Atmospheric
Chemistry
and Physics

Supplement of

Site representativity of AERONET and GAW remotely sensed aerosol optical thickness and absorbing aerosol optical thickness observations

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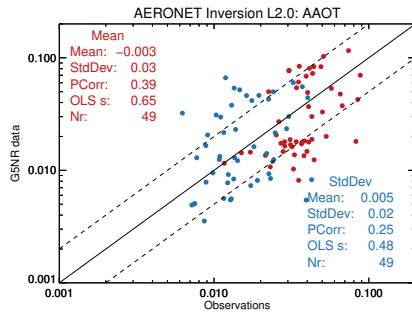*Correspondence to:* Nick A. J. Schutgens (n.a.j.schutgens@vu.nl)

Figure S1. Similar to Fig. 1, evaluation of the G5NR simulation AAOT with AERONET Inversion L2.0 data. Each dot represents the yearly mean or standard deviation for a single AERONET site (with at least 30 observations in 2006); the mean value is shown in red and the standard deviation in blue. The coloured text summarizes the statistics over all data points in the figure. Hourly G5NR model data was collocated in time & space with AERONET observations before calculating site statistics. Due to data scarcity a minimum of only 30 measurements per site was required.
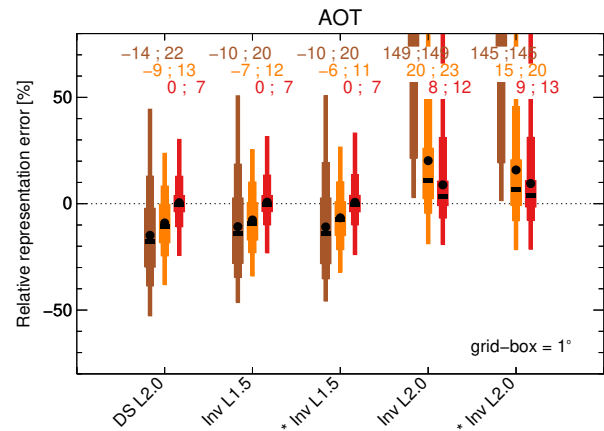

Figure S3. Yearly representation errors for AOT from AERONET for different products (DirectSun and Inversion) and a model grid-box size of 1°. The ∗ refers to Inversion products with artificially lowered temporal coverage in the Northern Hemisphere (see Sect. 4), but this appears to have little influence. The colours indicate different collocation protocols: yearly (brown), daily (orange) and hourly (red). Numbers on top are mean of the errors and mean of the sign-less errors.

Figure S2. Yearly representation errors for AOT from DirectSun L2.0 AERONET in different regions and a model grid-box size of 1°. The colours indicate different collocation protocols: yearly (brown), daily (orange) and hourly (red). Numbers on top are mean of t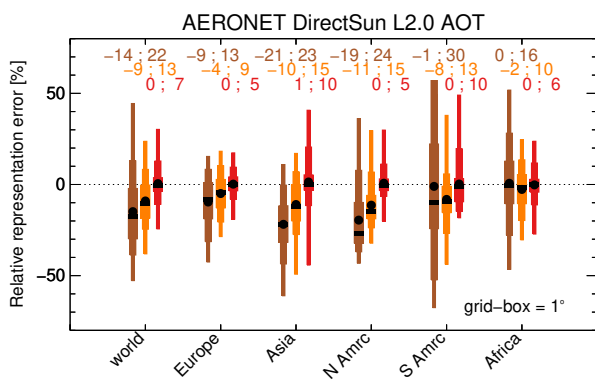he errors and mean of the sign-less errors. The large representation errors for South America are related to high cloudiness and subsequent low temporal coverage.
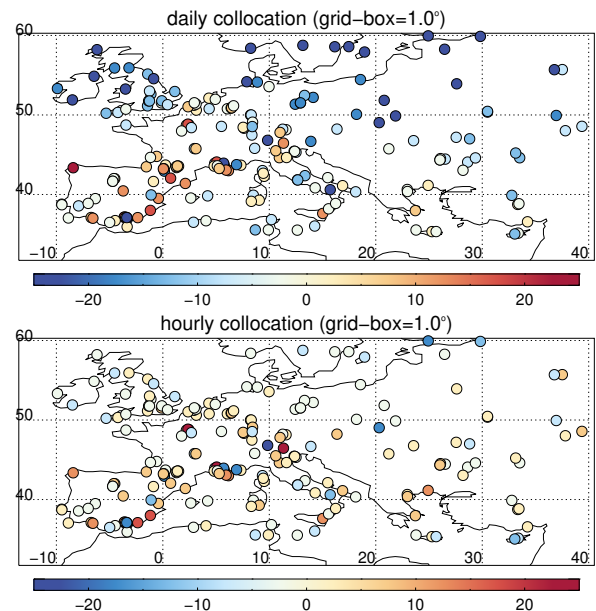

