



## **Investigation of local sulfur dioxide pollution from a thermal power plant using lidar and point monitors measurements**

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In Romania almost 40% from energy is produced by thermal power plants. The low quality of coal used in fossil-fuel power plant is responsible for atmospheric pollution mainly with SO<sub>2</sub> and NO<sub>x</sub> and also for a large quantity of CO<sub>2</sub> released in the atmosphere. Rovinari power plant is one of the biggest thermal power station from Eastern Europe and represents one of the largest electricity producer in Romania, having 4 groups of 330 MW each, thus totaling an installed capacity of 1,420 MW and being responsible for local and regional problems related to acid rain, formation of fine particulate matter, smog etc. Rovinari power plant is located in the South part of Romania (at the following coordinates 44°54'45"N - 23°09'44"E), in the Rovinari-Motru coal mining area, near Rovinari town that has almost 12500 inhabitants.

Because sulfur dioxide pollution represents a regional problem, this power plant is in process of modernization, process that includes the fitting of several sulfur oxide scrubbers at the existing power groups, in addition to other retention of pollutants and prevention of pollution technologies.

The fuel used in this power plant is lignite that has low calorific value and contains relatively higher amounts of ash, moisture and sulfur. Most of the lignite mined in Romania is consumed in the thermal power plants since it is not appropriate for use in other types of industry and heating.

In this study, the behaviors of the SO<sub>2</sub> resulting from lignite-fired thermal power plants are investigated at local scale. We focused on SO<sub>2</sub> pollution in the regions nearby, at 2 km from power plant in which the SO<sub>2</sub> can affect directly the life of local population.

During one field campaign in September 2010 in Rovinari city were made measurements with lidar to see the pollutant layers in the atmosphere above the town, near the factory chimneys using the lidar and at 2 m from ground punctual measurements. Measurements were made in an intercomparison campaign simultaneously with Eye-safe Mini Lidar with detection channels on 355 cross and 355 parallel and Horiba punctual analyzer for the continuous monitoring of atmospheric SO<sub>2</sub> using UV fluorescence. All the data was correlated with sulfur dioxide emission reported by Rovinari power plant facility to the local authorities in order to identify whether the local weather conditions facilitate the SO<sub>2</sub> increase in nearby human establishments.

In this campaign were recorded some high concentration episodes of sulfur dioxide. SO<sub>2</sub> concentration at ground has been found to depend not only on the wind direction and intensity and other weather conditions, but also on the time of the day, this being in connection with the diurnal fluctuation of the Planetary Boundary Layer height.