

2014

# GLOBE Europe and Eurasia Country Reports



# Belgium

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Angélique could not join the Regional Meeting 2014, still we had 2 teachers representing Belgium – from a GLOBE school in EUPEN:

## KÖNIGLICHES ATHENÄUM EUPEN, BELGIUM

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### Description of the program and recent activities:

Since many years, the « Königliches Athenäum Eupen » has been working with *globe* doing research concerning weather and soil.

Since November 2012, the school is in a renovation- and new construction-project. We have to move in other buildings for this long period and it was not possible to install our weather-house.

During this school-year, we only made cloud-observations with pupils of different classes.

After the relocation into our “new” school, we hope to find a new place for our weather-house, to restart analysis and to be more active on the *globe*-project.

# Croatia

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**Cooperating organizations:** University of Zagreb, Faculty of Science, Division of Biology; National Meteorological Institute, Institute for applied ecology OIKON – Zagreb.

**Participating schools:** 170

**Funding by:** Ministry of Science, Education and Sports of Croatia

**GLOBE protocols:** atmosphere, land cover, surface water, soil, phenology, macrozoobenthos

## Description of the program and recent activities:

Trainings and workshops for The GLOBE program are announced in ETTA's Catalogue of professional development seminars for teachers. Croatian teachers register for chosen workshop using on-line application ([www.ettaedu.eu](http://www.ettaedu.eu)). There is no participation fee, but they or their school pay for traveling and accommodation costs if workshop is not close to their place.

Usually training takes 3 days and in the same time we have 2 or 3 parallel programs (initial training group, next level training group, advanced level group). Involved are 4-6 trainers, depending of the size of the groups. Trainers are funded by ETTA.

Anyone could attend GLOBE trainings – they are open to all teachers. But, all trainees don't actually start doing GLOBE after the training. Schools have to buy GLOBE equipment themselves, or some of them get financial assistance from local government. If lucky or skilled, schools/ GLOBE teachers are sponsored by business subjects. Therefore, if teacher decides that GLOBE is too demanding, or it is not what he/she expected, or he/she do not get expected support from school master or other colleagues, they might give up.

Last year we had 2 trainings:

First one was in October, in Pazin/ Istria and lasting for 3 days (40 participants). We had 2 parallel groups (initial level – basic atmosphere and land cover protocols; second or next level protocols in the area of hydrology, soil and advanced atmosphere). Last day third, advanced group of teachers joined us because they wanted to learn and practice new web site operations.

Second training was in Zagreb at the beginning of February. 2 parallel groups were attending (initial and advanced). Again, many teachers came to learn and practice how to manipulate new GLOBE web site, but just in the same period it was not fully operational. Luckily, we could use filmed operations of entering the data. *Data search* options were operational. For advanced group we also had the topic of IBL and Student Research Projects with lighting up the roll of scientific reviewers that we promote in Croatian GLOBE. That part was very successful and useful for participants.

Last year we had Annual GLOBE conference and competition in Nin (place near Zadar on Croatian coast) with more than 128 students and 42 teachers from 42 most active GLOBE schools. In annual meeting GLOBE students represent their school and activities are designed for school teams of 3. Each school team compete in GLOBE survey and present GLOBE research project (project is not obligatory). Research project, when still in the stage of idea or plan was presented on regional meeting. Short description was sent to scientific reviewer, who gives the suggestions about corrections or additional work when needed. Reviewers draw the attention of mentors if description of the project

is not clear, or conclusions are not based on the presented data, or if research goes too wide, or is not real science at all. In the period between regional and national meeting GLOBE teacher – mentor can communicate with designated reviewer in order to improve project description. After reviewer judges that description is correct, it is posted on the Croatian GLOBE web site.

Projects are presented at national conference in front of 5 judges (usually one is the reviewer, while others are scientists or GLOBE teachers). Students also answer the questions about their research to the judges and to audience.

