Gérard Schwartzenberg said that his "number one priority" is to create opportunities for young researchers. Decrying a lack of positions that has forced talent abroad, Schwartzenberg remarked that "France's job is not to serve as a training institute of young doctorates for the benefit of the United States or other countries." The job creation initiative, which aims to retain young scientists, has earned praise from France's National Union of Scientific Researchers, an organization that's usually highly critical of the government's priorities.

But some prominent scientists are wringing their hands. "I am not optimistic that the government has taken [sufficient] measures to make research a top priority," says cell biologist Jean-Paul Thiery of the Curie Institute in Paris. And Pierre Chambon, director of the Institute of Genetics and Molecular and Cellular Biology near Strasbourg, complains that salaries—which begin at $20,000 per year at agencies such as CNRS, the national basic research agency—are too low to hold on to the best scientists. "We are not competitive," he says. "This is scary for the future."

–MICHAEL BALTER

MAGNETOSPHERIC PHYSICS

Magnetic Storms Have Two Drivers, Not One

When the skies dance with auroral light, satellites stagger under an onslaught of charged particles, and electrical power systems on the ground collapse, you can blame the solar wind. Space physicists have long known that the gale of charged particles howling by Earth at supersonic speeds bears the ultimate responsibility for magnetic storms, but they have vacillated between two very different explanations of how the solar wind roils Earth's magnetosphere. Now, a study using the latest in magnetospheric probes—published in the 1 September issue of *Geophysical Research Letters*—may settle the sometimes contentious issue: Both explanations appear to be right.

The events that precede the storms are not in dispute: The solar wind constantly peels back magnetic field lines from the sunward side of the comet-shaped magnetosphere into the tail, loading the tail with charged particles and magnetic flux. The controversy focuses on how that excess energy is released.

In the 1960s, Syun-Ichi Akasofu of the University of Alaska, Fairbanks, and the late Sydney Chapman, a founding father of magnetospheric physics, argued that days-long magnetic storms are fed by a string of half-hour-long substorms, which appear as sudden brightenings of the aurora. When the excess energy in the tail reaches a critical point, researchers came to believe, something snaps in the maze of magnetic fields and electric currents that links all parts of the magnetosphere. That snap slings charged particles earthward, where they energize the inner magnetosphere, spawning a huge electrical current that rings the planet above the equator and wreaking havoc on humans' electromagnetic devices.

That explanation held sway in the 1970s and '80s, but in the 1990s another interpretation gained favor: magnetospheric convection. According to this view, the imbalance in the magnetosphere is redressed by magnetic flux and particles steadily drifting or "convecting" back toward the sunward side, energizing the nightside of Earth as they go.

The new study, by Anthony Lui and his colleagues at the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Maryland, falls squarely in the middle ground. The APL group assembled observations of a 22 October 1999 storm that had been studied by an international consortium of researchers. Observations had been made from the ground by magnetometers and arctic radars monitoring the effects of the equatorial ring current, magnetospheric convection, and substorm activity.

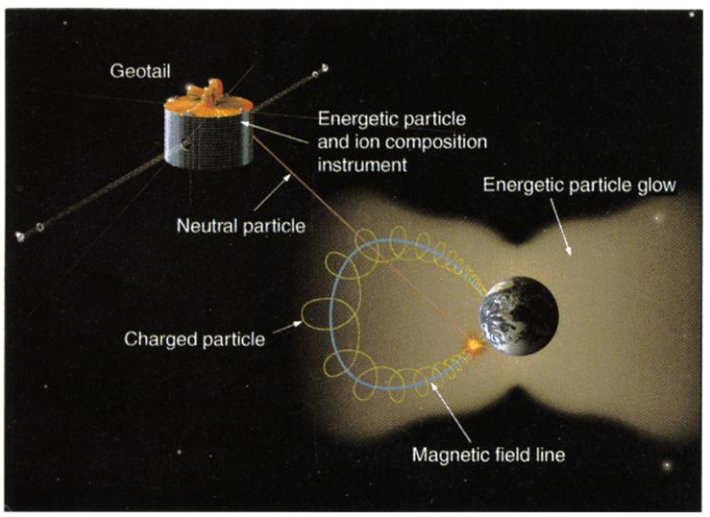
To this mix the group added energetic neutral atom (ENA) data collected by the Geotail spacecraft in distant Earth orbit. ENA is one of the first remote-sensing techniques that can "see" large parts of the magnetosphere in a single look (*Science*, 10 June 1994, p. 1531). Satellite-borne ENA "cameras" form a picture of charged particles trapped in the inner magnetosphere—especially in the ring current—by capturing the few particles that manage to escape after picking up an electron from the outermost fringes of the atmosphere. Their resulting neutrality lets them cut free of the entrapping magnetic field lines.

Lui and his colleagues found that the 22 October 1999 storm seemed to have a different driver at different times. At first, ENA data showed a sharp strengthening of the ring current as substorm activity jumped while magnetospheric convection remained subdued. That's "a very clear example of substorm contribution to storm buildup," says Ioannis Daglis of the National Observatory of Athens. A few hours later, substorms were muted, but convection and the ring current steadily intensified. "This shows enhanced mantle convection can bring the ring current [charged-particle] population up, too," says Lui.

Not everyone is convinced yet. "In the end this paper may even be correct," says Robert McPherron of the University of California, Los Angeles. "However, the data are much more difficult to interpret than the authors would have you believe. [And] the use of a single event to establish the conclusion is highly suspect."

In fact, more cases are on the way. The Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) satellite, launched last year in March, has three instruments specifically designed as ENA imagers. Preliminary analyses of data from IMAGE and the Polar satellite, which also has an instrument useable for ENA, at Los Alamos National Laboratory in New Mexico show both drivers at work in other magnetic storms, says Geoffrey Reeves of LANL. These and other satellite remote-sensing results should be presented in the next few months.

–RICHARD A. KERR



Seeing the invisible. Magnetically trapped charged particles reveal themselves to an ENA instrument when a few particles are neutralized and escape.

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MALARIA RESEARCH

Two New Steps Toward A 'Better Mosquito'

BARCELONA, SPAIN—Motivated by more than a million deaths from malaria a year, scientists have long fantasized about the ultimate method of eradication: replacing existing mosquito populations with ones unable to spread the disease. At a meeting* last week, researchers presented two studies

* Third International Congress of Vector Ecology, Barcelona, Spain, 16–21 September.