



JSR-95-317

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Dr. Ari Patrinos  
Director, Health and Environmental Research  
U.S. Department of Energy  
ER-74  
Washington, D.C. 20585

Dear Ari:

You have asked for a summary of our views on ARM. This letter provides that. We are also preparing a more technical report that will be sent to you.

ARM is a highly focused program designed to improve our understanding of the transport of infrared and solar radiation through the atmosphere. The program pays particular attention to the interaction of radiation with the three phases of water. The goals of ARM are usually articulated in terms of improvements in climate models. We agree that ARM can indeed make significant contributions to the understanding of climate change. In addition we believe that the results of the program will have wide applicability to a broad range of problems, including more accurate short-term and seasonal weather forecasting.

ARM has made remarkable progress over the past two years. The Southern Great Plains (SGP) site is operational, though further instrumentation will increase its value. The ARM data system is delivering high-quality data to its science team. This system includes data not only from the ARM array of instruments, but also from the NOAA radar and wind profiles, operational satellites, and the Oklahoma Mesoscale Measurement Network. The ARM archive is storing this data in a format that makes for easy retrieval by scientists worldwide.

Preparations for the second site in the Tropical Western Pacific (TWP) have made significant progress, and the site should be operational in 1996. The TWP site will contribute to the understanding of such phenomena as El Niño, and therefore to the possibility of seasonal forecasts. Preliminary work is also underway to prepare for an ARM site on the North Slope of Alaska, which will aid in understanding atmosphere/radiation interactions in the Arctic.

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P.O. Box 1474  
La Jolla, California 92038  
(619) 459-9701

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The Department of Energy's ARM program is clearly the jewel of the U.S. climate change program. ARM is well managed, and has gained the attention of many of the world's leading atmospheric scientists. Strong institutional ties have been established between the program and government agencies such as NOAA and NASA, and between the program and universities and international groups

Against this glowing picture of ARM, we are increasingly concerned about the program's future --- a concern that is increased by our recognition of ARM's potentially great value in several areas. Our uneasiness centers on the linked issues of central mission, budget, and wide use of the ARM facilities by other groups.

Documents describing ARM, and public presentations on ARM, invariably emphasize ARM's contribution to improving global circulation models (GCMs), and thus to deepening our understanding of global climate change. As noted above, we believe that ARM does indeed play a key role in climate change research. However, this narrow definition of ARM's mission should not hide the fact that understanding radiative transport in the atmosphere is also central to improving day-to-day weather forecasting. Support for climate change research is highly vulnerable to shifts in political winds, but no one questions the economic value of better weather prediction. We understand that weather forecasting is in NOAA's domain, but strong collaboration between NOAA and ARM can dampen this potential turf skirmish. Turf concerns cannot be allowed to suppress the recognition that ARM will make significant contributions both to weather forecasting at the time scale of days and, through the TWP-like site, to seasonal forecasts.

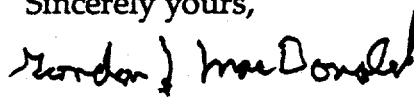
At best, ARM can anticipate level funding over the next few years. Overall budget pressures indicate that the ARM budget may very well be cut. Already, the SERDP support for the UAV component of ARM has melted away. In this stringent budget situation, there is danger that the program will spend in such a way that the quality and depth of ongoing activities will suffer. We would give the SGP site the highest priority, with the TWP site a strong second priority. A strong case can be and has been made for an Arctic site, work on this site should not proceed if doing so would imperil programs underway at the SGP and TWP sites.

DOE funding has created a unique facility at the SGP site. An array of instrumentation provides the capability to describe the state of the atmosphere with a greater resolution and fidelity than is available at any other site. At the same time, interest in remote sensing is exploding worldwide. NASA is poised to launch its Earth Observing System. Three U.S. commercial consortia have obtained licenses to place in orbit high-resolution (1-meter) photographic

systems. The U.S. classified community continues a very active, advanced program in remote sensing, as do France, China, India, Brazil, and Canada, among others. Commercial firms worldwide carry out airborne remote sensing operations. A significant requirement in all these activities is the validation of the remotely sensed data. In many cases, instrument calibration requires a well characterized atmosphere. The SGP site meets many of the requirements of a validation/calibration site for remote sensing instrumentation.

As a result of a JASON suggestion, DOE is currently negotiating with the classified imagery community to use the ARM site for validation and calibration. In addition, ARM and NASA have begun discussions with respect to using the SGP site for validation. We believe that ARM management should aggressively pursue further possibilities for use of ARM facilities by other developers and users of remote sensing technology. In fact, we recommend that ARM management prepare a "business plan" for the use of the SGP site by government and commercial users of remote sensing. Such activities will increase the visibility and support, both political and budgetary, of ARM activities. Given that political support for climate change-oriented ARM programs may waver in the future, an ARM program with multiple goals will have a better chance for long-term, stable support.

Sincerely yours,



Gordon J. MacDonald  
Mal A. Ruderman  
Sam B. Treiman

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