Figure S4. Yearly representation errors for AOT from DirectSun L2.0 AERONET in Europe, for two different collocation protocols (top: daily; bottom: hourly) and a model grid-box size of 1°.
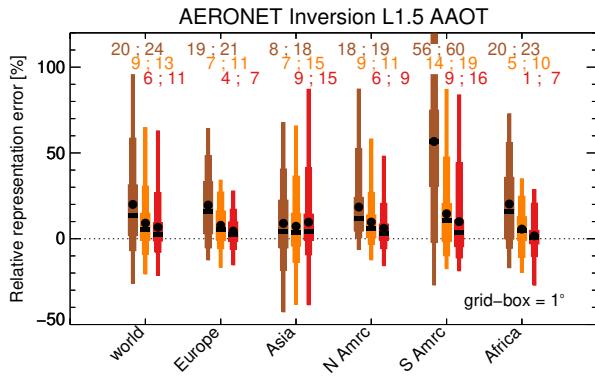
Figure S5. Yearly representation errors for AAOT from Inversion L1.5 AERONET in different regions and a model grid-box size of 1°. The colours indicate different collocation protocols: yearly (brown), daily (orange) and hourly (red). Numbers on top are mean of the errors and mean of the sign-less errors. The large biases in representation errors for the yearly protocol for South America and Africa are related to the episodic biomass burning season, outside of which fewer observations are made due to cloudiness.
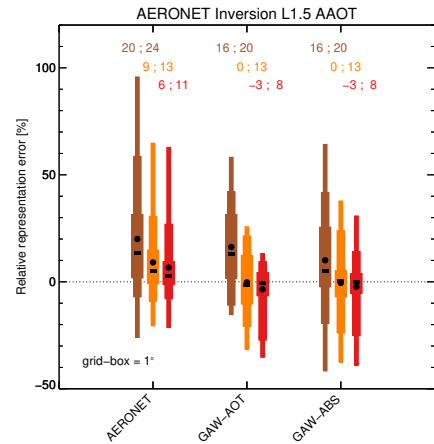

Figure S7. Yearly representation errors for AAOT from Inversion L1.5 AERONET and GAW and a model grid-box size of 1°. The colours indicate different collocation protocols: yearly (brown), daily (orange) and hourly (red). Numbers on top are mean of the errors and mean of the sign-less errors.
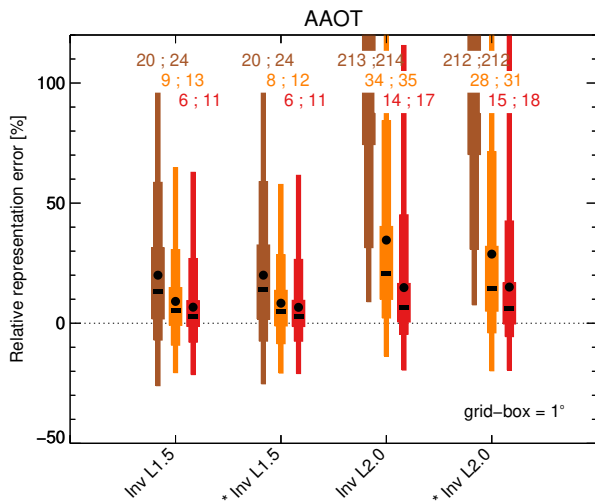

Figure S6. Yearly representation errors for AAOT from Inversion L1.5 AERONET from different products and a model grid-box size of 1°. The $*$ refers to Inversion products with artificially lowered temporal coverage in the Northern Hemisphere (see Sect. 4), but this appears to have little influence. The colours indicate different collocation protocols: yearly (brown), daily (orange) and hourly (red). Numbers on top are mean of the errors and mean of the sign-less errors.

Figure S8. Yearly representation errors for AAOT from Inversion L1.5 AERONET for different range scores r by Kinne et al. 2013, for a model grid-box size of 1°. The colours indicate different collocation protocols: yearly (brown), daily (orange) and hourly (red). Numbers on top are mea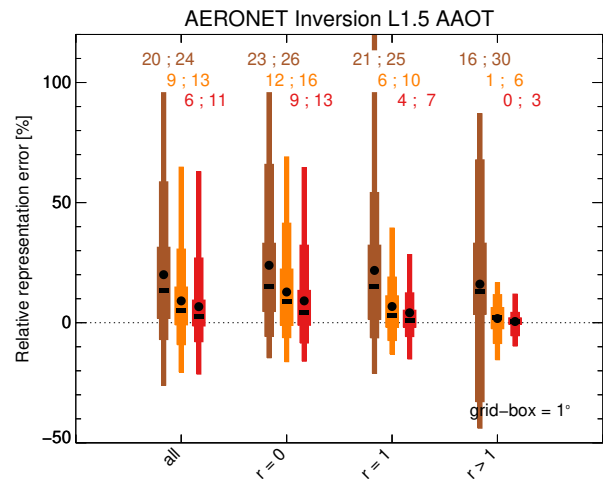n of the errors and mean of the sign-less errors.