Last year we chose 3 best judged projects to take part in Student Research Projects presentations during GLOBE Annual partner meeting (Maryland, USA, 12-16 August 2013). 2 schools translated their projects in English and they even managed to participate physically – they went there. One of them - Medicinska skola u Rijeci won the third price for their project.

The other school, Medical school Vrapce, from Zagreb is now bringing the glory to Croatia again in GLOBE at Night campaign:

This month, we'd like to highlight the amazing number of data points that Croatia (1255), Chile (1069) and Poland (987) have contributed to the Globe at Night campaign. They are the leading countries (besides the USA). Most of the measurements (1192) in Croatia were from one city, the city of Zagreb! (quote from [www.globe.gov](http://www.globe.gov) )

Students from both schools finished education for nurses or medical technicians, but they became GLOBE alumni. 3 of them are coming to next Croatian Annual GLOBE Conference, taking place in Trogir (near Split), 14 – 16 May 2014.



# Czech Republic



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**Cooperating organizations:** Faculty of Science, Charles University in Prague, Czech University of Life Sciences Prague, Czech Hydrometeorological Institute, Czech GLOBE Veterans

**Participating schools:** 136

**Funding by:** Guarantors: Ministry of the Education and Ministry of the Environment, Prague Municipality, Partner: Unilever CR, s.r.o., several other companies, schools, other.

**GLOBE protocols:** atmosphere, hydrology, land cover, phenology, soil

## Description of the program and recent activities:

The GLOBE Program in the Czech Republic started in 1995 and we celebrate 19<sup>th</sup> anniversary this year. The official guarantors are the Ministry of the Environment and the Ministry of the Education. TEREZA Association is the national coordinator. TEREZA cooperates closely with GLOBE Scientific Board which consists of 11 Czech experts from different areas of science. These experts help with training workshops, developing new teaching materials, PR of GLOBE within universities, at GLOBE Games.

136 schools currently join the GLOBE Program in the Czech Republic; half of them are high schools. Every year we organize several training workshops for schools – some of them are also available for older students. New schools receive the basic equipment for their measurements at the first workshop. We also support schools with methodical materials for teachers and worksheets for students in Czech language.

## **Themes of the year:**

**2012/13 Phenology and Climate**

### **2013/14 Water Challenge - find and solve local environmental issues connected to water in participant's surrounding**

Last school year we joined GLOBE Student Research Campaign and focused on Climate and Phenology. We prepared 4 special workshops and worksheets to engage students in this campaign. Every 2 months we announced special tasks in close connection to campaign. We consulted the outputs of schools with scientists and placed them on web. We made a calendar composed from this outputs. This year we focus on hydrology - we motivate schools to use their own measurements and data in practice - for improving their local environment.

### **Tree Ring Project**

The Tree Ring Project was a two-year study that uses tree rings in order to determine an environment's climate in any given year. The project, led by GLOBE Country Coordinators Karl Torstein Hetland is collaboration between 24 schools from three countries - Norway, Croatia and Czech rep.

### **Explorers - project aimed at Inquiry Based Science Education (IBSE)**

We developed new methodical materials usable for 3-9 th grade of elementary schools. We have prepared 16 inquiry lessons include worksheets for kids, videos etc. and also the special guide for teachers, how to prepare students for complete scientific process by practicing each step of this process separately. We cooperated closely with GLOBE teachers and scientists and some of this lessons are based on GLOBE measurements. We share the final outputs among Czech schools and train teachers in each region year.

### **GLOBE Games (GG)**

17<sup>th</sup> Czech GLOBE Games just finished (April 24-27) - with simple motto "I do GLOBE" took place in the town Trebic and the team of TEREZA was preparing the event in cooperation with GLOBE primary school.



