

## ASPECTS OF AIR CHEMISTRY IN GORJ COUNTY

**Roxana-Gabriela Popa**, University “Constantin Brâncuși”, Tg-Jiu, ROMANIA  
**Irina-Ramona Pecingină**, University “Constantin Brâncuși”, Tg-Jiu,  
ROMANIA

**ABSTRACT:** Gorj County is located in the south-east, in northern Oltenia, being polluted due to natural sources (volcanoes, fires, burning waste), and anthropogenic (industry, transport, cigarette smoke, human niche). For air quality indicators are measured pollutants and CMA PBB or g / m<sup>3</sup>. To highlight air chemistry from Gorj county is achieved in continuous monitoring and continuous automatic monitoring stations 3 in Tg-Jiu, Rovinari and Turceni. It constantly monitors SO<sub>2</sub>, NO, NO<sub>2</sub>, CO, O<sub>3</sub>, PM<sub>10</sub> and meteorological parameters: temperature, precipitation, pressure, wind direction and speed, humidity, solar radiation.

**KEY WORDS:** chemistry, air , pollution, Gorj county

### 1. INTRODUCTION

Gorj County is located in the south-east, in northern Oltenia, on the middle and upper Jiu, where he comes from the name. It is located between parallels 45 ° 38' north, Peak Parângu Mare and the parallel of 44 ° 58' north latitude, near Tantareni between meridian 23 ° 39' east, passing near the village Alimpești and meridian 22 ° 6' east longitude, Peak Dobru of Godeanu (fig. 1)

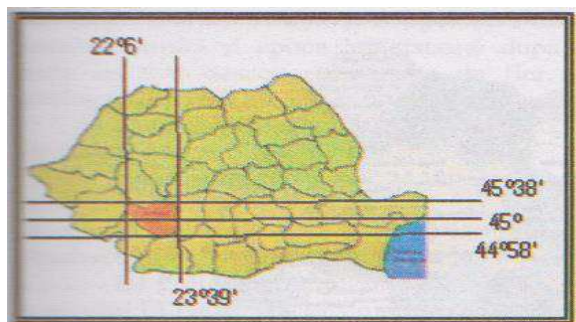


Fig. 1. Location of Gorj between meridian and parallel

Relief of the county consists of three major physical and geographical units which descend in steps from north to south and includes mountain ranges, foothills and hills hillside. Carpathians are represented in Gorj county of Parang, Valcan and Godeanu.

The climate is temperate continental with a wide variety of shades, due to its geographical position, atmospheric circulation and relief components present.

Hydrography Gorj county consists of surface waters (rivers and lakes) and groundwater (freshwater and mineral waters). The artificial lakes reservoirs with power purpose are rivers Cerna, Motru, Tismana, Bistrita, Jiu Gilort and Oltet. Areas richest in groundwater are karst areas of Runcu and Pocruia - Isvarna (Tismana) where supplies drinking water to the city of Targu-Jiu and Craiova.

Gorj county's air quality is affected in a very little pollution than natural and man-made pollution. Gorj county anthropogenic

activities are industrial and agricultural activities:

- Lignite mining industry (in Motru basins, Jilt, tomatoes and Rovinari, which represents the main source of pollution in the county of Gorj), anthracite (in Staging) and graphite (in Baia de Fier and Polovragi)
- Building materials industry (powder and dust pollute, because of exploitation of limestone and granite in quarries in Pades Meri and Porceni, but with rare metals, titanium and ziborniu to Golgova and Boboiesti)
- oil exploration industry (Balteni area and Ticleni) and natural gas (Bustuchin and oak)
- electricity generating industry (in the two large plants, Rovinari and Turceni, pollute SO<sub>x</sub>, NO<sub>x</sub>, CO<sub>x</sub>, heavy metals and sediment particles in suspension)
- agriculture (through uncontrolled and inappropriate use of fertilizers and pesticides)

## 2. CHEMISTRY OF THE AIR IN GORJ COUNTY

The main sources of pollution of natural Gorj county are burning forests (polluting CO, CO<sub>2</sub>, NO<sub>x</sub>, PM), decomposing vegetation (polluting with CH<sub>4</sub>, H<sub>2</sub>S) and ground (by viruses and any dust on its surface and carried in a storm or strong wind). Pollution sources anthropogenic are industrial processes (especially combustion in two large power plants Rovinari and Turceni), transport, agriculture, the resultant polluted find CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, SO<sub>3</sub>, PM, VOC, HAP, O<sub>3</sub> and the main effect is climate change, the emergence of poles and smog acidic, destroying vegetation.

