

# AIR QUALITY AFFECTED BY INDUSTRIAL ACTIVITIES GORJ COUNTY, IN THE YEAR 2010

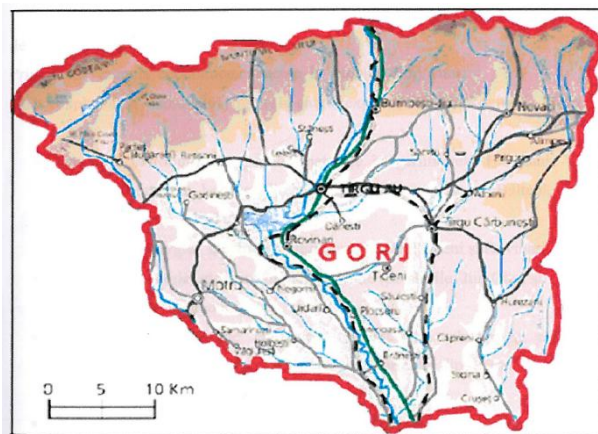
Lecturer Roxana - Gabriela POPA, Lecturer Irina-Ramona PECINGINĂ,  
„Constantin Brâncuși” University, Tg-Jiu

**Abstract:** The paper presents the main industrial activities pollution the air, at the level of Gorj County, in the year 2010. There are mentioned gases with greenhouse effect, acid effect gases, their graphical representation and pollution produced by the main polluting agents of the county: depositing dusts and dusts in suspension.

**Keywords:** acid, amissions, atmosphere

## 1.Natural frame and the social – economic development of Gorj county

Situated in the south – eastern part of Romania, crossed by the middle course of Jiu and by parallel 45, north latitude, Gorj County, represents a real standard of diversity and harmony (figure 1.). It has a surface of 56,0174 ha and is bordered in the northern part by county Hunedoara, in the north –west by Caraș-Severin county, in the south – east by Dolj county, in the east by Valcea county, and in the south west by Mehedinți county.



*Fig.1. Gorj county map*

The main industrial activities contributing to the air pollution [1] in Gorj county are:

- Coal (lignite) exploitation as part of exploitations from Rovinari, Motru, Jilț
- Extraction of petroleum and natural gases in the areas Hurezani, Țicleni
- Electricity production in steam power plants from Turceni and Rovinari
- Electricity production in hydropower plants (on rivers: Jiu, Oltet);
- Wood exploitation and processing (timber, furniture, parquet, wood chipboard)
- Manufacturing of technical articles from rubber
- Machines manufacturing, mining equipments (Tg-Jiu, Rovinari, Motru)
- Manufacturing of housekeeping glass (Tg-Jiu)
- Food industry (bread manufacture, drinks, cigarettes)
- ranches
- confections

## 2. Air's quality evaluation in Gorj county, in the year 2010

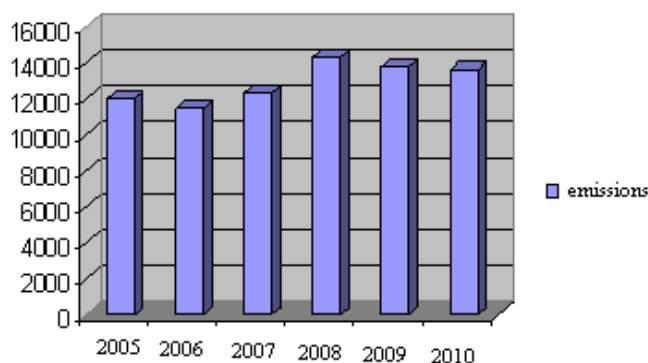
### 2.1. Gases with greenhouse effect

The quantities of gases with greenhouse effect, released in Gorj county, in the year 2010 are presented in chart 1

*Table 1. The gases with greenhouse effect, released in Gorj county, in the year 2010*

