efforts to model those effects.

The Russian data could provide a consistent look at the extent and kinds of cloud cover over the last 30 years, provide insight into the effects of pollution on cloud formation, and serve as a check on ground observations, Peterson says. There is no comparable data set in the United States, U.S. officials say. And the amount of Russian data, says Baker, is immense. "They have warehouses full of it," he told reporters on 20 July. In addition to the satellite data, there are data sets from aircraft and ships. Given the constraints on the Russian science budget, however, it's not clear whether U.S. data will provide similar benefits to Russian climate researchers.

But exchanging old data is just the first step in the cooperative effort, Baker says. The more ambitious goal is to share current data from spy satellites that could provide warnings about volcanic eruptions and insight into earthquakes. "There is real interest in this on both sides," he adds, predicting that "hopefully we can do this within the next year."

But to meet that rapid timetable, formidable obstacles must be overcome. The National Reconnaissance Office, which operates the U.S. spy satellite network, does not even share its current data with U.S. civilian agencies such as NOAA. And both nations would have to agree on ways to provide the data without revealing the full extent of their capabilities. A joint statement on the initiative notes that the exchanges should be done "without jeopardizing the national security interests of either side." This might mean, for example, fuzzing high-resolution pictures, NOAA officials say.

Baker says he is confident the two sides will be able to reach at least initial agreement on data exchanges by December, when Gore and Chernomyrdin meet again for their biannual meeting on economic and technology cooperation between the two countries. If they are successful, U.S. and Russian scientists could soon be seeing their own lands in a new light: as portrayed in photos taken by their former enemy.

–Andrew Lawler

COLLABORATIVE RESEARCH

Japan Picks First Centers of Excellence

TOKYO—In a significant departure from its usual pattern of funding academic science, Japan's Ministry of Education, Science, Sports, and Culture (Monbusho) last week awarded a total of $21 million to six university-based research groups deemed capable of developing into world-class "centers of excellence" in fields ranging from cosmology to economics. The awards, which cover the first of 5 years of funding, mark the launch of a new program designed to encourage universities to focus their resources on areas where they can make significant contributions. Eventually, Monbusho hopes to expand the program to fund 25 groups on the cutting edge of their fields.

In the past, Monbusho's research money has gone to large institutes with broad research agendas, such as the Institute for High-Energy Physics in Tsukuba, or small groups typically consisting of one full professor and one or two associate professors and assistants. The recent grant, however, aims at teams in between these two levels, thereby addressing a criticism university researchers have long aimed at the current system: that it makes it difficult to assemble large academic teams to work on a scientific problem. "This program's biggest impact will be in enabling a number of researchers in closely related areas to come together to focus on one research theme," says neuroscientist Kenji Sobue, a professor at Osaka University Medical School who will be leading a group studying signal transduction and its role in cell growth, differentiation, and death.

In Sobue's case, the nine Osaka University Medical School researchers in the group have been working together informally for 3 years, but the new grant will enable them to form a more cohesive team that Sobue says will be "internationally competitive." At the University of Tokyo, cosmologist Katsuhiko Sato says his grant to form a research center focusing on the early universe will bring together nine astrophysicists and elementary particle physicists who previously "were in their own little areas."

Makoto Kinoshita, deputy director for science in Monbusho's Science and International Affairs Bureau, says Monbusho didn't specify how large the groups should be. The aim, he says, was to encourage groups to form "spontaneously and voluntarily." As it turned out, however, the scientific research groups all number between nine and 12 researchers, and all draw their members from the same university. In contrast, a group led by Konosuke Odaka, professor of economics at Hitotsubashi University, which is planning to assemble a database of historical and current economic statistics for all of Asia, boasts 41 members from 14 universities. International participation in all the groups is being encouraged and will be supported by the Japan Society for the Promotion of Science fellowships.

Three selection committees—one each for humanities and social sciences, physical sciences, and life sciences—sifted through 194 proposals in a two-stage evaluation process before whittling them down to the six announced last week. Akito Arima, former president of the University of Tokyo and now head of the Institute of Physical and Chemical Research, says the evaluation process was open—something of a contrast to the way some other Monbusho programs are funded. Arima, who served on the physical sciences evaluation committee, says he was also encouraged by the quality of the proposals. "There is a lot of very good activity out there," he says.

In addition to considering the importance of the proposed research theme and the track records of the participants, the selection committees took into account the amount of additional support promised by the university. Sato says his group at the University of Tokyo will be getting additional space, as well as funding for equipment and research expenses, from the university.

The grants announced last week are just one part of Monbusho's centers of excellence program. It is also dividing $62 million this year among 46 of the established larger research institutes to further strengthen what are already viewed as internationally recognized programs. And Monbusho hopes to select an additional five or so university-based groups in each of the next 4 years. "We can't promise that we'll get the funding," Kinoshita says, "but we expect to."

–Dennis Normile

GROUNDBREAKING GROUPS

Research Theme	Lead Institution	Research Leader
Compilation of integrated long-term economic statistical database for the trans-Asian region	Hitotsubashi University	Konosuke Odaka
Probing the early universe	University of Tokyo	Katsuhiko Sato
Ultraparallel optoelectronics	Tokyo Institute of Technology	Kenichi Iga
Molecular chirality	Nagoya University	Ryoji Noyori
Regulation of higher order biological systems	Kyoto University	Shigetada Nakanishi
Signal transduction in cell growth, differentiation, and death	Osaka University Medical School	Kenji Sobue