In Gorj county air quality is monitored by continuous measurements 3 automatic stations located in Tg. Jiu (GJ-1 station) - Str. V.Aleksandri no. 2 Rovinari (GJ-2 station) - Str. Manufacturers no. 7 and in Turceni (GJ-3 station) - Str. Labor no. 452b, location criteria stipulated in Law no. 104/2011. The three automatic stations,

industrial type, part of the National Network for Monitoring Air Quality in the country consisting of over 100 stations. Are monitored pollutants: SO<sub>2</sub>, NO, NO<sub>x</sub>, NO<sub>2</sub>, CO, O<sub>3</sub>, particulates (PM<sub>10</sub>).

Air quality is represented by specific indicators and general quality derived from the concentration values main air pollutants measured, which are represented by integers between 1 and 6 corresponding ratings: excellent, very good, good, average, bad, very bad . The general index is the biggest day of specific indications that pollutants monitored that day. Air quality indices are disclosed to the public through information panels exterior and interior of the site and the [www.calitate aer.ro](http://www.calitate aer.ro) national daily bulletin of information for the public.

In this respect, based on data provided by the National Network of automatic stations of Air Quality Monitoring, changes in April 2015 index daily general air quality monitoring stations in each county of Gorj is shown in fig. 2, 3 and 4.

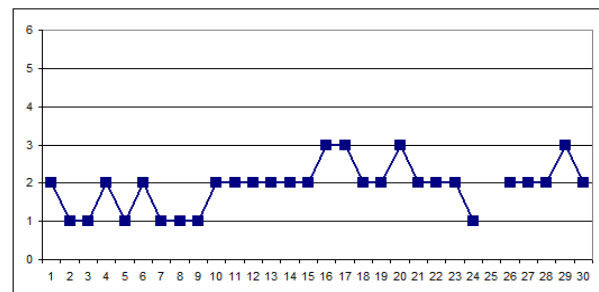


Fig.2. Evolution of the general air quality station GJ-1

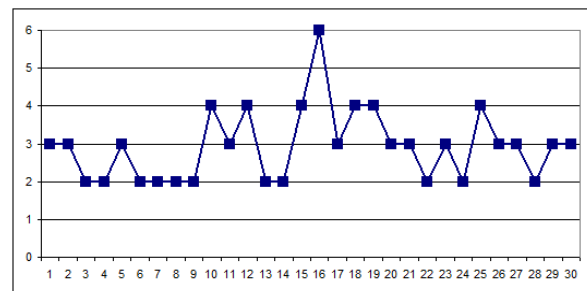


Fig.3. Evolution of the general air quality station GJ-2

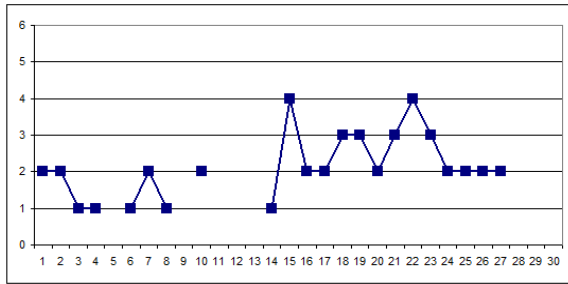


Fig.3. Evolution of the general air quality station GJ-2

According to Law no. 104/2011, highlight pollutants monitored for air quality are: SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, O<sub>3</sub>, CO, particulate sediment NH<sub>3</sub>.

Analysing the variation in average daily concentrations of SO<sub>2</sub> in FIG. 5 is observed that there were no exceedances of the daily VL 125 mg / m (VL = limit value). For NO<sub>2</sub> pollution, no exceedances

of the hourly VL 200 mg / m nor the PA (alert threshold) of 400 mg / m (Fig. 6)

Daily average concentrations of particulate matter PM<sub>10</sub> in all stations were monitored by automated method (Figure 7), and by the gravimetric method, which is a reference method according to EN 12341/2002 (fig. 8) and shown as PM<sub>10</sub> indicator has surpassed VL daily 50 mg / m through automated method at any of the stations and gravimetric method were recorded two exceedances of VL daily 50 mg / mc station GJ-2. In the monitoring point APM Gorj, there have been two VL exceeding 24 hours in total of 21 determinations (Fig. 9).

