CONSIDERATIONS REGARDING THE BAIA MARE AREA METEOROLOGICAL CONDITIONS IN THE LAST 5 YEARS WITH HELP OF ENVIRONMENTAL INFORMATICS

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ABSTRACT. – Considerations regarding the Baia Mare area meteorological conditions in the last 5 years with help of Environmental Informatics. Ever since "the environment" gained its place in the public international agenda (environmental legislation, sustainable development or disaster and hazard management) it has been bundled with data, information, knowledge and information systems. Environmental Monitoring Systems (EMSs), Environmental Monitoring and Analyzing Systems (EMASs) and especially Environmental Information Systems (EISs) are integrated part of what we call Environmental Informatics (EI) platform.
In this context, as we speak, the are of EI is becoming more complex due to the current context and trend of making the EISs available to the public and end-users access; this phenomena is based on the assumption that public and environmental information end-users awareness, participation and acting is improved by the rate of access to the environmental information to solve the complex problematic covered by the research, engineering and environmental protection fields. The aim of the present paper is to introduce and describe an innovative possibilities of forecasting and monitoring the environment meteorological specific conditions in Baia Mare urban area using a specialized EISs software.

Keywords: Environmental Information Systems, forecast, meteorological conditions, specialized modelling software.

1. INTRODUCTION

The meteorological science with its relative applications has made strong progress over the last decade at the European and worldwide level. In these conditions appear new modeling tools, post processing methodologies and observational data. The recent European efforts in developing a platform for e-science provide an ideal basis for the sharing of complex meteorological data sets and tools. Since May 2008 at the North University Centre from Baia Mare is running an Oregon Scientific WMR 100 type weather station which follows continuously the weather conditions from the interurban region of the city [2].

The variables which are measured by this weather station are various, starting from the basic temperature and humidity to a more complex heat index, rain, wind and others [3]. The most important value measured is the temperature because these influences the human condition in the first time and according to this

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the weather station is set to record automatically this parameter minute by minute.

The paper presents the evolution of the temperature during a period starting from May 2008 and since December 2012 [4]. We choose this period because of the accuracy of the data's recorded and because this period is the most illustrative since the weather station is functioning. The data is represented detailed by seasons and the extremes are analyzed according to the cause which determined them, there is also represented the evolution of this parameter during the whole period and the results are given graphically.

2. MATERIALS AND WORK METHODS

The discussion starts with a description of the system, that have been called meteorological station Oregon Scientific WMR-type 100, which operates in the North University Centre of Baia Mare - Tehnical University of Cluj-Napoca from May 2008, in order to identify and pinpoint the shared attributes of this system and other specific aspects. The weather station considered is used for continuous monitoring of weather conditions and weather data in order to create a specific meteorological database.

The purpose of this relative long monitoring activity of 5 years is to continue to issue monthly and annual reports on weather and meteo conditions, which are useful in environmental and socio-economic projects, or to describe and understand the urban microclimate (for our case, the Baia Mare microclimate). Regarding the positioning of the weather station, this station was placed on the roof of the North University Centre of Baia Mare and is located at an altitude of 250 m. The main console is located in an office on the 7th floor of the building and placed in the same proceeding with a PC connection [2].

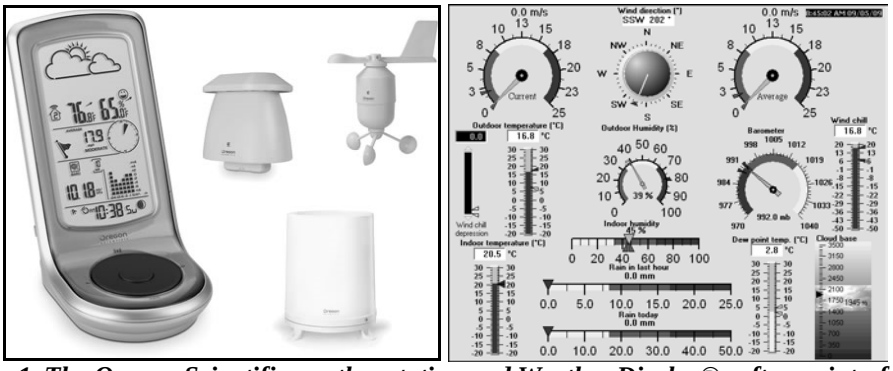

Fig. 1. The Oregon Scientific weather station and Weather Display® software interface

