**Air Quality Model Performance Metric Definitions**

Common Variables:

M, Cp = Modeled values/conc

O, Co = Observed values/conc

X = predicted or observed concentration

σ = standard deviation

n = count of samples (model-obs pairs)

**Standard Error and Bias Metrics (units of obs.)**

Mean Error = 

Other names & Abbrev: Bias, Mean Bias (MB)

Mean Absolute Error = 

Other names & Abbrev: MAE, mean absolute gross error

Root Mean Square Error = 

Other names & Abbrev: RMSE

**Systematic vs Unsystematic Error (units of obs.)**

Systematic RMSE (RMSEs) = 

Unsystematic RMSE (RMSEu) = 

Where C\* = , where a and b are the least squares regression coefficients of Cp and Co (the predicted and observed measurements/concentrations, respectively).

**Normalization Metrics (unitless)**

Normalized Mean Bias = 

Other names & Abbrev: NMB

Normalized Mean Error = 

Other names & Abbrev: NME

**Fractional Metrics (unitless)**

Fractional Bias = 

Other names & Abbrev: FB, Mean Fractional Bias (MFB)

Fractional Error = 

Other names & Abbrev: FE, Mean Fractional Error (MFE)

**Correlation Metrics (unitless)**

Correlation coefficient = 

Other names & Abbrev: CORR

Index of Agreement = 

Other names & Abbrev: IOA

Where:

Other names & Abbrev: AC

**Variability Measures (units of obs.)**



Standard Deviation =

Other names & Abbrev: SD, StDev, σ

Coefficient of Variation = 

Other names & Abbrev: COV