

(70-240405-A) Radiometer Upgrades for the Atmospheric Radiation Measurement (ARM) Program: Current Status

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Since 1995, the National Renewable Energy Laboratory (NREL) has been providing research and operational support to the U.S. Department of Energy's Atmospheric Radiation Measurement (ARM) Program. The principal goal of the ARM Program is to provide accurate measurements of atmospheric properties important to the development of improved general circulation models needed to predict climate change. Measuring and understanding the earth's radiative flux balance is central to this effort.

ARM operates climate research facilities in the Southern Great Plains, North Slope of Alaska, and ARM mobile facilities to provide research-quality measurements of the atmosphere. Consequently, the ARM program deploys radiometers in the SKYRAD, GNDRAD, and SIRS instrument platforms to measure broadband solar and longwave radiation at these locations.

The broadband radiometers manufactured by Eppley Lab have been deployed at ARM since the inception of the program. The Eppley radiometers such as, NIP, 8-48, and PSP needed to be upgraded based on recent advances in radiometric instrumentation technology. The ARM program, therefore, decided to upgrade these radiometers to Hukseflux radiometers. However, these thermopile radiometers, whether from Eppley or from other manufactures such as Hukseflux are susceptible to various types of systematic errors such as infrared loss (IR loss) that occur during calibration and field measurements. These are documented in the literature. However, the expectation is that the newer radiometers will have reduced systematic errors. In this presentation, the magnitude of these systematic errors will be presented by comparing the Eppley and Hukseflux radiometer data. Moreover, the plan of value-added radiometric data products will be discussed.

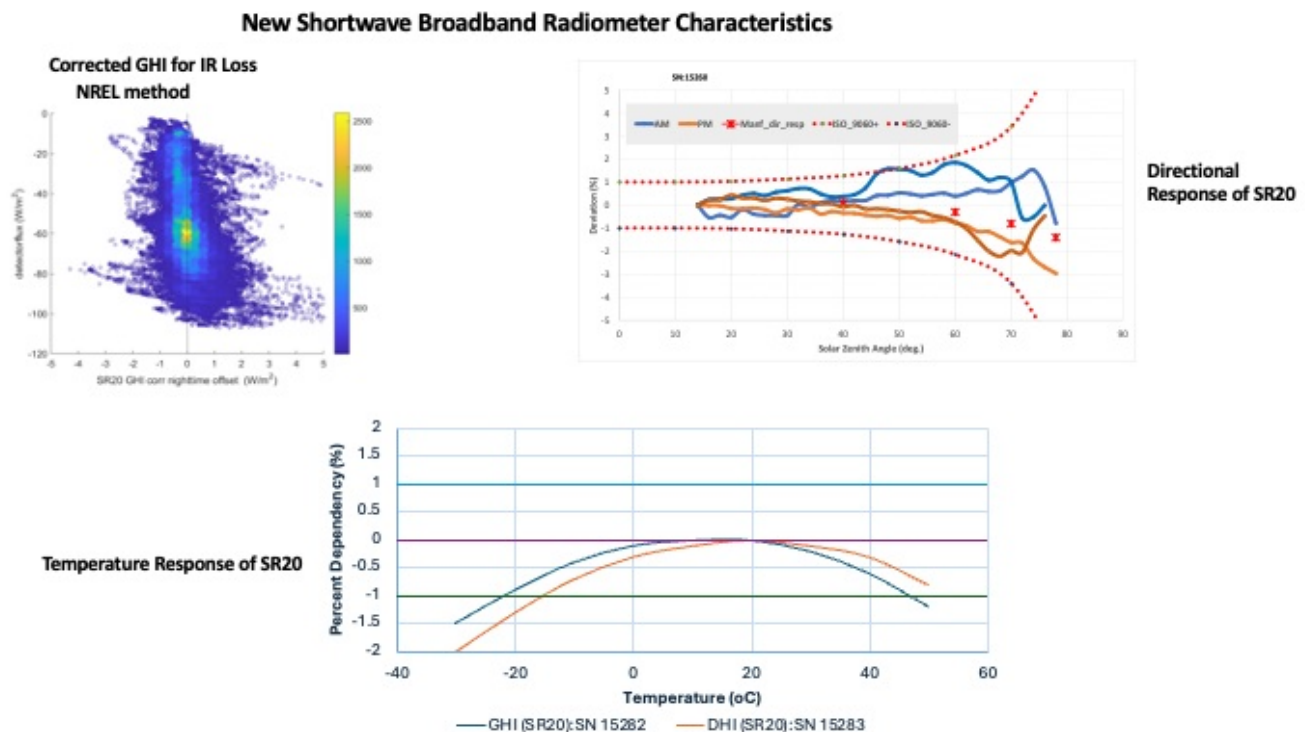


Figure 1. Hukseflux Model SR20 - Shortwave Radiometer Characteristics