Oregon Scientific Weather Station WMR 100 is a professional weather station equipped with a rotating central control system which facilitates immediately access to information on the console. This unique console includes a sensor that registers the temperature and humidity, also the weather station measures a broad spectrum of meteorological variables and allows wireless

connection of 10 different types of sensors along the sensors included in the console. Weather station equipment includes a full outdoor sensor consisting of a thermo-hygrometer, an anemometer with vane, a rain gauge and a barometer. Console base is provided with an atomic clock that adjusts itself automatically.

Data processing can be done in several ways, depending on the urgency and need for information [1]; in this case the fastest processing software offers a computer programme which is used for recording data arrays, Weather Display®, besides providing information on current weather conditions and monthly and annual reports. Weather Display Software® files are created in a so-called "diary", containing all the data recorded by the meteorological station in the rough.

Day	Temp	Wind	Gust	Rain	Max Temp	Min Temp	Av Hum	Av Baro
07	14.1°C	00.8m/s	04.6m/s	00.0mm	16.4°C	12.0°C	036%	0985.1 mb
08	12.1°C	01.8m/s	10.3m/s	10.6mm	17.6°C	07.4°C	067%	0985.9 mb
09	10.9°C	00.9m/s	08.2m/s	01.0mm	19.8°C	05.7°C	076%	0986.4 mb
10	11.5°C	00.9m/s	08.7m/s	03.0mm	19.8°C	05.5°C	067%	0989.7 mb
11	14.6°C	00.9m/s	06.7m/s	00.0mm	21.3°C	07.1°C	050%	0990.6 mb
12	13.2°C	00.5m/s	06.2m/s	00.0mm	21.0°C	09.1°C	070%	0989.1 mb
13	15.1°C	01.0m/s	05.7m/s	00.0mm	23.3°C	06.3°C	064%	0987.2 mb
14	16.9°C	01.0m/s	07.7m/s	00.0mm	25.1°C	09.0°C	055%	0984.3 mb
15	17.0°C	01.0m/s	08.2m/s	01.0mm	24.8°C	08.9°C	061%	0983.9 mb
16	17.8°C	01.3m/s	07.7m/s	07.4mm	25.8°C	12.1°C	069%	0983.2 mb
17	18.4°C	01.4m/s	09.8m/s	08.3mm	25.4°C	14.1°C	075%	0983.9 mb
18	22.3°C	01.5m/s	11.3m/s	06.4mm	30.0°C	14.6°C	057%	0981.3 mb
19	21.0°C	01.8m/s	11.3m/s	10.6mm	30.6°C	15.3°C	066%	0980.7 mb
20	21.7°C	01.2m/s	07.7m/s	08.3mm	30.2°C	15.9°C	065%	0979.7 mb
21	19.8°C	01.0m/s	06.2m/s	00.0mm	26.0°C	15.5°C	074%	0982.9 mb
22	17.4°C	00.7m/s	06.7m/s	00.0mm	20.2°C	15.5°C	087%	0981.6 mb
23	16.1°C	01.5m/s	07.7m/s	00.0mm	21.1°C	12.8°C	085%	0981.3 mb
24	16.5°C	00.6m/s	06.2m/s	00.0mm	23.5°C	10.7°C	076%	0983.7 mb
25	16.9°C	00.9m/s	07.7m/s	00.0mm	22.8°C	12.9°C	079%	0985.7 mb
26	16.3°C	00.9m/s	06.7m/s	00.0mm	22.3°C	09.9°C	067%	0988.7 mb
27	19.6°C	00.4m/s	04.1m/s	00.0mm	29.0°C	09.8°C	063%	0987.9 mb
28	21.4°C	01.7m/s	13.9m/s	00.0mm	27.1°C	15.7°C	060%	0986.3 mb
29	18.7°C	01.5m/s	10.3m/s	00.0mm	26.7°C	10.0°C	036%	0990.6 mb
30	21.8°C	01.2m/s	04.6m/s	00.0mm	28.7°C	14.5°C	046%	0987.7 mb
31	22.2°C	00.7m/s	05.7m/s	00.0mm	29.6°C	13.8°C	056%	0985.5 mb

