Ozone hole starts strong, fades quickly

The ozone hole currently hovering over Antarctica has once again forced scientists to gulp down a strong dose of humility. Confounding expectations, the hole didn't even come close to record depths this month.

The lowest ozone concentrations above Antarctica this year measured 111 Dobson units, according to data collected by the Total Ozone Mapping Spectrometer (TOMS) on NASA's recently launched Earth Probe satellite. "That is nowhere close to a record," says Arlin J. Krueger of NASA's Goddard Space Flight Center in Greenbelt, Md.

The stratospheric ozone hole—a patch of sky marked by extremely low concentrations of ozone—has formed over Antarctica each August and September since the late 1970s. During these months, springtime sunlight returns to the cold polar skies and powers chemical reactions in which chlorine and bromine pollution destroy ozone.

As atmospheric chlorine and bromine have grown more abundant over the last 2 decades, the ozone hole has gradually worsened. In 1993, a TOMS device on a Russian satellite measured an all-time low of 85 Dobson units. In 1995, that instrument was no longer working, but balloon-borne instruments measured near-record values below 100 Dobson units in the atmosphere above the South Pole.

David J. Hofmann of the National Oceanic and Atmospheric Administration in Boulder, Colo., predicted earlier this year that ozone amounts in 1996 would drop below those of 1995.

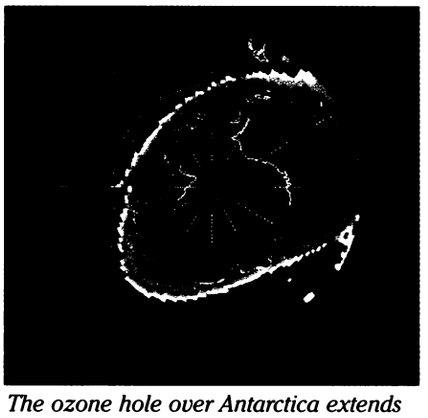
"He blew it," says Krueger.

Hofmann based his prediction on the status of upper atmosphere winds above the equator. When the winds shift toward the west—as they did this year—more air tends to blow toward the poles. This influx of air would bring more pollution and exacerbate Antarctic ozone loss, he suggested in the Sept. 12 NATURE.

The prediction showed promise when the 1996 hole first formed. At that time, the area of ozone depletion was growing extremely rapidly. Then, in the first week of September, the situation began to change. Stratospheric pressure patterns buffeted the giant vortex of winds that normally isolates the Antarctic atmosphere. With this vortex pushed off center and weakened, the process of ozone destruction slowed.

The inability to forecast the ozone hole is nothing new. Scientists failed to anticipate the hole when it first appeared in the 1970s and have since had little success in predicting its annual variability. Still, atmospheric chemists are confident that pollution controls will allow the ozone layer to recuperate after the year 2000. *— R. Monastersky*

NASA



The ozone hole over Antarctica extends outward to the blue bands.

Research funds increase in federal budget

Bruised by last year's government shutdown, Congress approved the 1997 budget on Sept. 30, hours ahead of the new fiscal year. Legislators granted science a respite, increasing funding slightly while backing away from earlier threats to cut research.

The 3,000-page spending bill provides $74 billion for research and development (R&D) in FY 1997, a $3 billion boost over last year, according to the American Association for the Advancement of Science in Washington, D.C. (SN: 10/12/96, p. 235). However, the AAAS contends that the increases fail to make up for cuts during the last 3 years.

"Had Congress followed the budget resolution that called for extensive cuts... the news would have been much worse," said Al Teich, AAAS director for science policy. "Science dodged a bullet this year."

Teich says that only the National Institutes of Health and the National Science Foundation have received enough support in recent years to beat inflation. NIH, which funds biomedical studies, won a 6.9 percent hike, raising its research budget to more than $12 billion in FY 1997. Basic research, spread over all federal agencies, including NIH, received a 2.7 percent raise, reaching nearly $15 billion in FY 1997.

Among major research agencies, only the National Aeronautics and Space Administration suffered cuts. Its research budget, declining for most of the decade, fell 1.6 percent, to a little over $9 billion in FY 1997.

Some analysts suggest that Congress passed the 1997 budget quickly so members could resume campaigning for reelection. Eager to avoid an unpopular budget showdown like last year's, legislators decided to fund projects in amounts about halfway between their earlier proposals and agency requests.

"The budget agreement reflects political priorities more than scientific priorities," says Steven Aftergood of the Federation of American Scientists in Washington, D.C.

"We didn't do that bad and we didn't do that great," said Robert L. Park of the American Physical Society's Washington, D.C., office. He adds that budget reductions now being planned for FY 1998 offer a bleak outlook for science, regardless of the results of November's elections. "We haven't hit the cliff yet on the budget projections."

Despite a reversal of past budget cutting, some habits proved hard to change. Park notes that three retiring senators slipped $30 million of science earmarks, projects not subject to peer review, into this year's budget. "It's nothing new. Get the budget up against a deadline and they slip anything they want in there." *— D. Vergano*

A hormone's reputation takes a beating

Composed of just nine amino acids, oxytocin is a small hormone with a big reputation. Used for decades to induce labor in women, it has been thought essential for female mammals to give birth and provide milk to their young.

On the behavioral front, animal studies have indicated that oxytocin drives the chemistry of mating, triggering the arching of females' bodies in readiness for copulation and the erections and ejaculations of males. Research on prairie voles and rats also offered a persuasive case that the hormone inspires maternal behaviors, such as nest building and licking of newborns.

Much of the conventional wisdom about oxytocin now lies in ruins. Mice deprived of the hormone mate naturally, and the females give birth on time and without apparent problems. The mothers also seem to care for their young as normal mothers do.

"This was one of those papers you hope never to have to write," jokes Thomas R. Insel, head of a research group at Emory University in Atlanta that for years has studied oxytocin's influence on mammalian behavior.

Insel and his colleagues, in collaboration with a group headed by Martin M. Matzuk