BULETINUL Universităţii Petrol – Gaze din Ploieşti	Vol. LXII No. 3A/2010	124 - 128	Seria Tehnică

Atmospheric Temperature Monitoring September-November 2009

Carmen Otilia Rusănescu, Mihaela Florentina David,
Gigel Paraschiv, Marin Rusănescu

University „Politehnica" of Bucharest, Industry Valplast Bucharest
e-mail: otiliarusanescu@yahoo.com, davidmihaela1978@yahoo.com, paraschiv2005@yahoo.com, rusanescum@yahoo.com

Abstract

In this paper, the air temperature is monitored weather station AWS / EV ISB faculty in the PUB during September-November 2009. Air temperature is one of the most important meteorological parameters. In recent years intensified the greenhouse effect, so it is very important to monitor atmospheric temperature. Air temperature was monitored using weather station type: AWS / EV. SIAP + MICROS program GECO Version 2.3.2 automatically records the following parameters: air temperature, wind direction and speed, air humidity, solar radiation, rain. Features weather station data for air temperature:

- *Measures 30 to + 600C,*
- *0.030 C sensitivity,*
- *Response time <10 s.*

Key words: *monitoring temperature, weather station AWS&EV, temperature control, atmospheric temperature*

Introduction

Figure 1 is presented by the six weather station sensors that measure the atmospheric parameters and using the modem of Figure 1 b that is connected on line with another modem working chamber records instantly to your PC all the measured atmospheric parameters.

Fig. 1,a. System for environmental monitoring of metrology type AWS / EV from the aculty I.S.B. Bucharest [3]

Fig. 1,b. Modem on the building faculty online with the modem connected to working [3]

Since changes in solar angle (azimuth) and length of days depend on latitude, these differences are responsible for high temperatures and low temperatures in the tropics in places near the poles [1]. But discretion can not control the temperature, because it is known that the settlements on the same parallel class are characterized by annual average temperatures, different.

Other factors contributing to temperature control are: differential heating of land and water, ocean currents, height and geographical position.

For any location, daily temperature variation is a phenomenon called diurnal variation. After reaching a minimum at around sunrise to sun, temperature increases, reaching a maximum between the hours of 2:17 p.m. the following afternoon, then it decreases until dawn, the next day. Control of the diurnal cycle is provided by the sun. Normally, air temperature in the layer of air is determined to a depth of 2 m from the earth's surface, with thermometers installed in the station shelter weather instruments. When are sudden changes in weather, the deviations of the daily variation of air temperature appear. For a rainy day, change has much smaller amplitude.

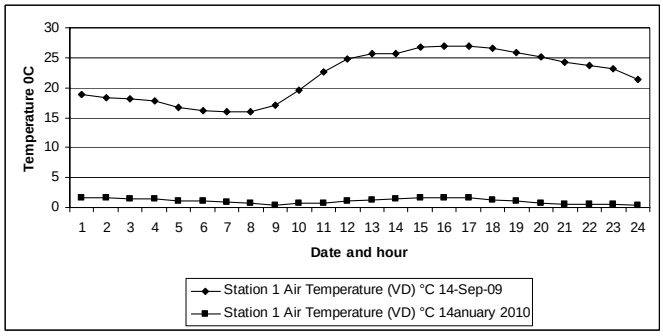

Fig. 2. Variation of atmospheric temperature in the range 14 September 2009 to 14 January 2010 [3]

Low latitude (northern hemisphere) the amplitude of diurnal variation in temperature decreases of 1.5-5^{0}C. The thickness of this layer depends on the thermal stability of the atmosphere and wind intensity. The atmosphere is more unstable and higher wind speed, with greater and height which is propagated by turbulent mixing [2]. Diurnal variation in temperature is: season as hot during the height of the sun above the horizon at noon and the day are higher, the amplitude of diurnal variation in air temperature reaches the middle latitudes from 10 to 15 ^{0}C. If the soil is covered with vegetation, the amplitude of diurnal variations in temperature changes in luxuriant vegetation that reduces the amplitude of these variations.

Landforms influence the amplitude of diurnal variation of air temperature. This is the biggest night in valleys where cold air flows more difficult, and on strong heating occurs due to multiple reflection of the solar stocks are subjected by the valley walls. The altitude increases, the temperature variations are smaller.

Latitude location affects daytime air temperature variation, meaning that the maximum amplitude of 15 to 20 ^{0}C of this variation occurs on continents in the right latitudes of 30-40 ^{0}C (the deserts).

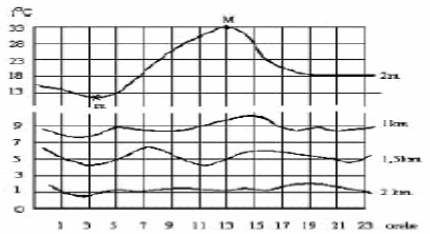

Fig. 3. Diurnal variation of air temperature at different heights [1]

Experimental processing

In Figures 4,a-d are shown variations of weather station recorded air temperatures in the months September to December 2009. The temperature values recorded, and statistical analysis was performed, obtaining the minimum, maximum temperatures recorded.

According to a chart of the temperature values are presented in September, the lowest September temperature was recorded on September 23 at 8 (12.6 ^{0}C) and the highest value in September was on September 14, 2009, at 12 (24.8 ^{0}C).

According to schedule 4 b in which the temperature values in September, the lowest October temperature was recorded on October 14 at 8 (4.7 ^{0}C) and the highest value in October was on October 8, 2009, at 3 (26.4 ^{0}C).

According to the graph in Figure 4 c, highest temperature was registered on November 3, 2009 at 5 am, with a value of 20^{0}C, and the lowest value was registered on November 3 at 4 AM as the - 0.4 ^{0}C.

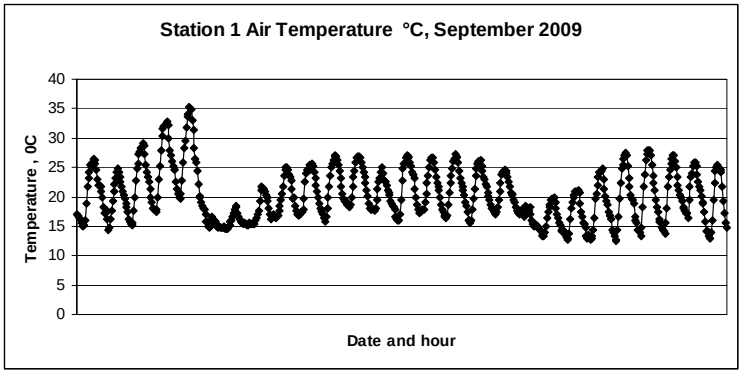

Fig. 4,a. September 2009 Changes in temperature 1-24 hours

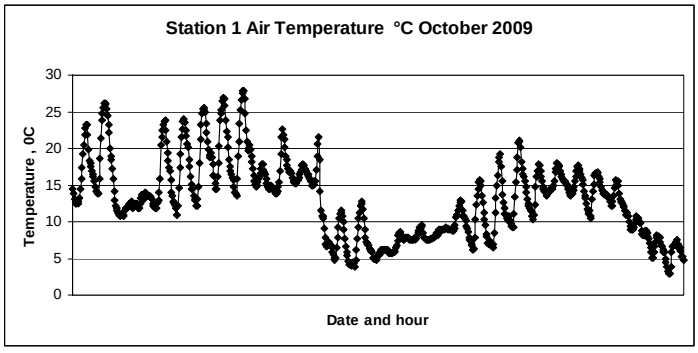

Fig. 4,b. Temperature variations recorded by station 24 hours of 24 October 2009

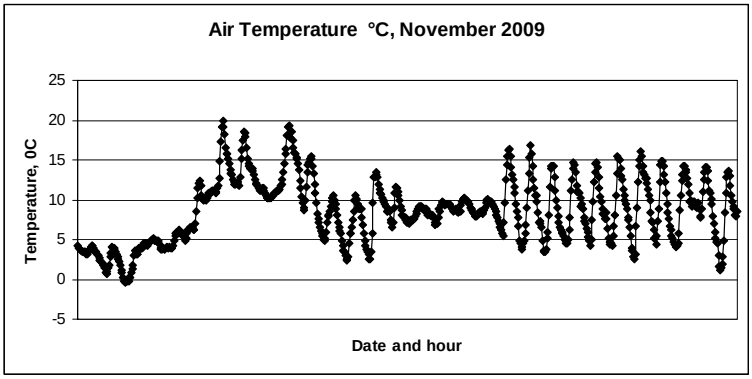

Fig. 4,c. Temperature variations recorded by 24-hour station on 24 November 2009

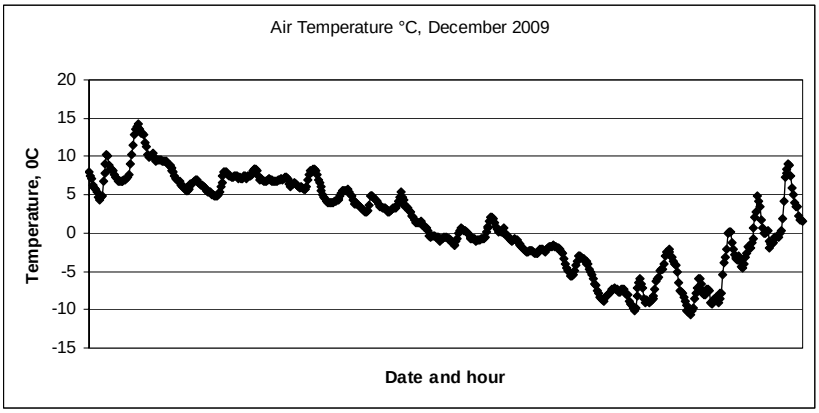

Fig. 4,d. Recorded temperature variation of 24-hour station on 24 December 2009

Based on statistical analysis carried out after recordings made by the station, the lowest value was recorded in atmospheric temperature on December 21 at 8 and had a value of -10.7 ^{0} C and the highest was 14, 3 On December 12 ^{0}C in 16 hours.

Conclusions

The work on this, air temperature was monitored weather station in the period September to December 2009. Atmospheric temperature monitoring was performed 24 hours 24 hours. It was made on state registration and statistical analysis of all values could see the highest and lowest temperatures in the months analyzed. It is known that temperature variations have influence on pollutant dispersion and transport and health implication. Because temperature decreases with altitude, when a layer of cold air is absorbed in a layer of warm air, there is a thermal inversion, the pollutants accumulating in the earth's surface is more harmful to human health. Once this phenomenon occurs and a destruction of the ozone layer about located at 24 km of land.

This layer is designed to filter out harmful sun rays, ultraviolet radiation. When they are stopped there is no greenhouse effect, that causes the average temperature of the planet and main A responsible in training the effect is carbon dioxide. Everything related to thermal inversion, it is important that thermal inversion layer acts as a lid preventing dispersion and transport of pollutants. These layers are more conducive to fog formation due to condensation of water vapor and the existence of pollution in the form of powders, so sometimes the smog.

Temperature may cause several types of atmosphere, depending on dry adiabatic gradient, namely: indifference atmosphere, the atmosphere unstable and stable atmosphere. Dry adiabatic gradient is a quantitative measure of particle cooling time is up, adiabatic, dry atmosphere. So in such an atmosphere concentration of pollutants is the same in all directions, whatever the position of particle air mass is equal to air temperature, so the dispersion and transport of pollutants are influenced, but only to the kinetic parameters of the flow of pollutants.

Unstable atmosphere is favorable dispersion and pollution transport, less the situation when the air mass loaded with pollutants is bound to fall. Stable atmosphere meets the vertical decrease when the temperature is lower dry adiabatic gradient. Particularly if the air is subject to upward it is colder than ambient, has higher density and a tendency to descend. If a particle of air has been directed vertically downward momentum, it is warmer than average and tends to climb. Both trips have resulted in a return to baseline. In such an atmosphere conditions diffusion and pollutant transport are not favored.

References

1. Rusanescu C., Rusanescu M., *Tehnici de achizitie si monitorizare a mediului*, Editor Cartea Studenteasca, Bucharest, 2010
2. Rusanescu C., Rusanescu M., *Elemente de dinamica poluarii*, Editor Cartea Studenteasca, Bucharest, 2007.
3. ***, *Manual installation of meteorological stations AWWS/EV*, offered by the company producing Elettronica Veneta 2009.

Monitorizarea temperaturii atmosferice septembrie–noiembrie 2009

Rezumat

În prezenta lucrare este monitorizată temperatura aerului cu staţia meteo AWS/EV la facultatea I.S.B(Ingineria Sistemelor Biotehnice) din cadrul U.P.B. în perioada septembrie - noiembrie 2009. Temperatura aerului constituie unul dintre cei mai importanţi parametri meteorologici. In ultimii ani s-a intensificat efectul de sera, de aceea este foarte important de monitorizat temperatura atmosferica. Temperatura aerului a fost monitorizata cu ajutorul statiei meteo de tipul: AWS/EV. Programul SIAP + MICROS GECO Versiunea 2.3.2 inregistrează automat următorii parametrii: temperatura atmosferică, direcţia şi viteza vântului, umiditatea atmosferică, radiaţia solară, ploaia. Caracteristici date de statia meteo pentru temperatura aerului:

- *Masoara de la 30 la + 60^{0}C,*
- *Senzitivitatea 0,03^{0}C,*
- *Timpul de raspuns < 10 s.*