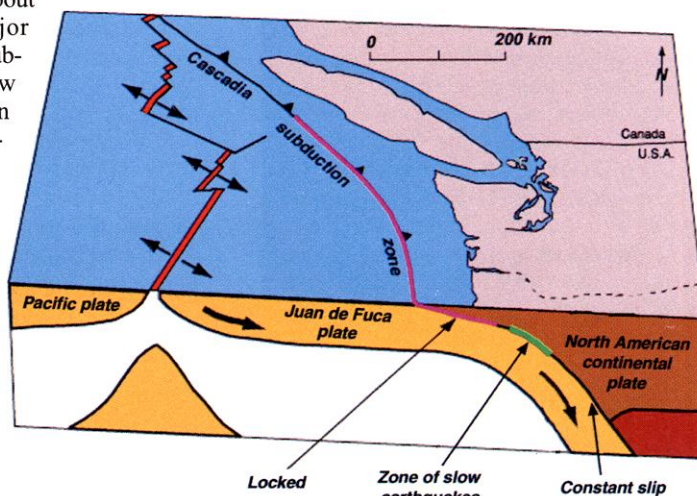
generates a major earthquake. Further down the fault, there's less potential for trouble; because the rocks are hotter and more plastic, the plates are thought to defuse their energy by slipping slowly and continuously.

But not always. Last year, Herb Dragert of the Geological Survey of Canada in Sidney, British Columbia, and colleagues found evidence for a relatively sudden pulse of movement farther down the fault than the locked zone is. By monitoring the location of Global Positioning System (GPS) stations relative to each other, Dragert's team discovered an unusual pattern of surface deformation in southeast British Columbia and northwest Washington state.

Most of the time, this region is being shoved northeastward at an average of 8 millimeters per year. Dragert's team noticed that over several weeks in 1999, the stations reversed their direction and moved 2 to 4 mm to the southwest. A numerical model indicated that roughly 35 kilometers below the surface, a 50-kilometer-by-300-kilometer swath of the plates had slipped (*Science*, 25 May 2001, p. 1525).

Geophysicists have had firm evidence of slow earthquakes in subduction zones since 1995, when Ichiro Kawasaki of Toyama University identified one off Japan, but Dragert's team was the first to find such a quake in the Pacific Northwest transition zone.

Intrigued by their finding, Miller's team went back and analyzed 10 years of data from these and other GPS stations. The researchers found a total of eight such slow earthquakes in the same general vicinity. Most remarkably, the slow quakes started every 14.5 months, give or take 1 month. “That's incredibly exciting,” says co-author Tim Melbourne, also at CWU. “If you can find a fault that's regularly but intermittently creeping, maybe you can make sense of this



Quiet habit. Slow-paced earthquakes regularly release some of the strain built up by the descent of the Juan de Fuca plate, but they don't relieve the locked zone, which generates much bigger quakes.



Clarification. Bulmahn gives young German researchers an extension.

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in a deterministic way.”

It's too early to tell what effect the slow earthquakes might have on the risk of a blockbuster shakeup. Each slow event reduces strain locally but not in the locked zone, which is where the big ones break out. The slow earthquakes do have a menacing potential, Dragert warns. “Just as a taut violin string is more likely to snap during sudden rapid tightening,” Dragert says, the locked zone—if close to critical threshold—might rupture when loaded with stress from a slow earthquake. This suggests that the likelihood of a major event may increase during slow-earthquake season.

But the CWU team points out that a large number of slow temblors may take place between each 500-year great quake. This makes it unlikely that any single slow earthquake is going to be a meaningful precursor. “I’m not convinced that they’re a harbinger of disaster,” Miller says. All agree, however, that slow earthquakes are likely to reveal more about how plate boundaries work.

Miller’s team believes the regularity implies that slow earthquakes are a basic way that strain is relieved in this subduction zone. Continuous GPS observations are revealing similar, individual events at other subduction zones, such as Japan and Peru, Miller notes. (Other experts say they’d like to see more examples of periodicity from around the world before calling the mechanism fundamental.)

To learn more, Miller’s team is exploring collaborations that would set down denser arrays of GPS stations with seismometers, strainmeters, and other instruments before a slow earthquake is scheduled to begin. And as continuous GPS networks become more common and more accurate in other parts of the world, the pace will be anything but slow.

