

# OMI DAILY TOTAL SULFUR DIOXIDE (TDCSO<sub>2</sub>) PRODUCT DESCRIPTION

## 1. Identification

### 1.1. *Product description*

#### 1.1.1. **Abstract**

Sulfur dioxide gas (SO<sub>2</sub>) is currently being measured over the entire earth using the Ozone Monitoring Instrument (OMI) on the AURA spacecraft. The gas is measured in Dobson Units (DU), the number of molecules in a square centimeter of the atmosphere. If you were to compress all of the sulfur dioxide in a column of the atmosphere into a flat layer at standard temperature and pressure, one Dobson Unit would be 0.01 millimeters thick and would contain 0.0285 grams of SO<sub>2</sub> per square meter.

#### 1.1.2. **Purpose**

Monitoring the concentrations of sulfur dioxide gas (SO<sub>2</sub>).

#### 1.1.3. **Application**

The daily total column of SO<sub>2</sub> is used for monitoring volcanic activity and for other scientific purposes.

### 1.2. *Time period of content*

#### 1.2.1. **Time period of content**

1 January 2010 – today.

#### 1.2.2. **Currentness reference**

Actual time of observation.

### 1.3. *Status*

#### 1.3.1. **Progress**

Complete

#### 1.3.2. **Maintenance and update frequency**

Continuous

### 1.4. *Spatial Domain*

#### 1.4.1. **Bounding coordinates**

Global coverage: Longitude [-180,180], latitude [-90.,90.]

### 1.5. *Keywords*

#### 1.5.1. **Theme**

Atmosphere, meteorology, volcanism, aviation.

**1.5.2. Place**

Global

**1.5.3. Stratum**

Lower stratosphere and upper troposphere

**1.5.4. Temporal**

Recent, data is available on a daily time interval

**1.6. Access constraints**

Currently, only visualizations of the data are available. Access to the original data is restricted.

**1.7. Use constraints****1.8. Point of contact**

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**1.9 Citation****1.9.1. Originator**

Royal Netherlands Meteorological Institute (KNMI)

**1.9.2. Publication date**

June, 2010

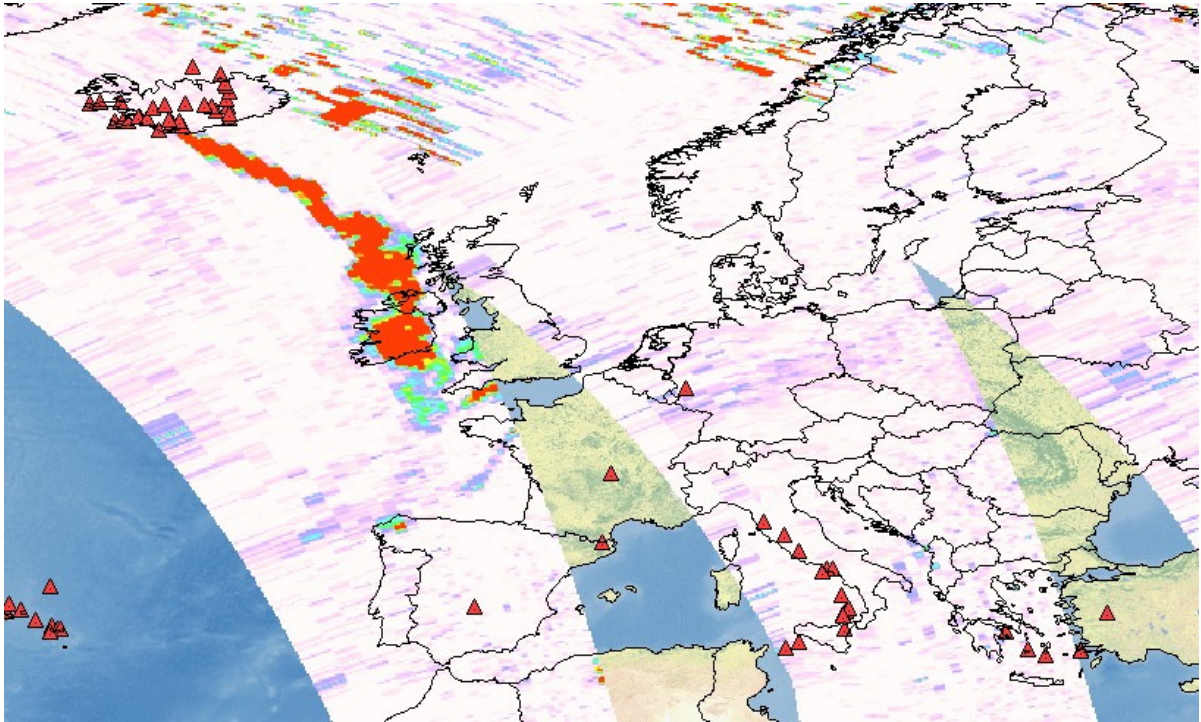
**1.9.3. Title**

OMI daily total sulfur dioxide (TDCSO<sub>2</sub>)

**1.9.4. Edition**

Version 0004

## 1.10 Preview



**Figure 1.** Total daily sulfur dioxide distribution on the 5<sup>th</sup> of May 2010 as measured with the OMI instrument, displaying the SO<sub>2</sub> cloud resulting from the eruption of the Eyjafjallajökull volcano.

