Updates to ESRL's Flow-following Finite Volume Icosahedral Model (FIM)-Chem Global Modeling System and Comparison of Aerosol Optical Depth Forecasts with AErosol RObotic NETwork (AERONET) Observations

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Development of the FIM, ESRL's new global model for medium range weather forecasting, is being extended to include new improvements for aerosols, dust, and wild fires. The FIM uniquely combines 3 key modeling design components (icosahedral horizontal grids, isentropic-hybrid vertical coordinate, finite volume numerics), all critical to provide improved transport over existing models (e.g. Global Forecast System (GFS)). The isentropic-hybrid vertical coordinate is "flow-following" in that the vertical coordinate surfaces follow isentropic (constant potential temperature) surfaces through most of the atmosphere, from mid-troposphere upward to the model top (current testing at ~60 km). Aerosol interaction with atmospheric radiation is included using the GFS physics. The aerosol indirect effect can be tested using a newly developed convective parameterization (Grell and Freitas). We will show results of evaluating a three-month retrospective period with observed aerosol optical properties from AERONET network.

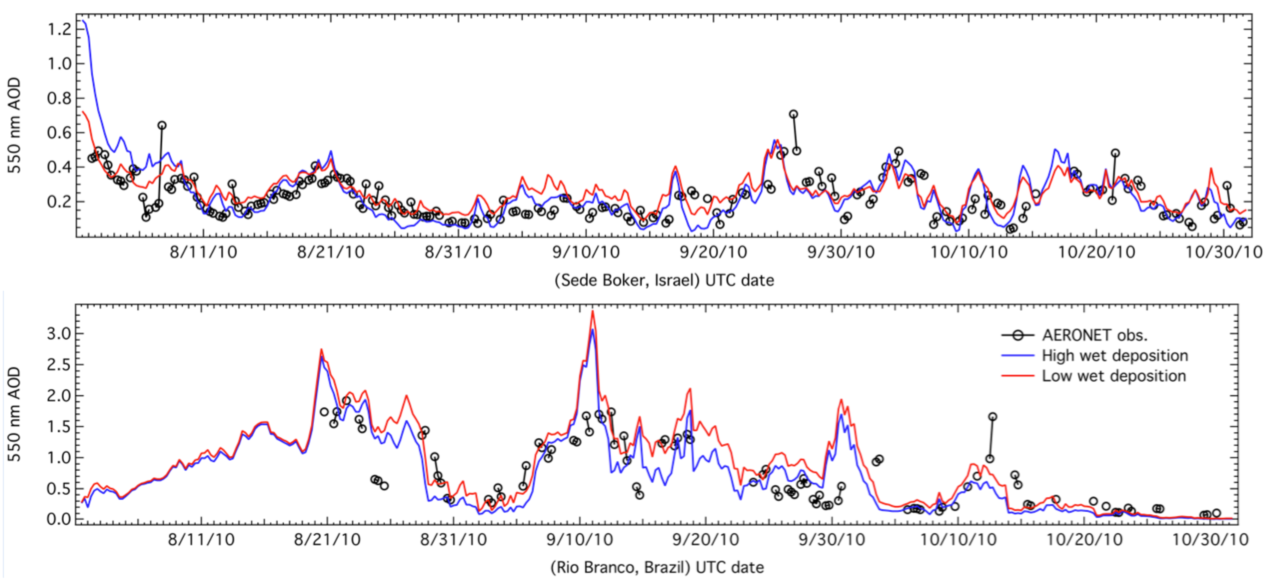

Figure 1. Comparison of AERONET observations with FIM-Chem model runs for a station with strong dust influence (Sede Boker, Israel) and wildfire influence (Rio Branco, Brazil).