



Dubovac Elementary school, Karlovac, Croatia

Benefits the enviroment

Research project

Save parks and plant trees



The aim of research was to show the importance of preserving parks in **Karlovac** and to raise public awareness of the need for planting trees after construction works.

At the time when we are raising students for sustainable development and environmental protection it was important to conduct the research on the importance of planting trees and preserving green spaces in cities.

This project was designed and presented by the students at the **GLOBE state competition in projects, in Zagreb 2019.** and was awarded.



Methods of work

The survey conducted from
22nd April to 21st September 2018.

The study was conducted according to the GLOBE protocol. About 20 students were measuring and then comparing measurement results.

Activities:

1. Measuring the current air temperature (min/max thermometer (GLOBE station) in hot and warm days with cloudiness >50%, at 12.30 pm.
2. Measuring the surface temperatures of the sunlit grassy surface, the sunlit asphalted surfaces, the shaded grassy surfaces under the two different trees (deciduous and evergreen) with infrared thermometer.
3. Measuring and determination of tree species (plant book, clinometer, cell phone - app)
 - a) Spruce (*Picea excelsa* L)- evergreen : 20,6 m high
 - b) Birch (*Betula Pendula* L.) – deciduous : 18,5 m high



Dubovac Elementary school



Voltcraft IR Thermometar IR 260-85
(8:1))



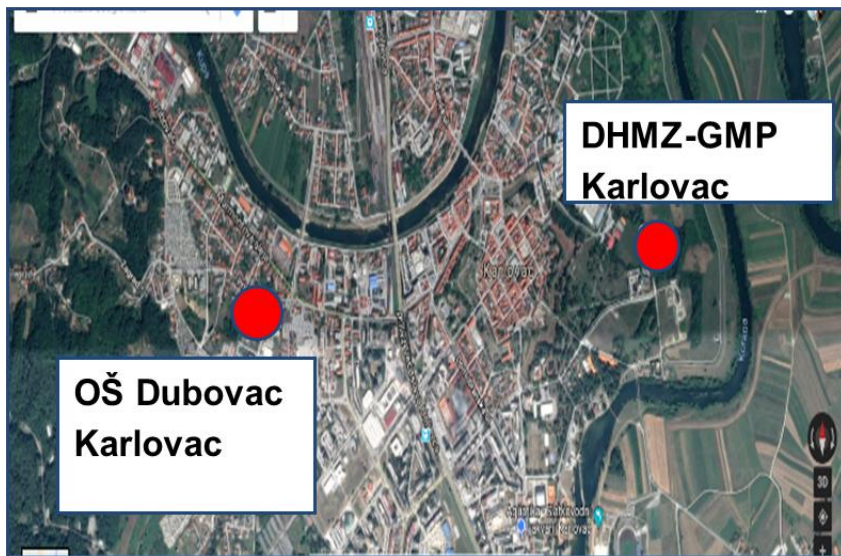
Hypothesis

1. The current air temperature on warm and hot days with cloudiness $<50\%$ is always lower than the surface temperature of a sunlit grass surface.
2. The surface temperature of the sunlit asphalted surface on warm and hot days with cloudiness $<50\%$ is always at least 5°C higher than the surface temperature of the sunlit grass surface.
3. The surface temperature of a sunlit asphalted surfaces on warm and hot days with cloudiness $<50\%$ is always higher at least 10°C than the surface temperature of the grassy shaded place under a deciduous and evergreen tree.

