



A new approach for the construction of gridded emission inventories from satellite data

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We present a new method for the derivation of anthropogenic emission estimates for SO₂. The method, which we term Enhancement Ratio Method (ERM), uses observed relationships between measured OMI satellite tropospheric columnar levels of SO₂ and NO_x in each 0.25 deg X 0.25 deg grid box at low wind speeds, and the Daily Emission estimates Constrained by Satellite Observations (DECSO) versions v1 and v3a NO_x emission estimates to scale the SO₂ emissions. The method is applied over China, and emission estimates for SO₂ are derived for different seasons and years (2007-2011), thus allowing an insight into the interannual evolution of the emissions. The inventory shows a large decrease of emissions during 2007-2009 and a modest increase between 2010-2011. The evolution in emission strength over time calculated here is in general agreement with bottom-up inventories, although differences exist, not only between the current inventory and other inventories but also among the bottom up inventories themselves. The gridded emission estimates derived appear to be consistent, both in their spatial distribution and their magnitude, with the Multi-resolution Emission Inventory for China (MEIC). The total emissions correlate very well with most existing inventories. This research has been financed under the FP7 Programme MarcoPolo (Grand Number 606953, Theme SPA.2013.3.2-01).