We consider the GLOBE Games one of the most effective long-term methods of motivation students and teachers in developing GLOBE at their school. GG is a 4 day long meeting of GLOBE students and consists of these main parts:

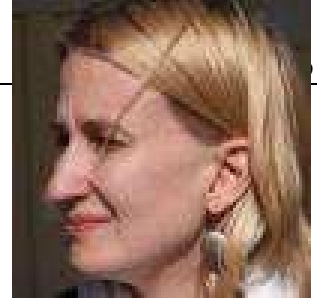
- GLOBE festival for public where students exhibit and explain various activities and GLOBE measurements
- GLOBE students conference where teams of students present their project to GLOBE community
- GLOBE field game where students teams explore the surrounding area, do measurements and team activities at study sites.
- Teachers conference

TEREZA Association has now hosted GLOBE Games in the Czech Republic for 17 years in a row, about 200 students from 30 schools.

### **GLOBE Movement**

We have started long term process of Czech GLOBE program transformation responding to results and evaluation follow from project Explorer. The heart of innovated program will be inquiry based methods more likely than measurements or observation. We will develop new materials for teachers - both for training of particular steps of scientific process and complete GLOBE lessons included whole scientific cycle.

# Finland



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Cooperating organizations: Finnish National Board of Education (OPH), Embassy of the United States, Finnish Meteorological Institute, Heureka Science center

Participating schools: Viikin Normaalikoulu (University of Helsinki), Utajärvi Upper Secondary School, Kuokkalan koulu, Palokan Ylakoulu

Funding by: Finnish National Board of Education, University of Helsinki

GLOBE protocols:

Description of the program and recent activities:

- Season kickoff at the U.S. embassy was a success. We made snow depth measurement sticks out of old skiing poles, enjoyed a nice lunch and the Ambassador Bruce Oreck gave the teachers a tour of the embassy.
- Teacher training in meteorology as well as measurements and observations was successfully combined to teachers updating training (also funded by OPH).
- Snow depth measurement campaign. Unexpected lack of snow in Finland last winter made it a flop, but we received good media attention.
- Viikin normaalikoulu had a nature day for 7<sup>th</sup> grades, natural science week and made a special course with many expert lectures, experiments, visit to Tallinn globe school [http://globefinland.fi/wp\\_viikkiglobekurssi/](http://globefinland.fi/wp_viikkiglobekurssi/)

# France



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Cooperating organizations: CNES (Centre National d'Etudes Spatiales)

Participating schools: 18 (for this year's measurement campaign) ; 55 Globe Schools (not all active)

Funding by: CNES

GLOBE protocols: atmosphere : aerosols, weather, ozone, ...

Description of the program and recent activities:

Globe France was started as a pilot project **10 years ago**, when CNES signed a memorandum of understanding with NASA; an extension of this agreement was signed 16<sup>th</sup> September 2010, again between CNES and NASA.

In this framework:

- We develop Calisph'Air (<http://www.cnes.fr/web/CNES-fr/7167-calisph-air.php>) which focuses on the atmosphere (air quality and climate) using aerosol protocol, in connection with PARASOL, CALIPSO, IASI... satellite mission. We also developed our own sun photometers CALI that we lend to schools and now **CALITOO**.
- For elementary schools we developed the <http://www.schoolweather.net> project as a first step to approach Globe protocols. We also worked on clouds protocols and compared satellite data to pupils observations (clouds hunters project).

We have a group of around 6 GLOBE *resources teachers* who help us shape development of the program; some of them are responsible for the training of newcomers.

Each year we organize a *teacher conference* at the beginning of the school year to make an assessment of the work that has been done, to prepare the coming year and welcome the new teachers. We organize 2 *measurement campaigns* during the school year and a *student conference* at the end of the school year( this year we plan a special event for the **10<sup>th</sup> anniversary**), where students present their GLOBE research to the other schools and to scientists.

We developed a *web platform* to host data during the measurement campaign, in order to have teachers easily check and get the data from the others schools (<http://globeFrance.org/data/>). This separate web platform allows us to welcome all the volunteers for the campaign measurements, even if we don't have time to train them as GLOBE teachers. Ultimately only data from GLOBE teachers are transferred to the GLOBE database.