## 1.11 Unique identifiers

For TDCSO2 files:

Source data unique identifier:

iso\_dataset:uid = "40da6c46-4fc4-422d-ab81-9cf40d402351"

Metadata identifier:

iso\_dataset:metadata\_id = "bcc544b4-2d5d-4ede-ad50-cd23b6ce5b6f"

For CCFSO2 files: (OMI SO<sub>2</sub> cloud cover data)

Source data unique identifier:

iso\_dataset:uid = "1d4a0b2b-822f-4d1b-a348-da84dcf2cb50"

Metadata identifier:

iso\_dataset:metadata\_id = "31c8daff-598a-471a-a871-4c720d35a763"

## 1.12. Data set credit

Mijling, B. (KNMI), R.J. van de A, (KNMI), Krotkov, N.A (GEST).

## 1.13. Cross reference

GOME-2 and Sciamachy aerosol and SO<sub>2</sub> information (<http://www.temis.nl>).

## 1.14. Literature

See:

- <http://www.temis.nl/aviation/so2.php>

- [http://www.knmi.nl/omi/research/product/product\\_generator.php?info=intro&product=SO2](http://www.knmi.nl/omi/research/product/product_generator.php?info=intro&product=SO2)

- <http://www.knmi.nl/omi/research/documents/index.php>

## **2. Data Quality**

### **2.1 Lineage**

#### **2.1.1. Source information**

Level 2 SO<sub>2</sub> data from the OMI instrument on the AURA spacecraft.

#### **2.1.2. Processing steps**

##### **2.1.2.1. Processing description**

The algorithm currently in use is called the Band Residual Difference algorithm (Krotkov et al., 2006). This algorithm uses residuals from the operational TOMS version ozone code at four wavelengths corresponding to maxima and minima in the SO<sub>2</sub> absorption cross-section.

By using optimum wavelengths for retrieval of SO<sub>2</sub>, the retrieval sensitivity is improved over NASA predecessor Total Ozone Mapping Spectrometer (TOMS) by factors of 10 to 20, depending on location. The ground footprint of OMI is 8 times smaller than TOMS. These factors produce two orders of magnitude improvement in the minimum detectable mass of SO<sub>2</sub>. Thus, the diffuse boundaries of volcanic clouds can be imaged better and the clouds can be tracked longer. More significantly, the improved sensitivity now permits daily global measurement of passive volcanic degassing of SO<sub>2</sub> and of heavy anthropogenic SO<sub>2</sub> pollution to provide new information on the relative importance of these sources for climate studies.

For this project the OMI SO<sub>2</sub> level 2 data has been regridded to daily level 3 data on a regular grid with 0.1 degree resolution.

##### **2.1.2.2. Algorithms used**

- Band Residual Difference algorithm (Krotkov et al., 2006).
- Regridding of level 2 data to level 3 data

##### **2.1.2.3. Ancillary data**

OMI cloud cover (CCFSO<sub>2</sub>)

##### **2.1.2.4. Processing date**

1st of June 2010

##### **2.1.2.5. Data validation**

## **3. Spatial Data Organization**

### **3.1. Indirect Spatial Reference**

Map covers the world.

### **3.2. Direct Spatial Reference Method**

Raster data in a regular longitude latitude grid on a 0.1 degree resolution

### **3.3. Point and vector object information**

N/A

### **3.4. Raster object information**

Global regular longitude latitude grid on a 0.1 degree resolution

#### **3.4.1. Row count**

1800

#### **3.4.2. Column count**

3600

#### **3.4.3. Vertical count**

1

## **4. Spatial Reference**

### **4.1. Coordinate System**

#### **4.1.1. Geographic coordinate units**

degrees

#### **4.1.2. Map projection**

latitude\_longitude.

#### **4.1.3. Datum**

WGS84

#### **4.1.4. EPSG Code**

EPSG:4326

#### **4.1.5. PROJ4 parameters**

+proj=longlat +ellps=WGS84 +datum=WGS84 +no\_defs

## **5. Product Description Reference Information**

### **5.1. Product Description Date**

03-05-2010.

### **5.2. Product Description Review Date**

03-05-2010.

### **5.3. Product Description Contact**

ADAGUC: adaguc@knmi.nl