

Ambient air pollution by suspended and sedimented dust in the agroecological area of Arad

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Expert paper

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Abstract

The accomplished researches from Arad agro-ecological area aimed to estimate ambient air pollution with suspension and sediment dust on a certain period of time (1997-2005), to point out some aspects regarding pollution level and its evolution for these pollutants and to find some possible causes for the determined emissions' values.

Key words: pollution, suspension dust, sediment dust

Introduction

Environment protection represents a global problem of major importance. It requires rational use both of natural resources and surrounding pollution's prevention and control, thus aiming ecological balance maintenance and quality's improvement of natural factors. All these have in view to assure best living circumstances both for actual generation and future generations especially.

Civilized man perceives polluted environment as a permanent stress with repercussions on his health. Environment protection is today's generation obligation, both for herself and future generations too. It is very important to begin immediately an ample instructive strategy of whole society training, through the agency of mass-media and education, in order to increase people's informational, scientific and technical degrees.

Material and methods

Ambient air pollution with dusts can be produced of the air streams by involving soil and dry powdered stored residues provided from industry or other people's activities. These pollutants' action over human body depends on the substance's nature, concentration in air, water solubility and exhibition time.

Ambient air pollution with suspension dust in Arad area have been studied since 1997, afferent determination being carried out in three impact stations (24 hours average samples), all placed in Arad Town, industrial city which concentrates almost the whole county's industry, in the same time possessing a high population density and an intensive road transport. Determination stations were placed on some intensely thoroughfares: Astra Vagoane, A. Saguna street and Power Station.

Studies concerning air pollution with sediment dust were carried out using obtained data from 11 stations: 7 placed in Arad Town (APM Center – Environment Protection Agency, Power Station, A. Saguna street, UTA area, Gradiste, Aradul Nou and Rosiori street) and 4 placed all over the district: Lipova, Pecica, Nadlac, Sanleani.

Results and discussions

Analyzing suspension dust pollution's sources presented in Table no. 1 and Figure no. 1., during 2004 and 2005, one can see that their origins are: power stations coal-based, metal foundries, building and demolishing sites, motor vehicles.

The most important quantity of suspension dust, in the two analyzed years, come from no industrial combustion installations (houses) – 52,3%, processing industry – 20,9% and road transport – 17%.

Concerning to suspension dust emissions' quantities and according to Figure no. 2, between 1997-2005, one can find a certain stability between 1997-2002 (excepting 1998 year), after these period of time their volume being three times higher; a slight diminution can be observed in 2005.

Table 1. Report on suspension dust emissions (t/year)

Crt. no.	Sources categories	2004	2005
1	Energetic industry's combustions	360	379,4
2	No industrial combustion installations	2441	2457,4
3	Combustions came from processing industry	973	5,25
4	Production processes	0,01	0,00062
5	Road transport	717	0,0072
6	Another mobile sources	173	333,3
TOTAL		4664	3175