Issuing activities greenhouse gas	CO <sub>2</sub> (mii t)	CH <sub>4</sub> (t)	N <sub>2</sub> O(t)
Combustion in energy and transformation industries	12344.52	397.10	855.64
In non-industrial combustion plants	1041.62	1384.92	70.01
Combustion in manufacturing industry	104.76	63.35	7.08
Productin processes	0.08	0.01	0.00
Fossil fuel extraction and distribution	0.05	22142.51	-
Road	151.43	25.26	5.09
Other mobile sources and machinery	-	3.76	27.90
Treatment and waste disposal	0.84	3.66	-
Agriculture	-	9952.94	188.49
Other sources	-	-	539.74
<b>Total</b>	<b>1364.31</b>	<b>33973.51</b>	<b>169.94</b>

The quantities of carbon dioxide represent rough emissions [2]. The anthropic activities with the most important ponderosity in generating gases with greenhouse effect are combustion processes, in county Gorj functioning the two energetic systems of great power, C.E. Turceni and C.E. Rovinari. The CO<sub>2</sub> emissions appeared from combustion in energetic and transforming energies, represent 90% from the total of CO<sub>2</sub> emissions, forecast at county level and are presented in figure 2:



*Fig.2. Variation of CO<sub>2</sub> in the county Gorj in 2005-2010*

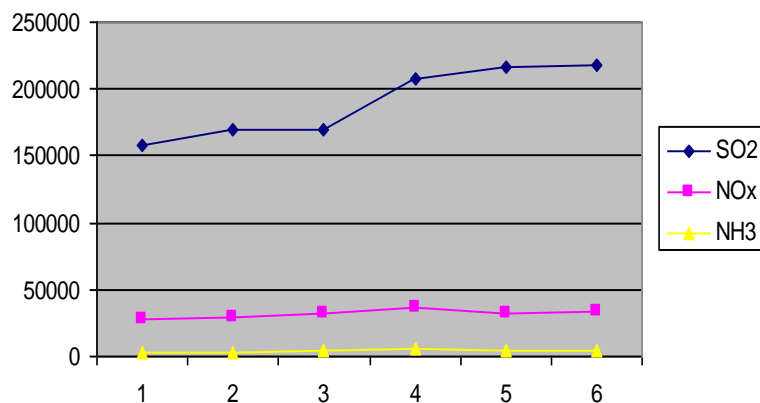
## 2.2. Acid forming process

The acid forming process is the one of modification of the natural thermal character of an environmental exponent, as a result of the presence of some compounds determining a series of chemical reaction in the atmosphere. The atmospheric emissions of the acid forming substances SO<sub>2</sub> and NO<sub>x</sub> resulted mainly from fossil fuels combustion, can persist in the atmosphere for several days and can be transported at thousands of km, where the process of conversion into acids takes place (sulphuric and azothic). The emission of gases with acid forming effect evaluated for the year 2010 are presented in chart 2.

**Table 2.** The emission of gases with acid forming effect evaluated for the year 2010 in the county Gorj

Issuing activities greenhouse gas	SO <sub>2</sub> (t)	NO <sub>x</sub> (t)	NH <sub>3</sub> (t)
Combustion in energy and transformation industries	214754.29	29278.66	
In non-industrial combustion plants	922.71	401.48	29.51
Combustion in manufacturing industry	18.56	236.48	0.47
Productin processes	27.31	19.96	-
Road	156.00	1483.65	-
Other mobile sources and machinery	118.71	1056.68	0.15
Treatment and waste disposal	0.24	3.99	368.61
Agriculture	-	-	4196.98
Total	215997.82	32480.90	4605.73

Emissions of gases with acid forming greenhouses effect (SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>), for the period 2005-2010 in graphically represented in figure 3.



**Fig. 3.** Variation of emissions SO<sub>x</sub>, NO<sub>x</sub>, NH<sub>3</sub>, in 2005-2010

The acidity of the atmosphere is mainly provoked by compounds containing sulphur and azoth. These are formed as a result of emitting, in the atmosphere, of sulphur dioxide (SO<sub>2</sub>), azoth oxides (NO<sub>x</sub>) and ammonia (NH<sub>3</sub>).

