Los Alamos National Laboratory Associate Directorate for Theory, Simulation, and Computation (ADTSC) LA-UR 13-20839

Climate, Atmospheric, and Earth Systems Modeling

LANL is a world-renowned research institution in the area of climate and ocean modeling, stemming from its seminal work on nuclear winter several decades ago which derived from LANL's nuclear weapons activities. LANL scientists are responsible for the ocean and sea ice models in the Community Climate System Model and, as such, are also key contributors to Intergovernmental Panel on Climate Change analyses. The articles in this section highlight new discoveries using state-of-the-art, integrated simulations (glacial response to climate change, understanding unique observations of ocean circulation), new research in the creation of more accurate simulation tools with better modeling capabilities (new parameterizations of sea ice melt ponds, the application of uncertainty quantification), new modeling results for ocean simulations and three-dimensional eddies, the exploration of important new techniques for multi-resolution modeling (a requirement for the understanding of regional climate effects), and seminal work in the understanding of ocean turbulence and eddy formation. These developments are key in the ongoing quest to understand and quantify our changing climate.