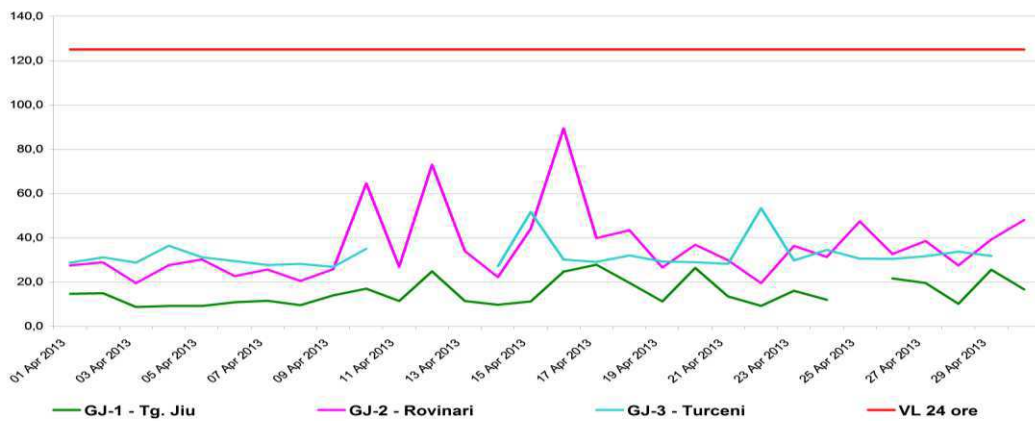


Fig. 5. The evolution of the average daily NO<sub>2</sub>

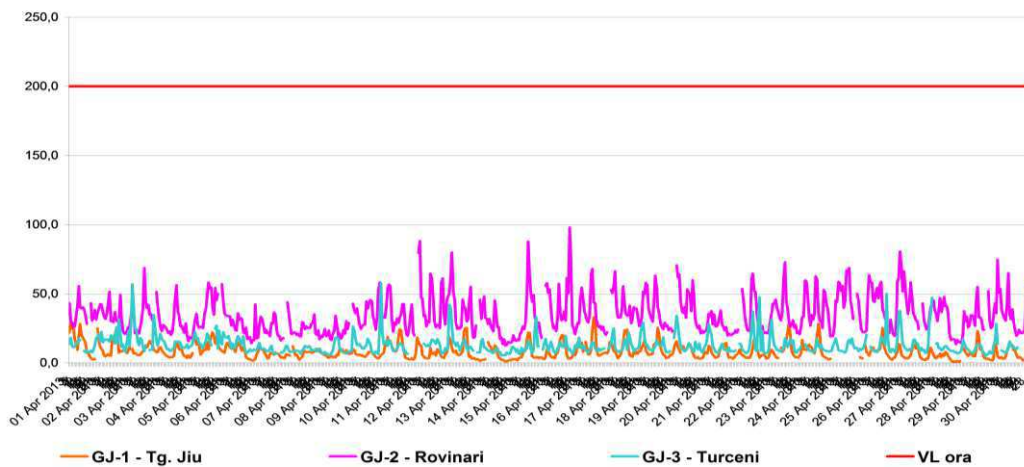


Fig. 6. The evolution of the average daily SO<sub>2</sub>

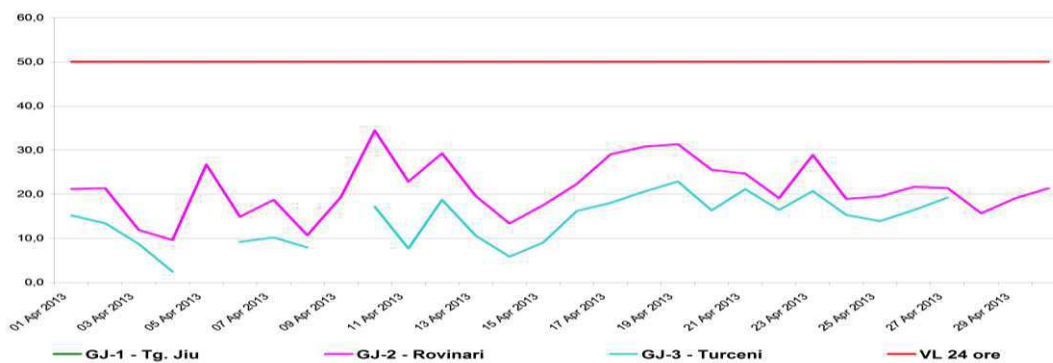


Fig. 7. The evolution of the average daily dust (PM10) caused by automatic method