Fig. 2. The evolution of Baia Mare urban area meteorological conditions as data recorded roughts (May 2008)

3. RESULTS AND DISCUSSIONS

Information obtained from the meteorological station is stored as strings of data. These strings of data as type of environmental information containing information on atmospheric parameters, with a frequency of one digit per minute, allow their interpretation with high precision and getting a detailed picture of the weather conditions.

Table 1. ***The averages for the month in Baia Mare urban area (December 2012)***

Average temperature	3.0°C
Average humidity	66%
Average dewpoint	3.2°C
Average barometer	1011.0 mb
Average windspeed	0.6 m/s
Average gustspeed	0.8 m/s
Average direction	340° (NNW)

Strings of data can be stored in the computer system of gross state indefinitely, given the small size of these files, or can be processed and interpreted. If a clearer picture of the meteorological parameters is needed, then the data can be processed by using Microsoft Excel. For a calendar month, a log files containing 43.000 rows of data with values for the following parameters: temperature, relative air humidity, atmospheric pressure, wind speed and precipitations [4].

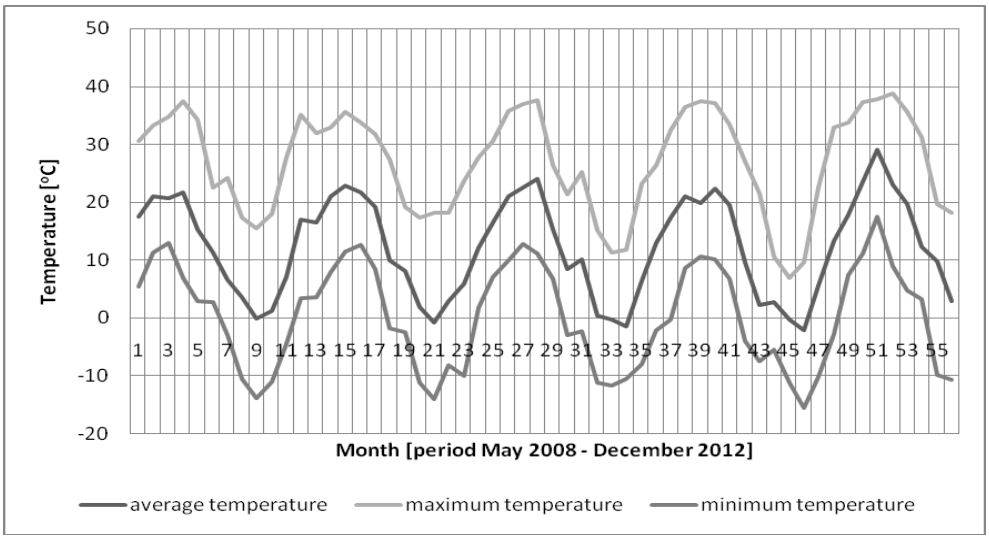

Fig. 3. ***The evolution of Baia Mare urban area temperature (May 2008-December 2012)***

