

MAGIC update 2011-11-30

Thanks to everyone who responded and provided feedback on the first MAGIC update last week. There were many of you who kindly volunteered their time to endure the hardships of traveling to Hawaii. Rest assured that I will keep each of you in mind, but this choice is not mine to make, as the conditions under which this project will be carried out are quite different from other projects in which many scientists are involved. I will attempt to explain, to the best of my knowledge, the bases for some of these differences.

The MAGIC proposal was submitted to and accepted by ACRF, the Atmospheric Radiation Measurement (ARM) Climate Research Facility (<http://www.arm.gov/>), a user facility of the U.S. Department of Energy (DOE). ARM started more than 20 years ago and consisted of a science component and an operations component. The science component recently merged with the former Atmospheric Science Program of DOE to form ASR, Atmospheric System Research (<http://asr.science.energy.gov/about/>), which funds scientists at universities, national laboratories, and the private sector. The operations side of ARM became ACRF, which consists of an aerial facility (<http://www.arm.gov/sites/aaf/>), three fixed sites (<http://www.arm.gov/sites/>), and two mobile facilities (<http://www.arm.gov/sites/amf/>), together with an operations team that is responsible for obtaining, ingesting, and archiving the measurement data that are collected. The fixed sites are the Southern Great Plains site in Oklahoma, the North Slope of Alaska site at Barrow, and the Tropical Western Pacific sites in Manus, Papua New Guinea, Nauru Island, and Darwin, Australia. These sites, which have been performing long-term measurements of clouds, precipitation, aerosols, and atmospheric radiation for many years, provide valuable data for understanding processes affecting climate in different locations. The first ARM mobile facility has been in operation for several years and has been deployed at different locations around the world for up to a year. The Second ARM Mobile Facility, AMF2 (<http://www.arm.gov/sites/amf/amf2/>), came on line last year and is the one that will be deployed on the Horizon *Spirit* for MAGIC.

The term “atmospheric radiation” in the present context refers to infrared (pronounced in' fra red'), visible, and ultraviolet light (not to radioactivity). The radiation of interest here is distinguished into so-called shortwave (SW) and longwave (LW). Shortwave radiation is the radiation coming

from the sun—some of it visible light, some with wavelengths greater than visible light (infrared), and some with wavelengths less than visible light (ultraviolet). These latter two cannot be seen by the human eye but can be detected with instruments. As the light from the sun carries energy, knowledge of how much of this incoming radiation reaches Earth's surface as opposed to being scattered by clouds back to space, for instance, is essential for understanding Earth's energy balance. Longwave radiation is the infrared radiation emitted by Earth. It is the principal means by which Earth loses energy to space. Radiation and Earth's energy balance, both of which are important topics for climate, will be discussed in future updates.

As indicated above, the MAGIC proposal was accepted by ACRF. In contrast to scientific proposals that many are accustomed to, however, this is not a grant or contract to conduct measurements, but rather an agreement on the part of ACRF to deploy the instruments (i.e., install them on the ship) and provide the staff who will go on the ship to take the desired measurements. To the extent that I or any other scientist goes on any of the legs of the deployment (and I plan to go on several) it will be in the role of observer, rather than as someone operating the instruments. The data from MAGIC, as well as the data from all other field campaigns and those from the long-term measurements at the fixed sites, go to the ARM Data Archive where they will be available to the scientific community (<http://www.archive.arm.gov/armlogin/login.jsp>) who will use them to test hypotheses and models, to attempt to find the best way of representing quantities in computer codes, and to improve understanding of various aspects of clouds and climate.

As is obvious by now, the field is rather acronym-intensive, and it has taken me quite some time to navigate through the mazes of letters. I have attempted to define all the acronyms I have used in these updates with the exception of MAGIC itself, which will be the topic of a future update.

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Please address any questions or comments to elewis@bnl.gov.

All updates and other MAGIC information can be found at <http://www.ecd.bnl.gov/MAGIC.html>.