



**Department of Energy**  
Office of Science  
Washington, DC 20585

Office of the Director

April 21, 2004

Dr. Keith O. Hodgson  
Director, Stanford Synchrotron Radiation Laboratory  
Department of Chemistry  
Stanford University  
Stanford, CA 94305

Dear Dr. Hodgson:

By this letter, I am charging BERAC to provide advice to the Office of Science on two climate change research issues related to predicting future changes in climate and understanding the potential for and risks of future changes in climate.

BER conducts research to reduce the scientific uncertainties in simulating and modeling the effect of clouds and cloud feedbacks on climate. It has been argued that the current rate of progress using statistical cloud parameterization schemes is inadequate and that a new and different strategy is needed to accelerate progress in model improvement.

Accordingly, I request that BERAC advise me on whether BER should invest more in research to evaluate the viability and effectiveness of other approaches to modeling cloud processes and properties and their effects on climate. I am especially interested in whether it should invest more in research to explore the capabilities of the so-called superparameterization approach, including its data and computational needs. Should BER support a major research effort to develop improved superparameterization methods and to evaluate the application of such methods to the simulation of regional and global-scale climate responses to human-induced forcing? If so, and if no new funding for such an investment is forthcoming, what areas of climate change research in BER's current portfolio does BERAC suggest be reduced, delayed, or terminated to free funds for new investments on this or other approaches?


The second area on which I would like advice from BERAC is the issue of abrupt climate change. A recent National Research Council report on this topic highlighted the need to improve both the fundamental knowledge base related to abrupt climate change and modeling focused on abrupt change. It also identified a need to investigate no-regrets strategies to reduce vulnerabilities to abrupt climate change. I am charging BERAC to advise me on whether BER should initiate a focused investment in research specifically targeted on scientific uncertainties of abrupt climate change. If so, what specific areas of research on this topic does it recommended BER undertake that would effectively complement what other agencies are currently supporting and leverage DOE capabilities



and strengths? Finally, if no additional funds are forthcoming to invest in such research, which areas of climate change research currently supported by BER would BERAC recommend delaying or terminating to make funds available for the new investment?

I request that BERAC report on its findings and recommendations at the November 3-4, 2004, meeting of the BERAC.

Sincerely,

  
Raymond L. Orbach  
Director

cc: Ari Patrinos  
Jerry Elwood  
David Thomassen