

Comparing Air Quality Observations and Model Outputs Techniques for Identifying and Comparing Relevant Time Scales

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Brief Description:

The air quality models REMSAD and CMAQ were used to generate hourly ozone estimates over the entire US for all of 2001. Here we compare time scales present in model outputs and observations using a selection of classical (spectrum analysis, time invariant linear filters) and novel approaches (empirical mode decomposition, temporal principal components, and wavelet filters). Among the definitions of time scales can be found average energy in a particular frequency band (spectrum analysis), spectral energy evolving over time (wavelet analysis) and temporal decompositions, which express a time series as a sum of several independent modes of variation and have as a goal untangling of the complex combination of forces that control air quality. These tools provide clues about the physical forcings that produce ozone and whether those forcings are captured by modeling systems.