

Optimizing the Efficiency of Measuring Instruments in Ouagadougou-Burkina Faso

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Abstract : At the moment, AERONET or AMMA database shows a large volume of data loss. With only about 47% data set available to the scientist, it is evident that accurate nowcast or forecast cannot be guaranteed. The calibration constants of most radiosonde or weather stations are not compatible with the atmospheric conditions of the West African climate. A dispersion model was developed to incorporate salient mathematical representations like a Unified number. The Unified number was derived to describe the turbulence of the aerosols transport in the frictional layer of the lower atmosphere. Fourteen years data set from Multi-angle Imaging SpectroRadiometer (MISR) was tested using the dispersion model. A yearly estimation of the atmospheric constants over Ouagadougou using the model was obtained with about 87.5% accuracy. It further revealed that the average atmospheric constant for Ouagadougou-Niger is $a_1 = 0.626$, $a_2 = 0.7999$ and the tuning constants is $n_1 = 0.09835$ and $n_2 = 0.266$. Also, the yearly atmospheric constants affirmed the lower atmosphere of Ouagadougou is very dynamic. Hence, it is recommended that radiosonde and weather station manufacturers should constantly review the atmospheric constant over a geographical location to enable about eighty percent data retrieval.

Keywords : aerosols retention, aerosols loading, statistics, analytical technique

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