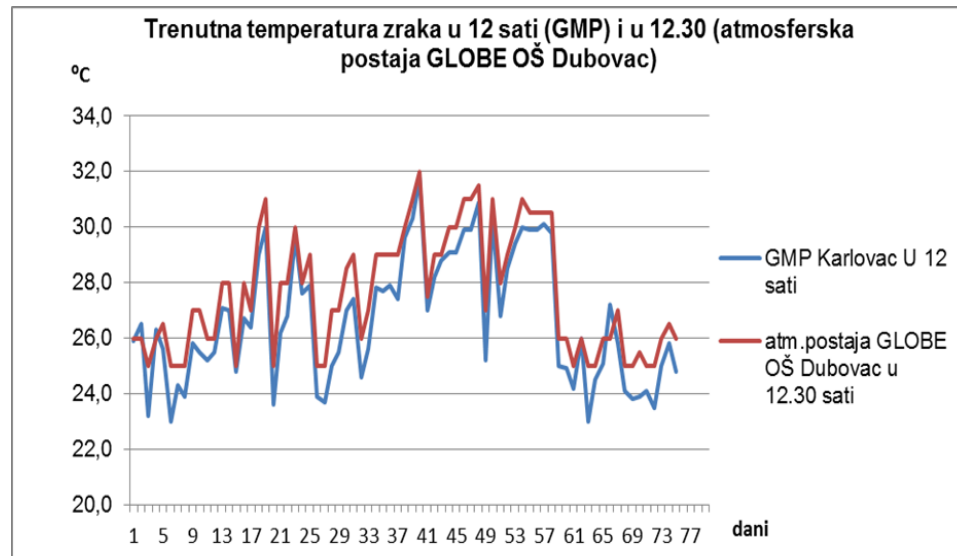
Results and conclusion

We checked and compared the accuracy of our measurements of the current air temperature on the GLOBE station (Dubovac, Elementary school) with measurements of the Croatian hidrometeorological institute from April 22nd to September 21st 2018. in Karlovac.

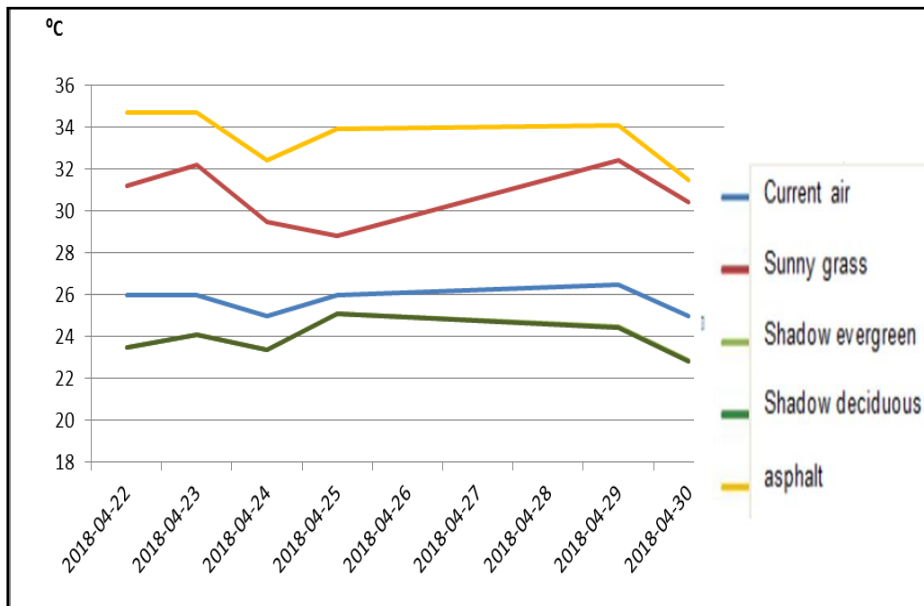
The distance between school and the Croatian hidrometeorological station is 2 kilometers.



