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New global short-wave radiation climatology from VOS based on highly accurate parameterization.

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The talk will revisit the computation of short wave radiation at sea surface using VOS observations of cloud cover and meteorological state variables. For the development of new climatology of SW radiation we used newly designed parameterization based on 4 years of in-situ observations in the Atlantic Ocean. Parameterization for the first time accounts not only for the cloud amount but also for the forms of clouds that is critical under overcast and nearly overcast conditions. New parameterization was for the first time applied to the VOS meteorological observations (available from the latest update of ICOADS collection) on individual sample basis. In order to avoid the impact of inhomogeneous distribution of observations in time (resulting in strong biases and precluding the use of similar parameterizations for climatological computations) we used multiply computations with virtually rotated time for every VOS report. Climatology of SW radiation for the period from 1950 to 2011 has been intercompared with reanalyses and satellite radiative products. Furthermore, a comparison was performed with alternative SW parameterizations. Accounting for cloud types allowed for the identification of specific features of insolation at sea surface in the eastern parts of the ocean. Generally global mean insolation in our new climatology tends to be 1 to 5 Wm2 smaller compared to the estimates based on alternative parameterizations. Using new climatology we analysed climate variability in short wave radiation fluxes including estimates of long-term trends and oscillating shorter-term interannual modes.