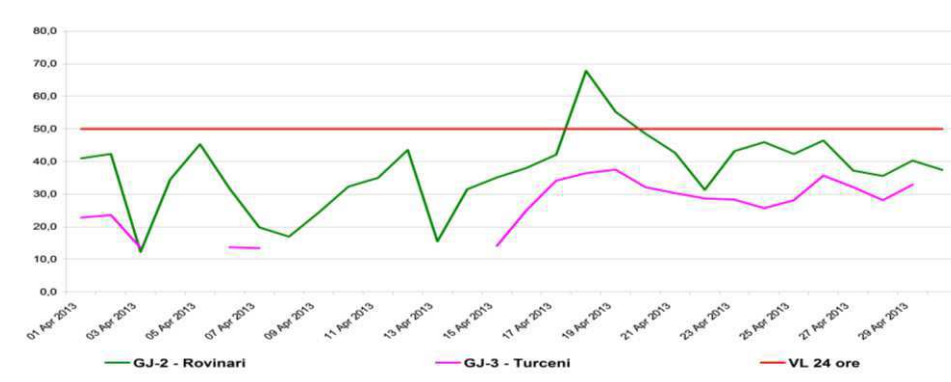


Fig.8. The evolution of the average daily dust (PM10), determined by gravimetric method

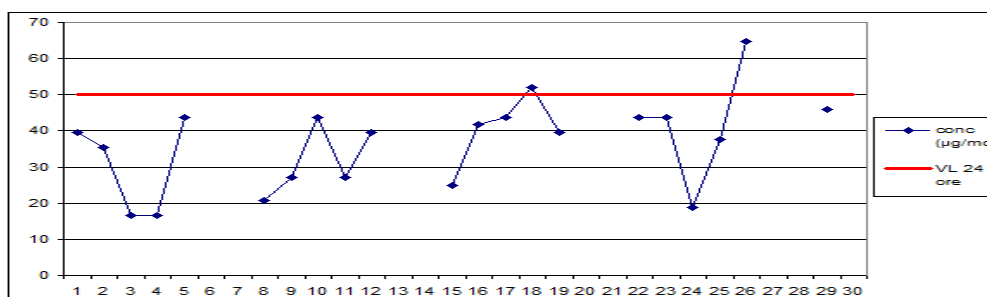


Fig.9. PM10 values in point APM Gorj

And for ozone, which was monitored stations GJ GJ-1 and-2, the maximum daily 8-hour average recorded EVC below the target value of 120 mg / m (fig. 10).

Peaks daily 8-hour average for carbon monoxide were placed well below the limit of 10 mg / m<sup>3</sup>, stations GJ GJ-1 and-2 from jud. Gorj (fig. 11).

