Quantification of Uncertainties in OCO-2 Measurements of XCO₂: Simulations and Linear Error Analysis

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Supplementary Material:

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The following figures show the sensitivity of retrieved XCO2 to interference error caused by aerosol. Five composite aerosol types are shown, dust (DU), sea salt (SS), black carbon (BC), organic carbon (OC), and sulfate (SO). Each aerosol is considered separately in 2 layers, at $\sigma = 0.95$ and $\sigma = 0.5$. See section 3.3.1 of the paper for

25 details of the aerosol definitions and calculations.

In the figure labels, interference in the lower layer is referred to as 'Interference_1' while the upper layer is 'Interference_2'. All figures show the response of XCO2 to an error, or variability, of AOD = 0.1 in the relevant layer and aerosol type. All

30 figures are plotted on the same scale and with the same color sequence, to aide comparability.

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50 Figure 1. Dust (DU) in the layer surface - 750 hPa



Figure 2. Dust (DU) in the layer 750 hPa – top of atmosphere



Figure 3. Sea salt (SS) in the layer surface - 750 hPa



Figure 4. Sea salt (SS) in the layer 750 hPa - top of atmosphere

Figure 5. Black carbon (BC) in the layer surface - 750 hPa

80 Figure 6. Black carbon (BC) in the layer 750 hPa – top of atmosphere

Figure 7. Organic carbon (OC) in the layer surface - 750 hPa

Figure 8. Organic carbon (OC) in the layer 750 hPa - top of atmosphere

Figure 9. Sulfate (SO) in the layer surface - 750 hPa

105 Figure 10. Sulfate (SO) in the layer 750 hPa – top of atmosphere