Development of cumulative distribution functions for dry bulb temperature and evaluation of outside design condition for eighteen locations in Nigeria.

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Abstract

The probability density function (PDF) and cumulative distribution function (CDF) for eighteen locations in Nigeria were computed from long term hourly dry bulb temperature obtained from Nigerian Meteorological Services Agency, Oshodi, Nigeria for 1994-2008 or 1995-2009. Mathematical models were developed from the averages of the probability curves. The test for errors for the CDF model were carried out using mean absolute deviation (MAD), mean forecasting error (MFE) and mean absolute percentage error (MAPE) which gave maximum errors of 0.04, 0.03 and 4.14% for MAD, MFE and MAPE, respectively. With these results the model can be said to represent the actual data well. Then 0.4%, 1.0% and 2.0% annual percentile dry bulb temperatures were determined from the cumulative distribution curves. The coincident relative humidities were also obtained for the annual percentile dry bulb temperatures for each location. These values of annual percentiles serve as the design information for air conditioning systems for each location in this study.