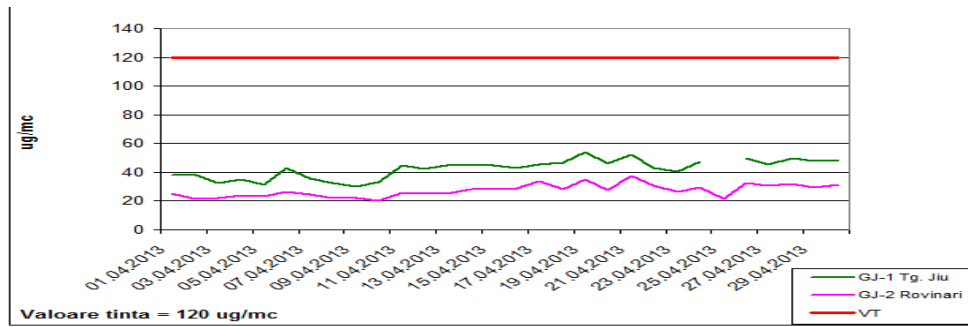


Fig. 10. Evolution of the daily maximum 8-hour average for O3

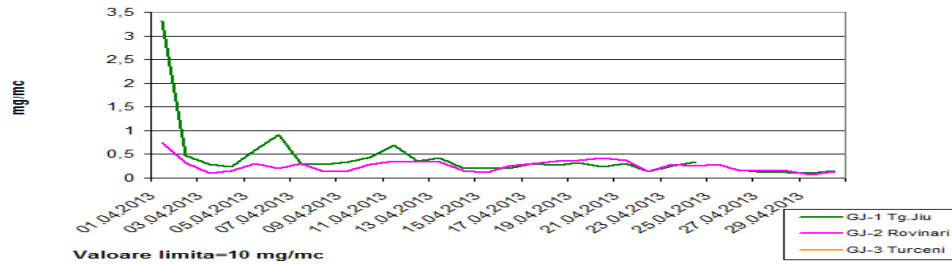


Fig. 11. Evolution of the daily maximum 8-hour average for CO

Air quality measurements indicative of fine sediment areas: Tg. Jiu Bîrsești, Rovinari, Turceni, tomatoes, Jilt, FARCASESTI, Porceni, Timișeni, Dragotești, Bumbesti Jiu Iezureni are shown in Fig. 12.

Hall, Town Hall Motru UATAA (fig. 13, 14, 15, 16).