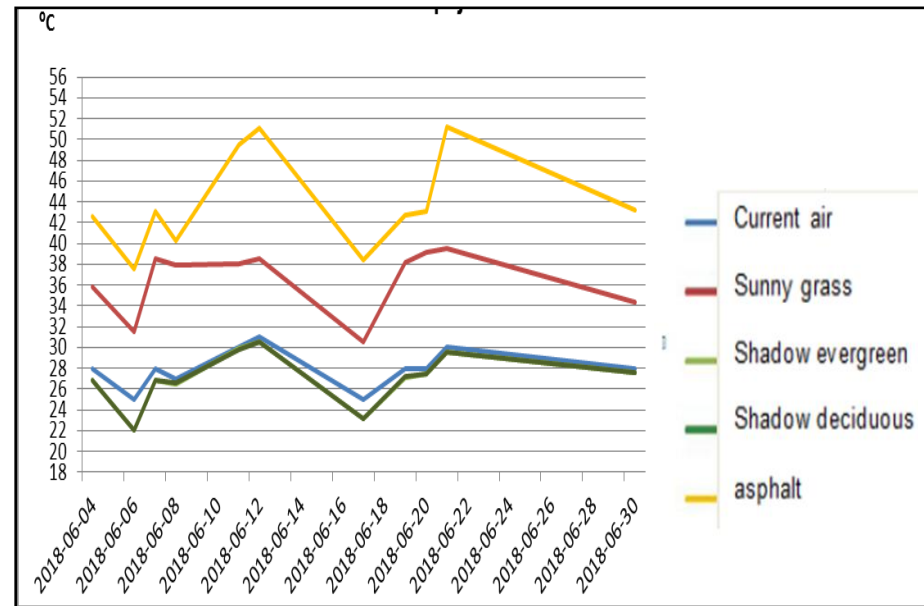
Comparison of air temperature: GLOBE station at 12.30 pm (local time) and the Croatian hidrometeorological station at 12 pm (local time).



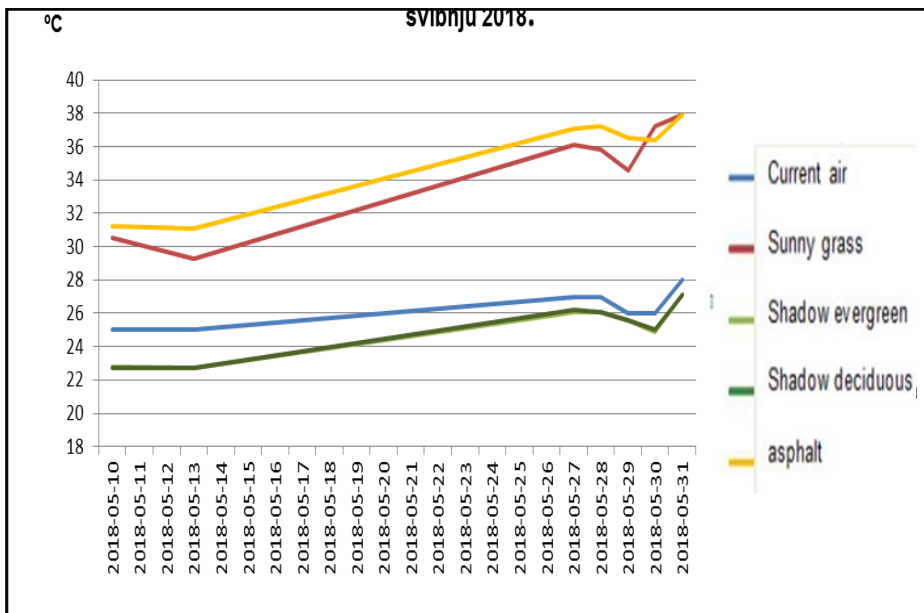
Comparison of a temperature in April 2018.



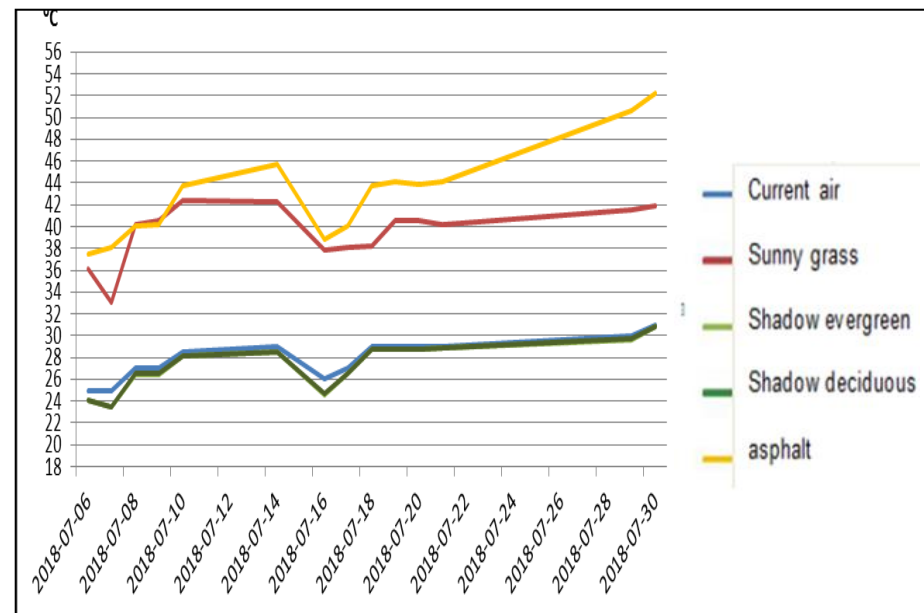
Comparison of a temperature in June 2018.