APM Gorj realised the monitoring of the pollutants SO<sub>2</sub>, NO<sub>x</sub> and NH<sub>3</sub> in the areas: Târgu-Jiu-3 sample taking points (average tests 24h), Rovinari-1 sample taking point (average test 24h), Turceni-1 sample taking point (tests 30') and Motru-1 sample taking point (tests 30'). The concentrations of SO<sub>2</sub>, NO<sub>x</sub> and NH<sub>3</sub> resulted from the process of monitoring exceeded the critical thresholds.

In figure 4 is presented the monthly average concentration for pollutant NO<sub>2</sub>, 24h.

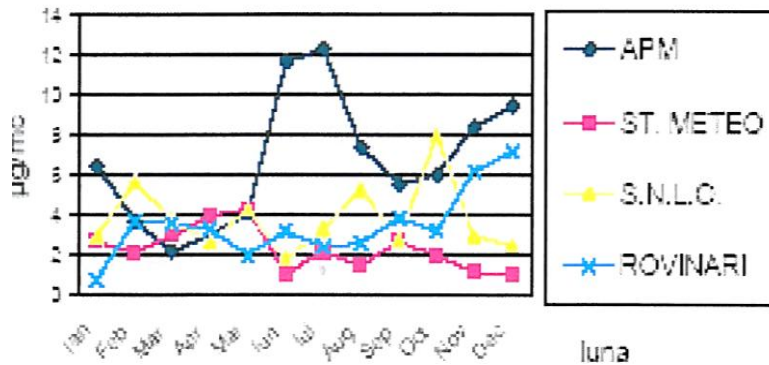


Fig. 4. The monthly average concentration for pollutant NO<sub>2</sub>, 24h

The middle annual concentrations of the sulphur dioxide have been smaller than annual CMA (0,06mg/m<sup>3</sup>), namely APM Târgu-Jiu-0,0021mg/m<sup>3</sup>, Meteo Târgu-Jiu-0,0021mg/m<sup>3</sup>, CNLO Targu-Jiu-0,0027mg/m<sup>3</sup>, Rovinari-0,0020mg/m<sup>3</sup> and are presented in figure 5.

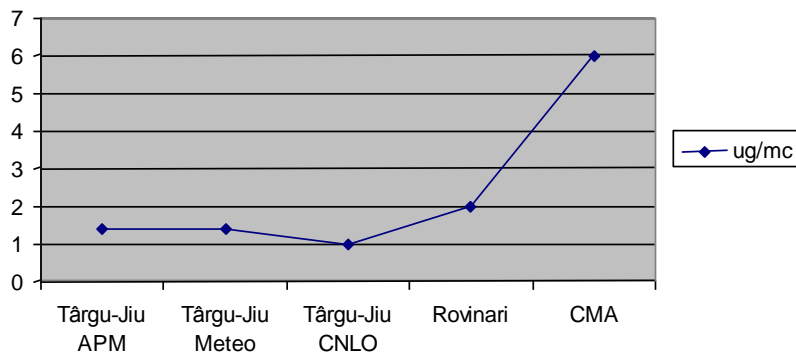
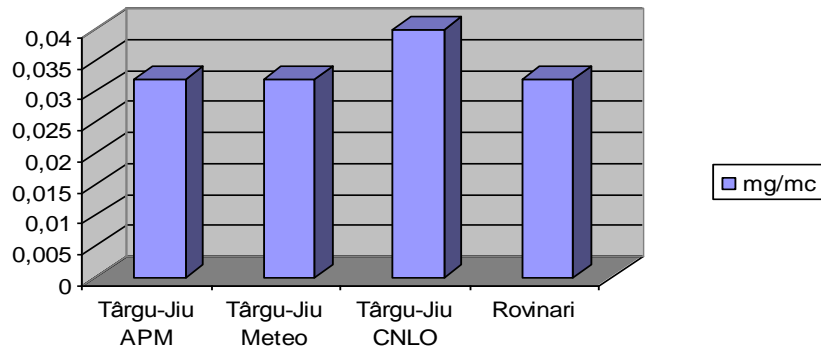


