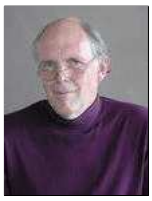
SL14I_12781

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004



Ocean Circulation and Its Influence on Climate

Peter B. Rhines

University of Washington, Seattle, USA

Heat- and water transports by the atmosphere- and ocean circulations are principal elements of global climate. Natural variability and human-induced emissions combine to create active patterns of climate change which are not reflected in overall averages like global mean-surface temperature. Some of these patterns are well-known, like el Nino/Southern Oscillation cycles and the North Atlantic Oscillation; others are less familiar and may be abrupt: the 30-year decline in salinity of the northern Atlantic, invasion of the Arctic by warm Atlantic waters, and the rise and subsequent decade-long decline in the subpolar North Atlantic circulation, and the pattern of global heat content and upper ocean salinity increase in the subtropics. Dynamical elements of Rossby-wave theory, jet dynamics, stratified spin-up, and rotating convection seem to be important. We also describe a new invention, the Seaglider, with which we are patrolling the cold northern oceans to examine the structure of abruptly changing climate.

View the extended summary