EARTHQUAKE PREDICTION

Report Slams Japanese Program

TOKYO—Japan's rock-solid faith in predicting earthquakes is about to get a good shaking. A draft report to the government says the 32-year-old program has not met its goal of warning the population about impending earthquakes and has overstated the chances of developing accurate forecasts. The report is the sharpest official criticism to date of the centerpiece of the country's $147-million-a-year earthquake research program.

The essence of the still-confidential report, according to Masayuki Kikuchi, a seismologist at the University of Tokyo's Earthquake Research Institute who worked on it, is that "trying to predict earthquakes is unreasonable." Instead, the report says, the government should inform the public that earthquake forecasting is not currently possible and shift the focus of the program in a direction to be determined by other committees.

The report is the result of a review by a working group within a special committee on earthquake prediction. That body is itself a subcommittee of the Geodetic Council, which advises the Ministry of Education, Science, Sports, and Culture. The report is not scheduled to be made public until after it is reviewed this summer by the Geodetic Council, but a summary of its findings appeared over the weekend in the *Yomiuri Shimbun*, one of the country's leading newspapers.

The review is a normal part of Japan's earthquake-prediction research program, launched when Japan was in the vanguard of efforts to predict the time, location, and magnitude of impending earthquakes. Most of these programs, including one in the United States, gradually lost support when researchers could find little or no link between presumed precursors and earthquakes. However, Japan's prediction program has rolled on and is now midway through its seventh 5-year plan.

But the more than 5000 deaths in the Kobe quake, which occurred in an area not heavily instrumented, prompted officials to take a closer look at the overall research program. "Previously, the committee was really just looking at the next 5-year plan," says Masataka Ando, a professor of seismology at Kyoto University's Disaster Prevention Research Institute. The report's harsher tone also reflects the panel's rotating membership, with seismologists more skeptical of prediction replacing several firm supporters of the concept.

Despite its strong words, the report must clear several hurdles before it alters the direction of earthquake research. It will be reviewed by the full special committee, as well as outside scientists, before it goes to the Geodetic Council. Then, another working group of the special committee for earthquake prediction will begin drawing up an agenda for the eighth 5-year plan, beginning April 1999, or for an alternative approach. In the meantime, the council's recommendations will not directly affect Japan's only actual prediction program, in the Tokai region 150 kilometers west of Tokyo. Government officials say they are prepared to issue a warning for the region when they believe that a large earthquake is imminent.

"[The report] is a step in the right direction," says longtime prediction opponent Robert Geller, associate professor of geophysics at the University of Tokyo. "But it remains to be seen how much it really affects actual research."

–Dennis Normile

EARTH SCIENCES

Climate Warms a Bit for NASA Mission

Congressional opponents of NASA's ambitious Mission to Planet Earth (MTPE) appear to be softening their criticism of the multibillion-dollar program, in part because of changes being made in order to satisfy the concerns of legislators and scientists. The result will likely be smaller spacecraft and a data-management system more closely tailored to the needs of researchers.

MTPE, an array of large and small satellites to gather environmental data, has served as a lightning rod for House Republicans who have charged that it will be used to buttress theories of global warming and that it will siphon money from other NASA efforts. Scientists have joined the fray, expressing concern that the spacecraft and its data-collection system are too expensive and unwieldy.

But change is afoot. At a hearing last week, Representative Dana Rohrabacher (R–CA), the new chair of a House science subcommittee that oversees NASA, promised to keep "an open mind" toward a program that he once denigrated as part of the liberal environmental agenda backed by U.S. Vice President Al Gore. Although Rohrabacher hinted that he might push for a cut of $250 million from the program's $1.4 billion budget request, that amount is less than some House Republicans proposed last year in attacks led by Representative Robert Walker (R–PA), who is now retired. Any significant cut would likely face serious opposition in the Senate, which is more supportive of MTPE.

Last week, NASA underscored its commitment to reform by announcing the first two missions of a new MTPE effort aimed at giving researchers a quicker and cheaper way to monitor Earth. One, to be launched in 2000, will survey the forest canopy around the world for less than $60 million. The other, an $86 million experiment to measure Earth's gravity field and its variability over 5 years starting in 2001, would help researchers understand ocean circulation and heat transport between the poles.

NASA officials say they are also moving quickly to incorporate the recommendations made last month by an outside advisory panel headed by atmospheric and environmental chemist Steve Wofsy of Harvard University. That panel said NASA should make a "fundamental change" to its data system, by giving principal investigators more control over how data are made available. The original plan involved a more centralized distribution system to serve educators and the public as well as researchers. The panel also called on the agency to overhaul MTPE after 2000, when the second of three large spacecraft is slated to be launched. Panelists suggested that the third satellite, Chem-1, could be divided into smaller missions.

The third recommendation was that the agency shift funding from space and ground hardware to scientific work in modeling and analysis to prepare for the huge amounts of data that will begin flowing when the first large satellite is launched next year. Many of the ideas echo ones made the year before last in a report by the National Academy of Sciences that was requested by House Republicans (*Science*, 22 September 1995, p. 1665).

MTPE chief William Townsend told Rohrabacher that NASA is already acting on the recommendations by revamping the data system to make it more decentralized, studying ways to reduce the size and scope of the Chem-1 spacecraft, and trying to keep a balance between hardware and research funding. However, agency officials say that a decision on the fate of Chem-1 is not expected for several months.

Although critical of the program specifics, Wofsy praised MTPE at the hearing as a "very, very high quality science program" and said he was impressed with the agency's "very positive" response to the panel's report. For their part, agency officials believe that the best way to protect their 1998 budget request is to take action. "We're trying hard to be responsive and put together a plan that will show Congress the monkey is on our back," says one NASA official. Those reforms, combined with Rohrabacher's more conciliatory stance, point toward a brighter future for the program.

–Andrew Lawler