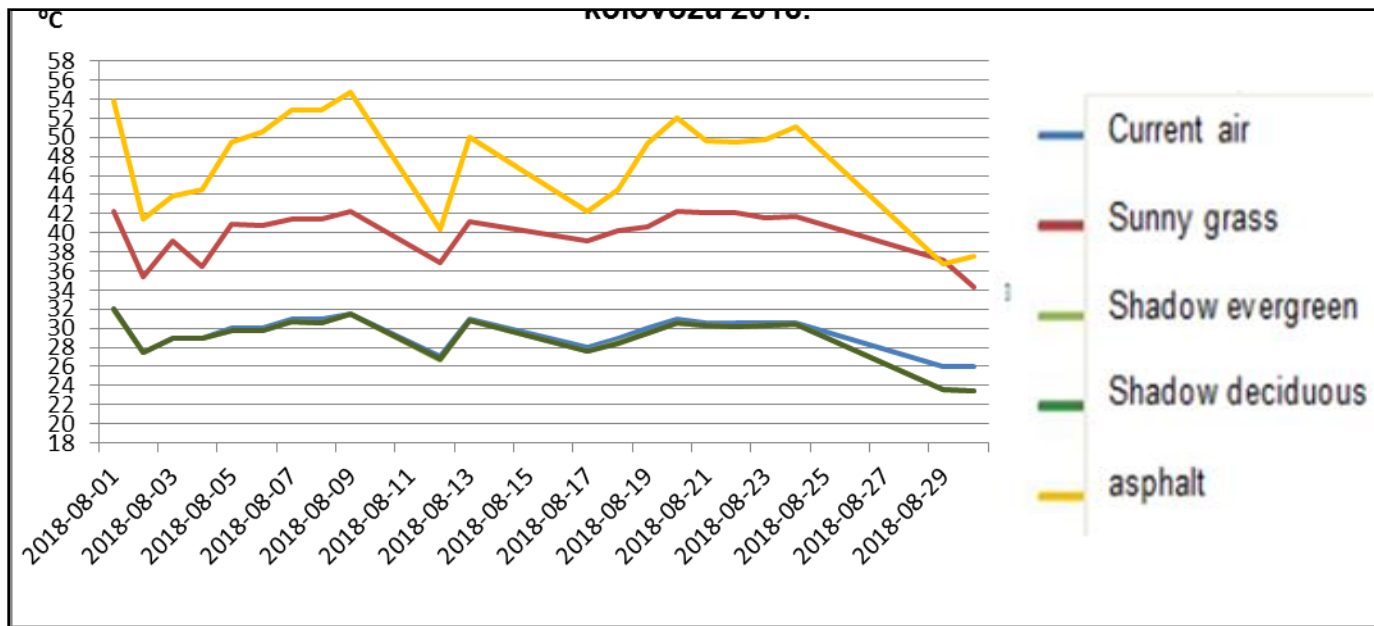
Comparison of a temperature in May 2018.