—ERIK STOKSTAD

ENVIRONMENTAL FELLOWSHIPS

Will Congress Catch EPA’s Falling STAR?

The U.S. Environmental Protection Agency (EPA) has pulled the plug on a popular, one-of-a-kind graduate fellowship program in the environmental sciences. This year, the program drew applications from about 1400 environmental science and engineering students, who now must scramble to find other support.

Agency officials say the move, announced recently on the agency’s Web site (es.epa.gov/ncer), responds to a presidential proposal to end the \$10-million-a-year program this fall. An EPA official familiar with the fellowship program, called Science to Achieve Results (STAR), says the agency is “being a good soldier” in assum-



Supporting role. Granger Morgan says fellowships bolster EPA’s “science-based” rules.

ing that Congress would concur with the president’s 2003 budget request and zero out the program.

Awards for the 2002–03 academic year were due to be announced next month. But rather than making a commitment it might not be able to honor, the official said, EPA will instead send back reviewers’ comments and suggest that students look for other sources of funding. The money saved in the 2002 budget will be doled out as needed to complete the multiyear awards for 211 current fellows.

Environmental groups are beginning to rally support for the program, pointing out that last year EPA director Christine Todd Whitman told Congress it “continues to successfully engage the best academic environmental scientists and engineers.” The program is also important for the field, says David Blockstein, head of the National Council for Science and the Environment. “If the STAR fellowships end, there will be no dedicated funds for graduate fellowships in the environmental sciences.” The demand greatly exceeds the supply, he adds: “Based on my experience as a reviewer, EPA could double the number of awards without diluting the quality.”

Terminating the STAR graduate fellowships would undermine EPA’s efforts to improve the scientific basis of its regulations, says Granger Morgan, head of the department of engineering and public policy at Carnegie Mellon University (CMU) in Pittsburgh, Pennsylvania, which has had several fellows. “It’s been very important in funding top-flight students,” he says, adding that the fellows also develop a relationship with EPA and a better understanding of its mission. “If you want science-based regulation, then you need to invest in the people to do it,” Morgan says.

In addition to tuition support, the fellowships provide students with an annual stipend of \$17,000 and research funding of \$5000.

ScienceScope

Pondering Quality A new rule aimed at improving the quality of technical information released by the government could do both good and harm, experts concluded last week at a Washington, D.C., workshop. The data quality rule, issued by the White House Office of Management and Budget on 22 February, requires agencies to rigorously vet data in reports and regulations. It also allows citizens to challenge information that they think is inaccurate (*Science*, 13 July 2001, p. 189).

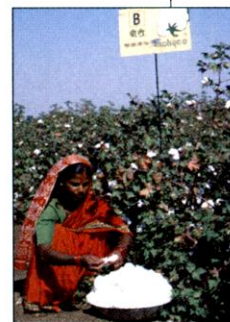
Legal experts at the National Academy of Sciences (NAS) workshop predicted that the rule’s loosely defined call for “objective” review of “influential” information will trigger lawsuits. A business group has already cited the rule in challenging U.S. climate projections, but environmental activists could also use it to question industry data, suggested David Hawkins of the Natural Resources Defense Council.

Academic scientists, meanwhile, worry that they could become entangled by provisions that “third-party” data cited by the government be subject to review. That could be used to harass scientists, marking “the dark side of an otherwise positive development,” says Washington, D.C., attorney Fred Anderson, a member of an NAS task force on data quality. Agency proposals for implementing the rule are due 1 April.

India OKs GM Cotton Indian agriculture reached a milestone this week as the government approved the first commercial release of genetically modified (GM) cotton. Farmers have been given a 3-year pass to plant three Bt cotton varieties developed by the Maharashtra Hybrid Seeds Co. (MAHYCO) in Mumbai. Under the new rules, farmers must plant at least 20% of any GM field with non-Bt varieties and surround them with five rows of non-Bt plants.

MAHYCO must also report insect resistance and track annual GM seed sales. Monsanto, which imported the Bt gene, owns a minority stake in the company.

Some farmers like the promised higher yields, but environmentalists say the government’s decision is premature. Pests are “bound to develop resistance,” says Devinder Sharma, a food policy analyst with the Forum for Biotechnology and Food Security.



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