

Supplemental Material

A Fast and Sensitive New Satellite SO₂ Retrieval Algorithm based on Principal Component Analysis: Application to the Ozone Monitoring Instrument

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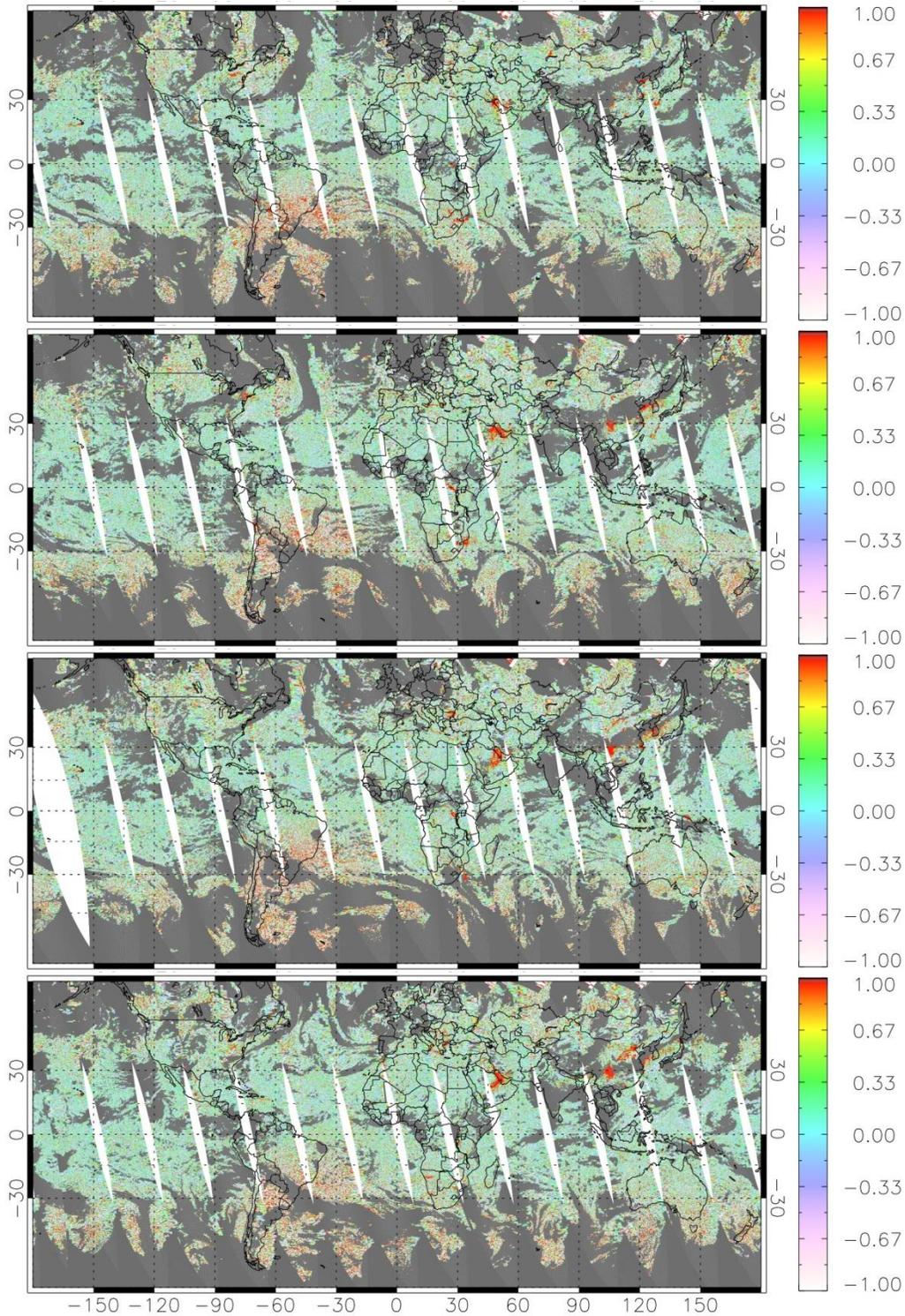


Figure S1. From top to bottom, daily OMI PCA SO₂ (units: DU) from August 13-16, 2006. Note the different color scale from monthly maps. Pixels outside the center 56 rows or with radiative cloud fraction > 0.3 or slant column O₃ > 1500 DU were excluded. In this case, the PCA algorithm captured the day-to-day variation in SO₂ over regions with strong SO₂ sources (e.g., the Eastern U.S. and eastern China) in response to change in weather conditions.

