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The Earth Simulator and Its Impact on Science and Technology

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Abstract

The Earth Simulator Research Project started in March 2002 with primary objective of producing reliable prediction data for the global environmental change. Within a couple of months after the start of operation, the Earth Simulator achieved an amazing performance of 35.86 Teraflops (about 90% of the peak performance of 40.92 Teraflops) for the Linpack benchmark test and, more surprisingly, 26.58 Teraflops for a typical application program of global atmospheric circulation (AFES) with a horizontal resolution of 10 kilometers. Global atmospheric and oceanic circulation simulations we have obtained for the first year's operation of the Earth Simulator clearly indicate its superior ability. Other products such as the seismic wave propagation near the pacific side of Japan and carbon-nano-tube dynamics also indicate the excellence of the Earth Simulator, some of which will be presented in this talk. These facts are good enough that the Earth Simulator would make a real revolution in science, industry, and human thinking, as well as finding the best human's wisdom to keep a sustainable symbiotic relationship with nature.