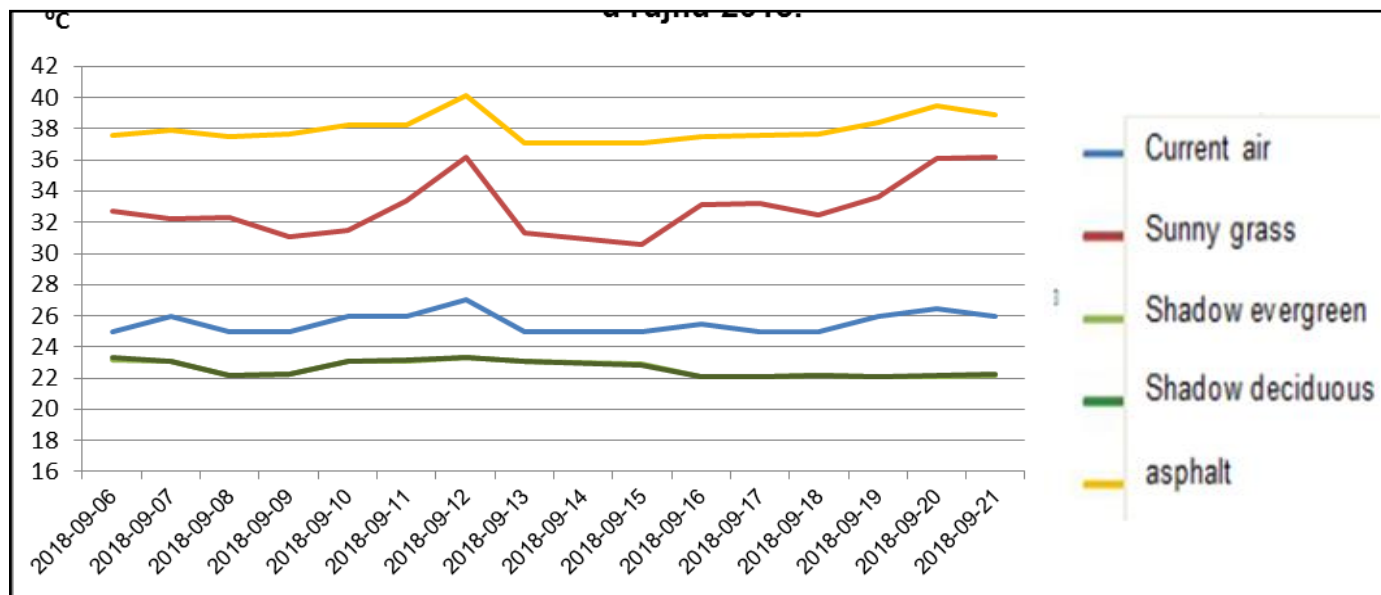
Comparison of a temperature in July 2018.



Comparison of a temperature in August 2018.



Comparison of a temperature in September 2018.