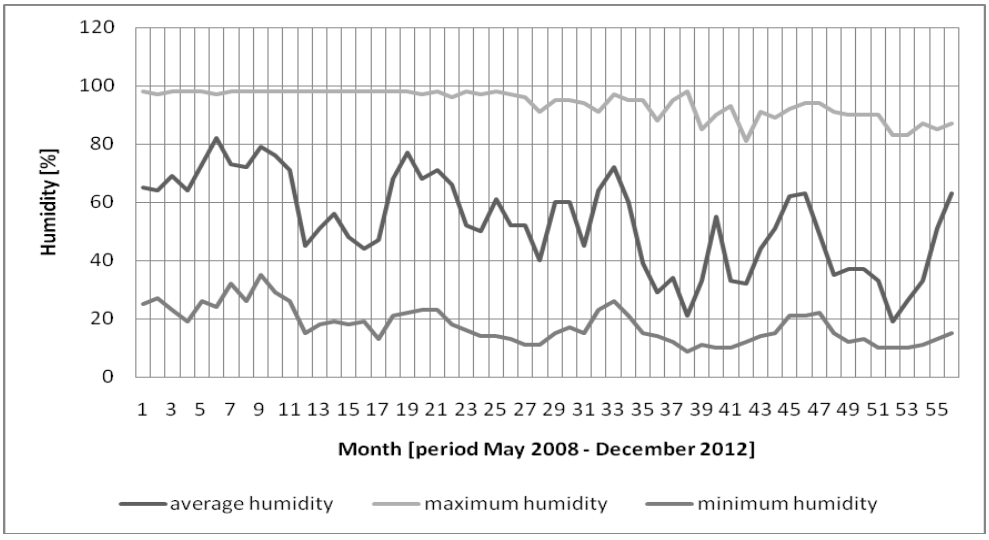

Fig. 4. ***The evolution of Baia Mare urban area air humidity (May 2008-December 2012)***

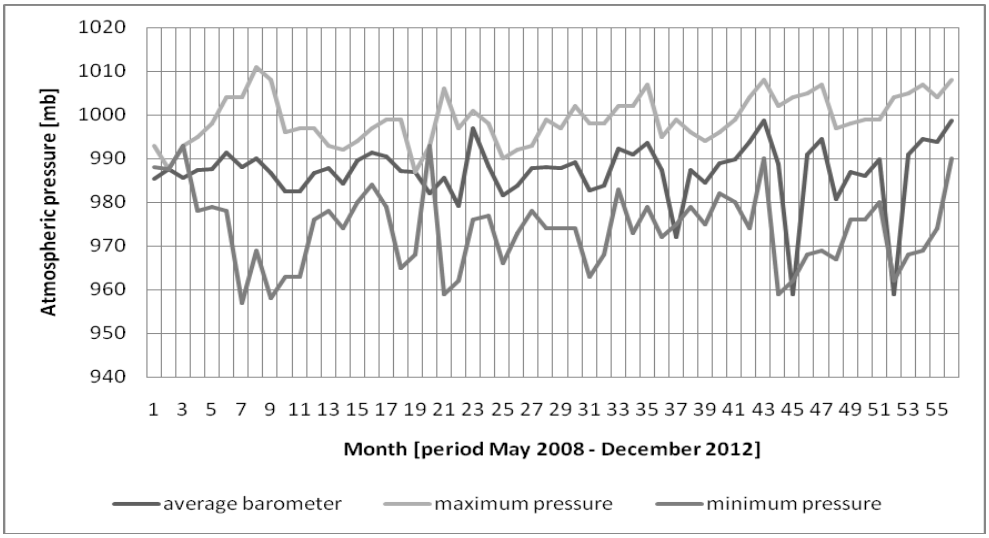

Fig. 5. ***The evolution of Baia Mare urban area atmospheric pressure (May 2008-December 2012)***

4. CONCLUSIONS

The perspective of Environmental Information Systems (EISs) especially in solving many environments problems in accordance with this work paper - prediction, prognoses, modeling and simulation models for evolution and dinamics of meteorological conditions presented in Baia Mare urban area, brings the idea that all this aspects must be integrated with the environmental information elements related to sustainable development of local and regional communities.

Meteorologists, hydrologists and engineers have long recognized the value of hydrometeorological data [1] and more importantly the application and analysis innovative methods for meteorological data.

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