Ammonia was determined in four points APM Gorj, Hall Rovinari Motru Town

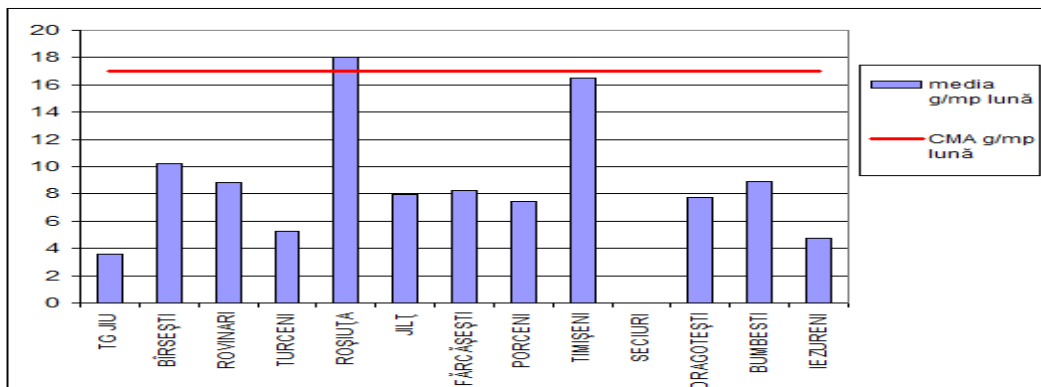


Fig. 12. Monthly averages of fine sediment

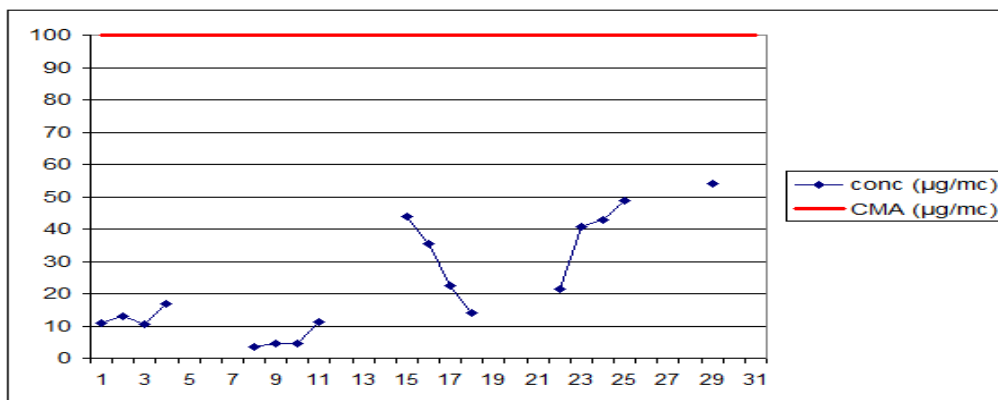


Fig.13. Ammonia NH3 point values APM GORJ

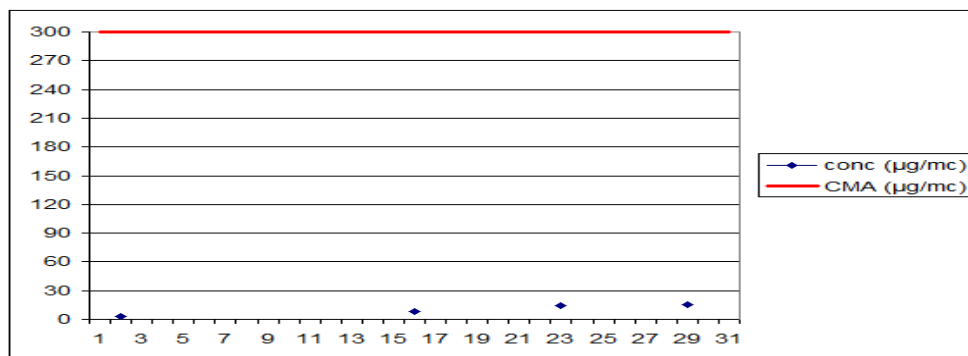


Fig. 14. Ammonia NH3 values in primary point Rovinari

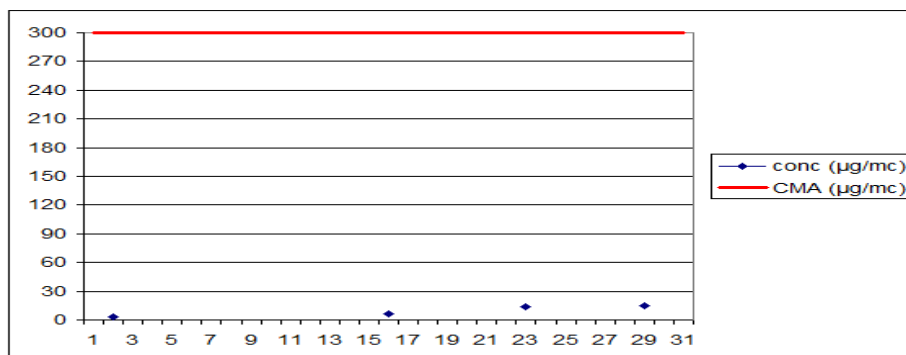


Fig.15. Ammonia NH3 values in primary point Turceni

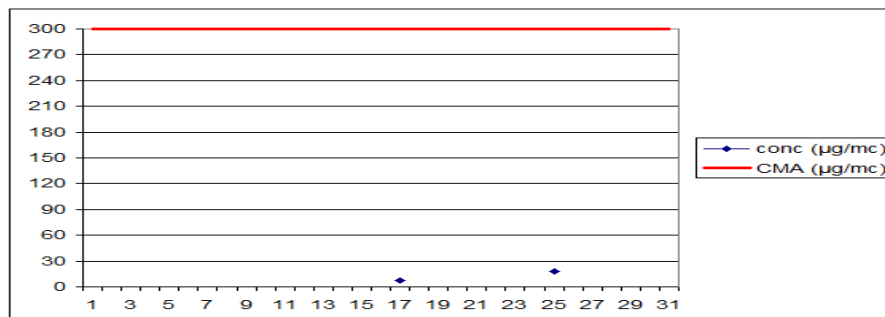


Fig.15. Ammonia NH3 values in primary point UATAA Motru

#### 4. CONCLUSIONS

In april the monitoring station in Rovinari has been reported exceeding SO<sub>2</sub> pollutant concentration, possibly due to thermal Rovinari lignite combustion. SO<sub>2</sub> concentrations are graphically presented (hourly and daily average values) and shown that no limit values Exceedings.

- For NO<sub>2</sub> pollution were not recorded breaches of VL zone and Thresholds. Particulate matter were monitored by gravimetric method and the automatic method demonstradu that there were two daily VL station overruns of Rovinari.

- Ozone was monitored in Tg-Jiu and Rovinari and alue daily maximum was below the target value.

- CO was framed under the limit both in Tg-Jiu and Rovinari.

- Sediment particles were collected from Tg-Jiu, Barsesti, Rovinari, Turceni, Porceni and shown that out of 21

measurements were recorded exceeding the VL 2.

- Of ammonia was monitored APM Gorj point, Hall Rovinari, Turceni and City Hall Motru, neatingadu being under any of the CMA.

#### REFERENCES

[1.] Haiduc, I., L. Bobos, Environmental Chemistry and chemical pollutants, Ed. Ephesus, Cluj-Napoca, 2005.

[2.] G. Oprea, C. Mihali, Environmental Chemistry, Ed. Risoprint, Cluj-Napoca, 2005.

[3.] A.M. Moldoveanu, Air pollution particles, Ed. Matrix Rom 2005.

[4.] Zamfir Gh., Environmental pollution, vol I, Junimea, Bucharest, 1974.

[5.] [http://apmgjold.anpm.ro/upload/139185\\_RAPORT%202013%20GORJ.pdf](http://apmgjold.anpm.ro/upload/139185_RAPORT%202013%20GORJ.pdf)