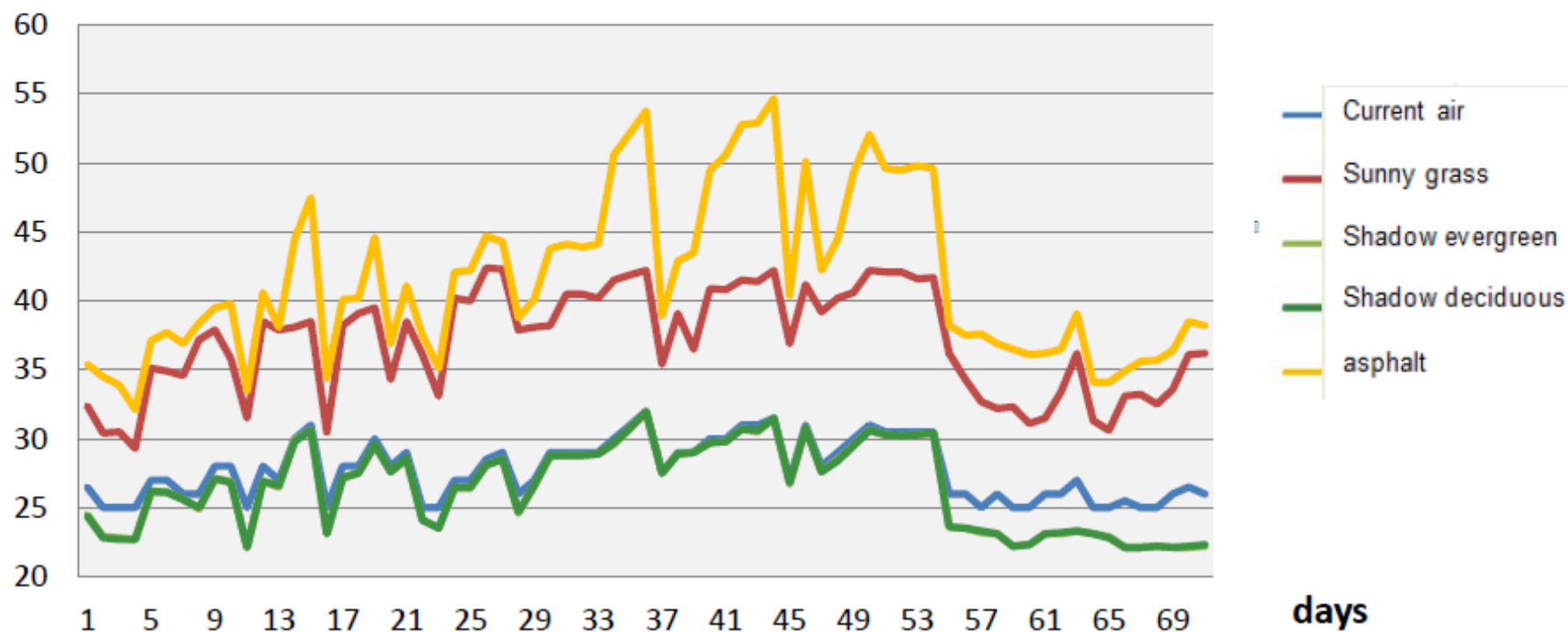


The summary of results are shown graphically from April to September with selected hot and warm days when cloudiness was <50%.

The research has shown that **the current air temperature is always lower than the surface temperature of the sunny grassy surface.**

The **surface temperature of the sunlit asphalt surface is always >10°C than the surface temperature of the grassy shaded place** below the deciduous or evergreen tree in all hot and warm days with cloudiness <50%.

Current air temperature at 12.30 h and surface temperatures of different surfaces in warm and hot days from April 22nd to September 21st 2018. on the atmospheric station GLOBE Elementary school Dubovac, Karlovac



Analysis

Differences in the surface temperature of sunlit asphalted surface and sunlit grassy surface are usually less than 5°C in April and May when the solar time is shorter and there is less amount of solar energy.

In a few days of the summer months, the difference between the surface temperature of the sunlit asphalted surface and sunlit grass surface is less than 5°C . We assume that the cause of that is dried and thinned vegetation in the summer months.

Surface temperature can also be affected by other factors (soil moisture) which we will investigate in future research.



Sources



- 1.<http://globe.pomsk.hr//materijali/zagreb09/modulA/Povrsinska%20tempertura.pdf>
- 2.Bastić, M., Bule, R., Bulić, M., Novoselić, D.: Priroda 6, Alfa d.d., Zagreb 2014.
- 3.Paar,V.,Martinko, S., Čulibrk, T.:Fizika oko nas 7, Školska knjiga, Zagreb 2015.
- 4.<https://vis.globe.gov/GLOBE/#>
- 5.<https://www.globe.gov/web/surface-temperature-field-campaign>
- 6.<https://www.globe.gov/documents/348614/7537c1bd-ce82-4279-8cc6-4dbe1f2cc5b5>

The activity after the state GLOBE competition 2019.



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Save parks and plant trees

Organization(s): OS Dubovac

Student(s): 15

Grade Level: Secondary School (grades 9-12, ages 14-18)

GLOBE Teacher(s): Srjezana Marković-Zoraja

Contributors:

Report Type(s): Standard Research Report


Protocol(s): Air Temperature, Surface Temperature, Biometry (including Tree Height)

Language(s): English

Date Submitted: 12/06/2019

[View Research Report](#)

Abstract: The aim of the research was to show the importance of preserving parks in city of Karlovac and to raise public awareness of the need for planting trees after construction works. In a survey conducted from 22 April to 21 September 2018, the surface temperatures of the sunny grassy surface, the sunny asphalted surfaces, the shaded grassy surfaces under the trees with the current air temperature in hot and warm days with clouds <50% were compared. The study was conducted according to the GLOBE protocol for surface temperature measurement. The results are shown graphically in months from April to September with selected hot and warm days when cloudiness was <50%. The research has shown that the current air temperature is lower than the surface temperature of the sunny grassy surface. The surface temperature of the sunny asphalt surface is higher by 10°C than the surface temperature of the grassy shaded place below the deciduous or evergreen tree in all hot and warm days with clouds <50%.