Fig. 5 The middle annual concentrations of the sulphur dioxide

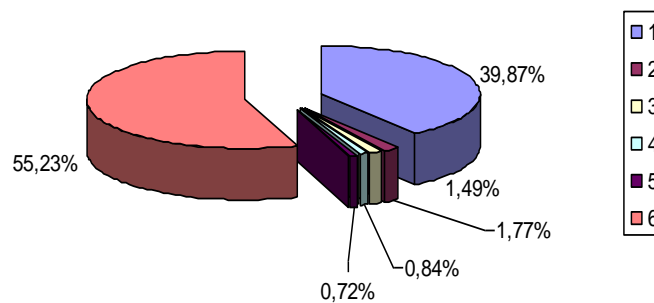
For sulphur dioxide, the average annual concentrations exceeded the annual CMA (0,040mg/m<sup>3</sup>), values being situated between 0.0044mg/m<sup>3</sup> (Meteo Targu-Jiu) and 0.0102 mg/m<sup>3</sup> (CNLO Targu-Jiu). Regarding the samples taking points from Turceni and Motru (short period average tests, 30min), the registered values are positioned under the correspondent CMA. The annual average concentrations for ammonia (fig.6) is positioned between mg/m<sup>3</sup> (Meteo Targu-Jiu) and 0,0356mg/m<sup>3</sup> (CNLO Targu-Jiu)



**Fig. 6.** The annual average concentrations for ammonia

### 2.3. Pollution of the environmental air with dusts in suspension and depositing dusts

Dusts in suspension and depositing dusts are the main pollutants from Gorj county, for which CMS exceeding are significant. In Gorj county, the most important dust pollution sources are: for Rovinari area: Energetic Complex Rovinari, quarry mining exploitations, road traffic; for Turceni area: Energetic Complex Turceni, road traffic; for areas Motru, Mătasări, Seciuri, Jilt-quarry mining exploitation, road traffic; for area Meri- Meri Quarry- figure 7.



**Fig. 7.** Settled dust production activities to share

The indicator of depositing dusts was determined in 52 sample taking points in the area of Gorj county, positioned in the areas: Târgu Jiu, Rovinari, Turceni, Barsesti, Motru, Matasari, Meri, Tg Cărbunesti, Pleșa, Timiseni, Telești, Jilt and are presented in figure 8 [3].

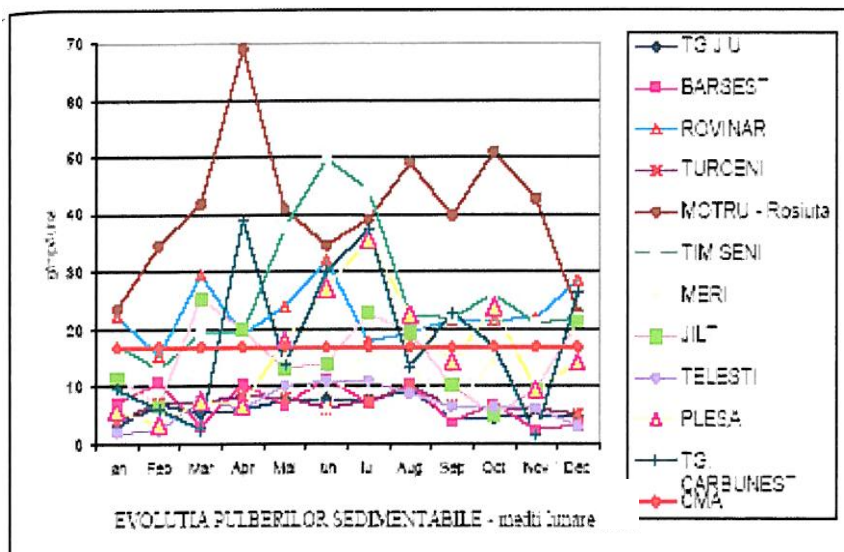


Fig. 8. Graphical representation of dust depositing in the county Gorj in 2010

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