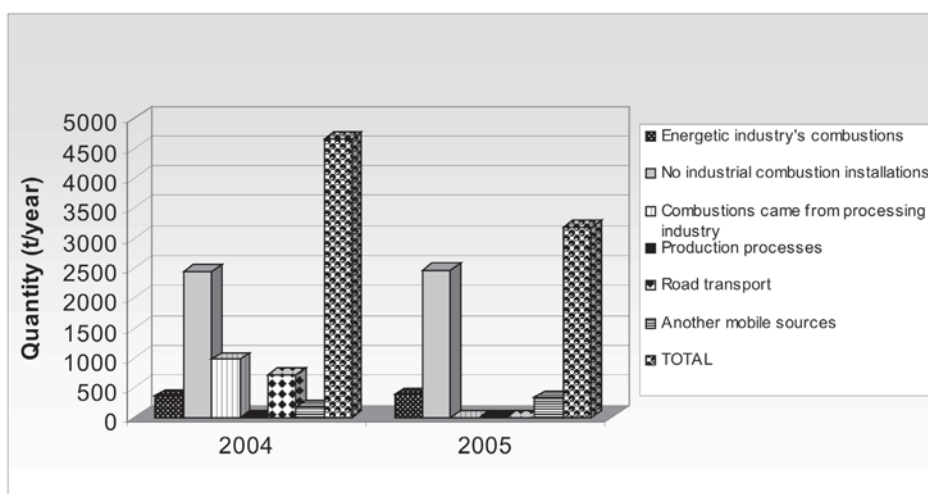


Figure 1. Report on suspension dust emissions

Source: Arad County Environment Agency

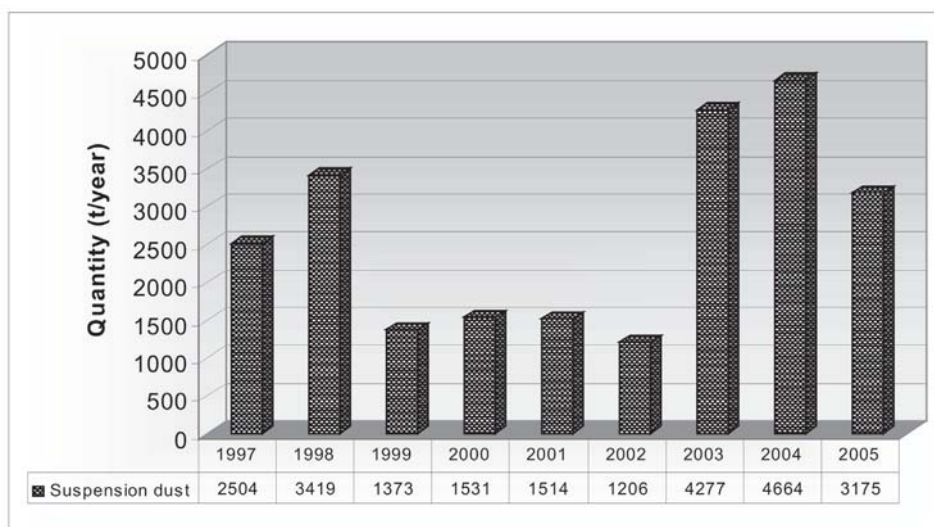


Figure 2. Evolution of suspension dust emissions' quantities

Source: Arad County Environment Agency

Table 2. Monthly average concentrations of suspension dust (2005)

C r t . No.	Month	Average concentration, mg/m ³			
		Astra Vagoane	Saguna Street	Power Station	City
1	January	0,1675	0,1313	0,1360	0,1450
2	February	0,1539	0,1480	0,1293	0,1437
3	March	0,1968	0,1996	0,2221	0,2062
4	April	0,1578	0,1400	0,1488	0,1480
5	May	0,1561	0,1437	0,1392	0,1463
6	June	0,1539	0,1492	0,1378	0,1470
7	July	0,1720	0,1640	0,1643	0,1668
8	August	0,1471	0,1422	0,1415	0,1436
9	September	0,1526	0,1450	0,1440	0,1472
10	October	0,1537	0,1554	0,1566	0,1552
11	November	0,1685	0,1461	0,1468	0,1538
12	December	0,1553	0,1481	0,1464	0,1500
13	Minimum concentration	0,1000	0,1060	0,1070	0,1000
14	Maximum concentration	0,1930	0,2060	0,1850	0,2060
15	Average concentration	0,1589	0,1455	0,1435	0,1484
16	MCA	0,150			
17	Exceeding, %	76,05	26,49	25,87	41,70

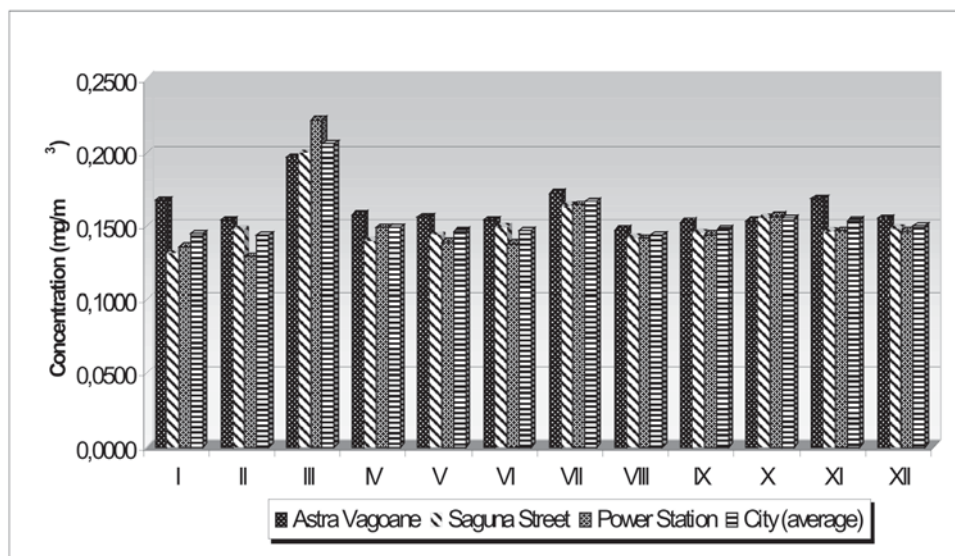


Figure 3. Variation of monthly average concentrations of suspension dust (2005)

Source: Arad County Environment Agency

In 2005, monthly average concentrations of suspension dust, registered at the three impact stations placed in Arad town (Figure no. 3), often overtake this pollutant's MCA, exceeding frequency taking values between 25,87% and 76,05% (Table no. 2). Emitted quantities of dusts, inventory resulted, which sometimes overtake admitted level (MCA), can be justified by these possible reasons: houses' heating systems – woods, embers and diesel-oil-based (45% of dwelling places); badly state of roads, no modernized roads (50% of roads network); badly salubrity; building activities.

Analyzing obtained data for sediment dust pollution in 2005, determined at the 11 collection stations from Arad County, one can find that the highest quantity was registered at Power Station, which is situated near to SC CET Arad hydrocarbons-based and Arad Entrance Avenue from Deva (Table no. 3).

Table 3. Annual average concentrations of sediment dust (g/m²/month), 2005

Zone	Collection station	MCA	Annual average
Arad	Power Station		8,71
	A. Saguna street		4,48
	UTA area		4,15
	Gradiste		6,84
	Aradul Nou		7,45
	APM Center	17	3,68
	Rosiori street		6,94
Lipova	Radnei street		3,88
Pecica	Centre		4,28
Sanleani	Centre		3,59
Nadlac	Centre		4,15

Conclusions

Referring to 2005 year, the highest quantity of suspension dusts came from no industrial combustions (77%), energetic industry's combustions (11,9%) and road transport (10,5%). Concerning to obtained data for suspension dust quantities from Arad Town, values frequently exceed MCA for this pollutant.

During 2005, sediment dusts as a pollution source register smaller values than MCA level.

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