The project was published on globe.gov web site .



The local community was introduced to the research project.



We are teaching our students „think globally, act locally „.

The students plant the trees behind the school.

Events



REPUBLIKA HRVATSKA
Ministarstvo znanosti i
obrazovanja

PREDSEDANJE REPUBLIKE HRVATSKE
VIJEĆEM EUROPSKE UNIJE – HR PRES 2020



**ZLOŽBENI PROSTOR HR PRES KONFERENCIJE „Učitelji i nastavnici budućnosti
– Teachers and Trainers for the Future“**

ŠIBENIK, 24. - 25. ožujka 2020. godine

PRIJAVNI OBRAZAC

- Institucija:** OŠ Dubovac, Karlovac
- Naziv izlaganja:** Čuvajmo parkove i sadimo drveće (Save parks and plant trees)
- Kontakt osoba (koordinator izlaganja):**
Snježana Marković-Zoraja, prof. biologije i kemije, prof. savjetnik, županijski voditelj



POZIV

Konferencija "Učitelji i nastavnici budućnosti:
Ususret „novom normalnom“
29. lipnja 2020.

Poštovani,

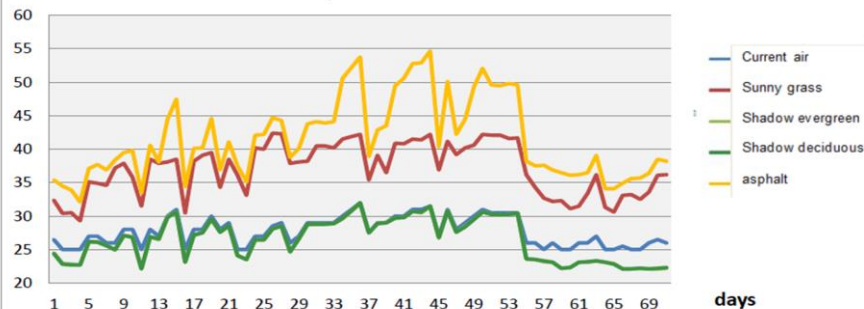
zadovoljstvo nam je pozvati Vas na videokonferenciju "Učitelji i nastavnici budućnosti: Ususret „novom normalnom“ (Teachers and Trainers for the Future: Towards the 'New Normal') koja će se održati 29. lipnja 2020. godine.

Videokonferencija se nastavlja na usvajanje Zaključaka Vijeća o europskim učiteljima i nastavnicima budućnosti te trenutnu raspravu o Nacrtu zaključaka o suprotstavljanju krizi u obrazovanju i osposobljavanju uzrokovanoj pandemijom COVID-19.

Učitelji i nastavnici, u svim sektorima i na svim razinama, glavni su nositelji razvoja obrazovanja i osposobljavanja te imaju ključnu ulogu u suzbijanju krize uzrokovane pandemijom COVID-19. Značajno doprinose nastojanjima da pojedinci iz svih sredina i dobnih skupina imaju pristup kvalitetnom obrazovanju i potrebnu podršku u obrazovanju i stjecanju kvalifikacija, kako bi mogli kvalitetnije živjeti te uspješno učiti i raditi danas, odnosno biti kreatori i predvodnici promjena u budućnosti.

