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COMBINED OPTOELECTRONIC METHODS USED IN THE MONITORING OF SO₂ EMISSIONS AND IMISSIONS

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Abstract

This study focuses on the local scale behavior of SO₂ emissions resulting from lignite-combustion thermal power plants. The investigations aimed at monitoring the SO₂ emissions and immissions over a two week period in September 2010. One of the largest power plants from Eastern Europe was chosen for monitoring using different optoelectronic techniques. Rovinari power plant (44°54'45"N – 23°09'44"E) is one of the largest electricity suppliers of Romania, having 4 groups of 330 MW each, with a total installed capacity of 1420 MW and is located in the Rovinari-Motru coal mining area. This power plant along with similar facilities located in south-west of Romania is responsible for local and regional pollution problems concerning acid rain, formation of fine particulate matter, smog etc. Emissions from the stacks of Rovinari power plant were monitored with a UV camera that uses the strong absorption of SO₂ molecules between 280–320 nm. Images with UV camera were collected from distances ranging between 1 and 2 km. Immissions measurements were made simultaneously with a HORIBA SO₂ analyzer for continuous monitoring of atmospheric SO₂ immissions using UV fluorescence method. Within the two weeks of measurements the SO₂ immissions hourly limit of 350 µg/m³ was exceeded two times, the highest measured concentration of 590 µg/m³ occurring during stable meteorological conditions (very low wind speeds) inhibiting dispersion and favoring the accumulation of SO₂ on a local scale. At the stacks, SO₂ concentrations were constantly over 1000 ppm during the analyzed days.

Key words: multispectral ultraviolet camera, power plant, SO₂ monitoring

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