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ASSESSING OCEAN BUOY SHORTWAVE OBSERVATIONS USING CLEAR-SKY MODEL CALCULATIONS

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SUMMARY

Comparison of ocean buoy observations and model calculations of incoming clear-sky surface shortwave radiation is performed in order to assess the buoys' general reliability under operating conditions. The buoy data employed for this study comes from several experimental and operational deployments conducted by Woods Hole Oceanographic Institution (WHOI) and Pacific Marine Environmental Lab (PMEL). WHOI deployments include the Frontal Air-Sea Interaction Experiment (FASINEX), Marine Light Mixed Layer Experiment (MLML), Coupled Ocean Atmosphere Response (TOGA COARE), Subduction Experiment, Arabian Sea Experiment, Pan American Climate Study (PACS) and Biowatt. PMEL deployments include the Tropical Atmosphere Ocean (TAO) moored buoy array in the tropical Pacific Ocean. These moorings and their associated shortwave measurements represent the vast majority of open ocean in-situ shortwave observations available to date. Two separate schemes were used to filter the cloudy samples from the buoy shortwave time-series, one based on satellite values of cloudiness and a second scheme based on the buoy observations themselves and a number of additional constraints. The clear-sky model calculations of surface shortwave were computed using the single-column radiation code from the NCAR Community Climate Model, version 3 (CCM3). The primary uncertainty associated with the model calculations is the specification of the aerosol amount. In general, there was a fairly high level of agreement between the buoy and modeled values of clear-sky surface shortwave. However, there were a few buoys that exhibited significant model-data discrepancies (e.g., model-data biases exceeding 10%, or ~ 40 W/m^2). The possible reasons for these discrepancies were investigated. In some cases, unaccounted for aerosol variability in the model was found to be the most probable cause, indicating that observations were likely to be reliable. In other cases, the discrepancies appeared to result from sensor tilt associated with wind, currents or deployment/ mounting problems, and/or were possibly due to aerosol build-up on the sensor. The implications of the above results, along with additional details, can be found in Medovaya et al. (2002) and Waliser et al. (1999).

References

Medovaya, M.,D. E. Waliser, R. A. Weller, M. McPhaden, 2002: Assessing Ocean Buoy Shortwave Observations using Clear-Sky Model Calculations. J. Geophys. Res. - Oceans., 107, No. C2, 10.1029/2000JC000558.

Waliser, D. E., R. A. Weller, R. D. Cess, 1999: Comparisons Between Buoy-Observed, Satellite-Derived and Modeled Surface Shortwave Flux over the Subtropical North Atlantic During the Subduction Experiment. J. Geophys. Res., 104, 31,301-31,320.

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