**Invitation to the EU conference
during the Croatian presidency of the
EU, presentation of projects and
souvenirs made by students.**

Current air temperature at 12.30 h and surface temperatures of
different surfaces in warm and hot days from April 22nd -
September 21st 2018, on the atmospheric station GLOBE
Elementary school Dubovac, Karlovac



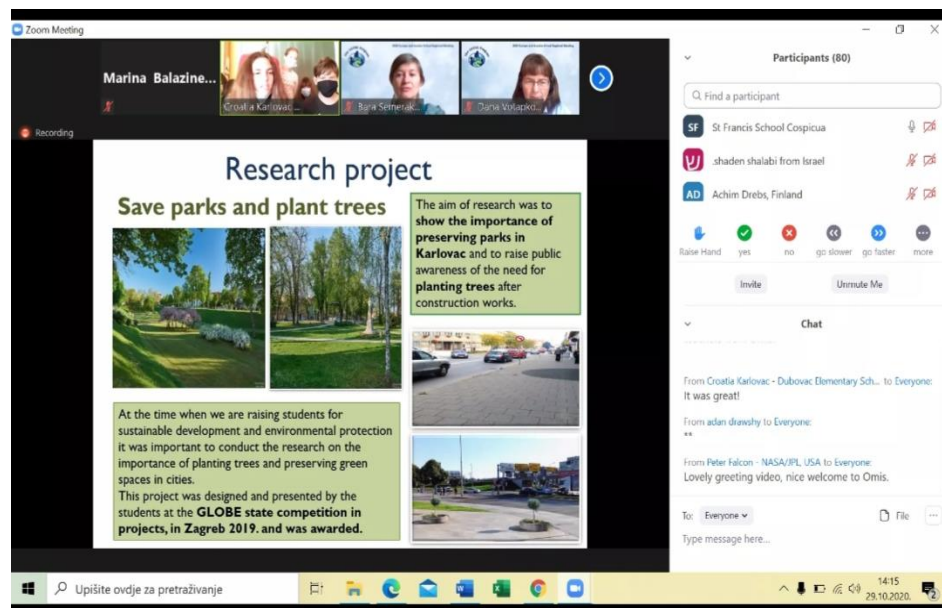
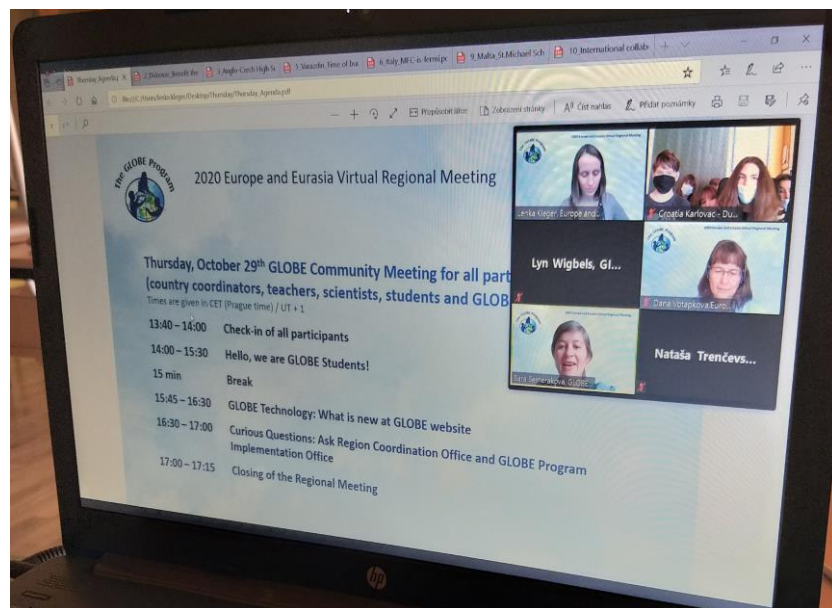
08.07.2020.



Učitelji i nastavnici budućnosti: Ususret „novom normalnom“ (Teachers and Trainers for the Future: Towards the 'New Normal')

October 29th 2020. Europe and Euroasia Virtual Regional meeting

GLOBE students presented
project „Save parks and plant
trees”.



During the research, we were given some advice by scientists of the Croatian Meteorological and Hydrological Service, and we were grateful for their cooperation.



Thanks for your attention,
Dubovac Elementary school, Karlovac, Croatia