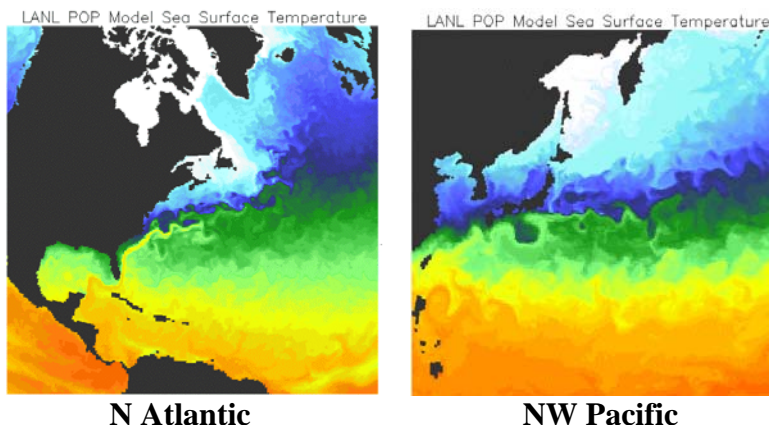**POP Science Runs**   **April 4, 2006**

A series of runs were recently made using LANL's Parallel Ocean Program (POP) model. Mark Taylor (1433) in collaboration with Mat Maltrud (LANL) performed two 10 year simulations on 5000 processors on Red Storm. The model resolution was $1/10^{th}$ of a degree (3600x2400x40) which resulted in 350 million grid points and 1.5 TB of output data. Results from these runs showed improved results for the Gulf Stream separation, NW corner, Agulhas rings, and Kuroshio current.

N Atlantic   **NW Pacific**

A series of benchmark runs were also made to compare the performance of POP on Red Storm (RS), Blue Gene Light (BGL), and the Earth Simulator (ES). Some of the resulting data are shown in the Table 1. Here, the numbers of processors required to yield particular real-time simulation-time ratios (simulation rates) on the three machines are given. It is interesting to note that ES requires roughly $1/4^{th}$ the number of processors that RS needs for simulation rates of 1yr/day and 3 yr/day. On the other hand, only RS can make calculations for simulation rates of 6 yr/day due to the fact that the peak performances of BGL and ES have been exceeded such that adding more processors actually increases run times.

Red Storm   **Blue Gene Light**   **Earth Simulator**

Real time Sim time	NCPU	Computer
1 yr/day	700	RS
	3000	BGL
	128	ES
3 yr/day	2000	RS
	8000	BGL
	500	ES
6 yr/day	8000	RS
	Not possible	BGL
	Not possible	ES

Table 1 Number of CPUs Required to Achieve Various Simulation Rates

Contact: Mark Taylor (1433, 284-1874) or Jim Strickland (Manager 1433, 844-8421)