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CRAY Research Honors NCAR Scientist and Naval Postgraduate School Colleague with Performance Award at Supercomputing Conference

Robert M. Chervin, a climate modeler with NCAR's Climate and Global Dynamics Division, and Albert J. Semtner, a professor with the Naval Postgraduate School in Monterey, California, formerly with NCAR, were awarded a Gigaflop Performance Award by Cray Research, Inc., on November 13, in Reno, Nevada, as part of the national Supercomputing '89 conference.

Chervin and Semtner were honored "for their achievements in meeting climate modeling challenges by restructuring and converting atmospheric and ocean general circulation models for parallel execution at a sustained speed of 1.125 gigaflops."

Chervin and Semtner's winning model achieved gigaflop performance by taking advantage of all eight parallel processors of the CRAY Y-MP at the Cray corporate computer center in Mendota Heights, Minnesota. This ocean model is a full production model and is used regularly on the the CRAY X-MP at NCAR, which has four parallel processors.

Their award was among twenty presented to computational researchers who are doing real-world work on Cray Research machines at speeds of more than one billion calculations per second (one gigaflop). The fastest program ran at 1.708 billion (giga-) floating point operations per second (flops). The award-winning programs came from most major areas of supercomputing, including weather, petroleum industry, aerospace, medicine, finance and chemistry.

Chervin and Semtner have developed a numerical model that simulates the world oceans' three-dimensional behavior. The model's present configuration contains 20 levels vertically, and 280 latitude by 720 longitude grid points. It requires considerable use of the CRAY's solid-state disk as well as much of the main memory, and use of all parallel processors, because the dominant features of the real ocean are 1/10th to 1/100th the size of atmospheric phenomena and have time scales 10 times longer. For example, it takes the atmosphere a year to reach equilibrium after some change is introduced, while the ocean needs decades to approach a near equilibrium state (when the upper ocean no longer is undergoing long-term changes).

Scientists have been unable to achieve this degree of realism in a global model without supercomputing technology and the application of parallel processing.

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