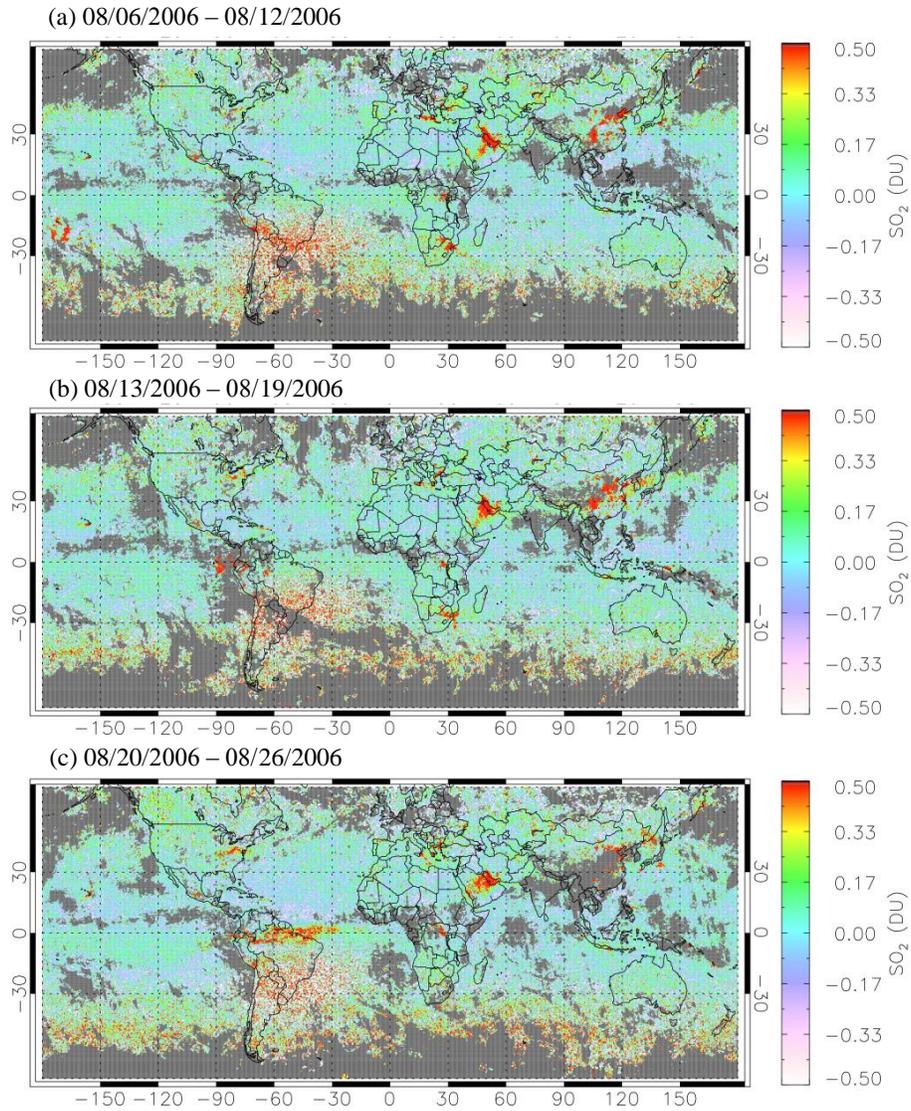


Figure S2. Weekly mean OMI PCA SO_2 for three full weeks in August 2006. Pixels outside the center 50 rows or with radiative cloud fraction > 0.3 or slant column $\text{O}_3 > 1500$ DU were excluded. Gray-shaded grid cells have less than 3 measurements during the week. Major anthropogenic SO_2 sources as well as some transient volcanic SO_2 plumes are visible on these maps, although the sampling coverage is smaller compared to the monthly map in Figure 2.

