**Abstract**

Since 19th century, the amount of anthropogenic gases have increased changing atmosphere and climate. Sulfur Dioxide (SO2) is one of the pollutants responsible for the environmental and climate change since industrial revolution.

This study assesses the original researches on historical anthropogenic SO2 emissions since 1850 till 2011 to access the past influence of SO2 on the earth system and as base-year information for future projections.

**Background**

**What is SO2?** Sulfur Dioxide (SO2) is a chemical compound that is present in the atmosphere produced both by natural sources, such as volcanoes, and by anthropogenic sources, such as burning of coal, oil and gas. SO2 as a pollutant not only changes the climate, but also causes: health problems and diseases such as asthma, ecosystem impairment, acid rain and metal corrosion.

**Methods/Data Sources**

- Broad Literature Research
- Collect/ Acquire SO2 emissions data from published research sources, such as energy consumption and greenhouse gas-air pollution interactions and synergies (GAINS) model data.
- Integrate data sets, compare and assess them at country level and by geospatial analysis

There is always an uncertainty in the emissions estimates from different input sources and computational methods. In order to see the full picture of anthropogenic SO2 emissions since 1850 till 2011, different input datasets to estimate regional and global SO2 emission were integrated.

Using Energy Consumptions data estimated from coal combustion, petroleum, gas, biomass and other industrial processes, have been compared to the outputs of GAINS model data for years from 2000-2005. There is a small difference between two datasets, and both datasets show same increasing trend in SO2 emissions for the following years.

**Results**

- Starting from 1850, anthropogenic SO2 emissions were distributed mostly by open burning sources and industrial activities (Smith et al., 2011).
- The following 100 years emissions had rapidly increased by use of coal. During World War II, depression caused increase to slow down, but after 1945 the reconstruction resulted in huge increase of SO2 (Smith et al., 2011).
- In 1970 emissions have reached their peak and started decreasing overall until 2000, when China became the biggest pollutant in the world (Smith et al.)
- Emissions continued to grow rapidly since 2000, and peaked again in 2006 (Klimont et al)

After increasing until about 2006, a declining trend was estimate continuing in 2011.

- North America and Europe decreased their emissions from 32% to 25% from 2000 to 2005. China has also started decreasing its emission from 2006, installing the flue gas desulfurization on power plants. (Lu et al.)
- Global emissions in 2010 estimated to be lower than in 2000 by about 3%. (Klimont et al.)

While North America and Europe continuing reducing the emissions, there is an increasing role of rest of Asia.

- China remained to be the key contributor representing 30% of the global total emissions in 2010, but India, International Shipping’s emissions and emissions of countries of Central Asia increased since 2000-2011 (Klimont et al.)

- India became the second largest emitter in the world after China, with no sign of decline of emissions (Klimont et al.)

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References: