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ADVANCES IN THE BROADBAND HEATING RATE PROFILE (BBHRP) VAP

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ABSTRACT

The Broadband Heating Rate Profile (BBHRP) VAP is a collaborative effort of all ARM Working Groups to create long-term datasets of computed vertical radiative heating rate profiles for all ARM Climate Research Facilities (ACRFs). The BBHRP VAP provides the climate processes community with a cohesive, easy-to-use data set to both validate and drive their models in clear and cloudy sky conditions. The accuracy of these heating rates is being established by extensive comparisons of corresponding computations of surface and top-of-atmosphere irradiances with radiometric measurements at the ACRFs. This effort is designed to build upon and broaden the fruitful long-standing series of measurement-model comparisons of clear-sky longwave surface radiation at the SGP ACRF. The BBHRP VAP has advanced considerably this year at the SGP and NSA ACRFs, with planning for the TWP and Point Reyes AMF deployment now underway. The BBHRP VAP transitioned from a product available only at radiosonde launch times to a product available every 20 minutes throughout the annual cycle due to the incorporation of the ARM Merged Sounding VAP. With so many more data points available, a more robust analysis of cloud retrieval comparisons for SGP (year 2000) has been performed. Additionally, a study at the SGP ACRF to determine the optimal averaging time for cloud properties in order to achieve radiative closure with instantaneous irradiance measurements was completed. For the NSA ACRF, an initial evaluation of a new cloud retrieval product shows promising results for the prevalent class of clouds with very low optical depths. Advances have also been made this year to provide the user community with improved tools to evaluate their new parameterizations, most notably cloud retrieval algorithms, and input sources on measurement-model comparisons within the BBHRP framework. The results, input and output files, documentation, current development plans, etc. for the project continue to be frequently updated on the BBHRP Web site. A subset of this material corresponding to the most recent reference version of BBHRP is now available as an ARM PI product.

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