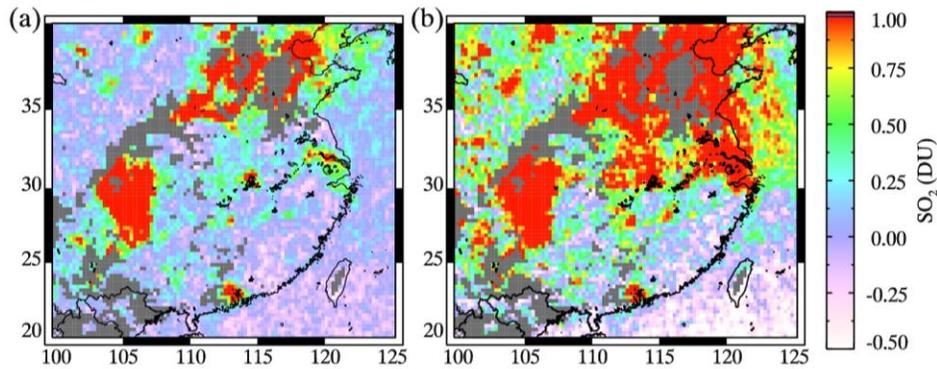


Figure S3. (a) The monthly mean SO₂ for August 2006 over eastern China retrieved using the PCA algorithm. (b) Same as in (a) but for the operational OMI PBL SO₂ product. Note the different color scale compared to other monthly maps.

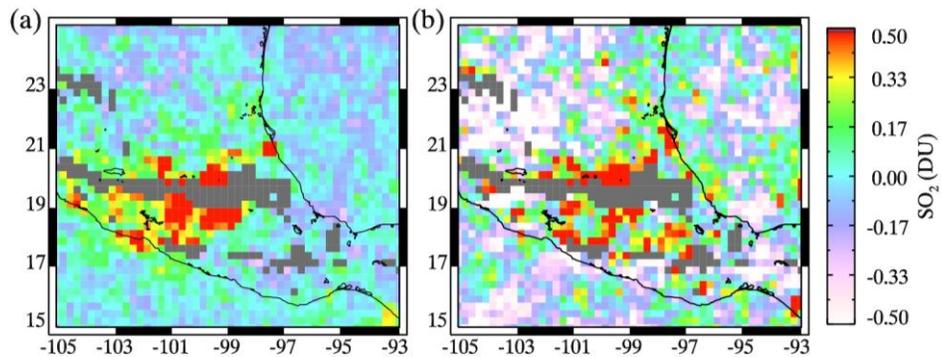


Figure S4. (a) The monthly mean SO₂ for August 2006 over the region around Mexico City retrieved using the PCA algorithm. (b) Same as in (a) but for the operational OMI PBL SO₂ product.

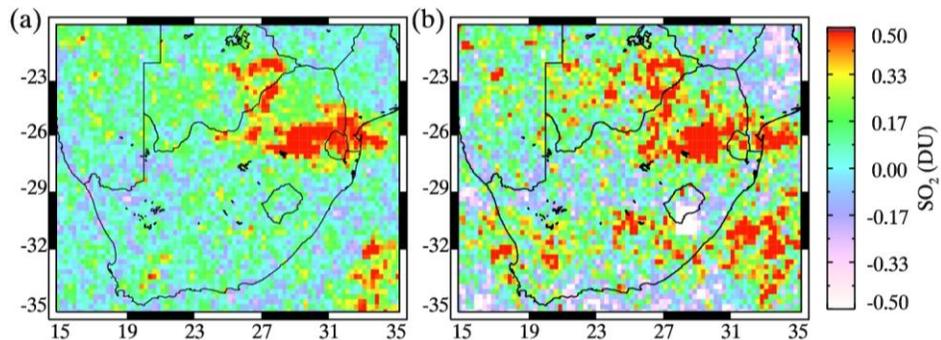


Figure S5. (a) The monthly mean SO₂ for August 2006 over South Africa retrieved using the PCA algorithm. (b) Same as in (a) but for the operational OMI PBL SO₂ product.