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## Cooperating organizations:

- Universität zu Köln
- Verband Deutscher Schulgeographen
- Institut für Klima- und Wetterkommunikation, Hamburg
- Deutscher Wetterdienst

## Participating schools:

Look at the list: [www.globe-deutschland.de](http://www.globe-deutschland.de)

Funding by: EU Comenius Programme

GLOBE protocols: Atmosphere, Hydrology, Aerosols

## Description of the program and recent activities:

- Student`s conference in Paderborn June 2013
- Visit in the GLOBE School Pine Ridge Christian High School Pine Bluff
- Visit of 12 students and two teachers of Erony Yud Bet High School f
- rom Jaffa/Tel Aviv in Paderborn February/March 2014
- Partner in the Comenius Project : Student Climate Research Campaign 2011 – 2013
- 8 European countries and 12 schools

# Greece



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**Cooperating organizations: National Observatory of Athens, Foundation for Research and Technology, Ministry of Environment, Ministry of Education**

**Funding by: University of Athens, local societies (limited).**

**GLOBE protocols: Atmosphere (Cloud, Max/min/current air temperature, Surface Temperature), Hydrology (Water temperature, PH), Land cover.**

**Description of the program and recent activities: Application of protocols, learning activities, science support on climatic issues, technical support, guidance for participation to EU funded programs. Emphasis given to the urban environment. Linkages to other environmental education programs is promoted.**

# Italy



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**Cooperating organizations:** Labter-Crea (Territorial Laboratory-Regional Center for Environmental Education) in Mantova, ISIS Malignani Cervignano del Friuli (UD), Department of Environmental Sciences - University of Parma, CNR-IBIMET (Institute for Bio-Meteorology) in Florence, CNR-IREA in Milano, University Department of Agriculture and Environmental Sciences (DISA) Udine, E.T.P. – Regional Laboratory of Hydrobiology of Friuli Venezia Giulia, CFR (Regional Forestry Group).

**Participating schools:** 60 schools are officially part of GLOBE program in Italy – 6 schools are actively working in the GLOBE Program at this moment.

**Funding by:** regions, local municipalities, private foundations and schools own budget.

**GLOBE protocols\*:** atmosphere, hydrology, soil, phenology/land cover. The protocols are not integrated in the national curricula but schools insert them in special activities called project area (a period full immersion, max two weeks of cross curricular teaching)

**Description of the program and recent activities:** GLOBE Italy is a local network of schools and scientific institutions. 60 schools are officially part of GLOBE program in Italy, but only few schools are regularly reporting data.

Some GLOBE schools co-ordinate local or regional networks of schools, operating in the following areas:

- GLOBE –SERENA network, Bologna province; 24 schools (19 Comprehensive Schools, 2 Elementary Schools, 2 JHS, 1 SHS) involved in atmosphere investigations in 3 provinces (Bologna, Reggio Emilia, Ravenna) located in Emilia Romagna Region, in Northern Italy, in collaboration with many scientific and environmental protection agencies.
- PROGETTO TERRITORIO e BIODIVERSITA' network, Friuli Venezia Giulia - Regional School Network (about 30 schools including primary, middle and secondary schools) involved in hydrology, soil investigation and atmosphere investigation in Northern Italy, in collaboration with many scientific and environmental protection agencies. The project includes chemical and physical analysis and the use of bio-indicators in relation to environmental quality. The project lasts a whole school year
- Progetto MINCIO-PO, network of schools (7 Junior High Schools with 12 classes and 5 Senior High Schools with 10 classes, 600 students and teachers) investigating the waters of the Mincio-Po watershed (Lombardia and Veneto regions) in 17 monitoring stations, in collaboration with a number of local institutions and agencies (research, environmental protection, health protection). The chemical/bacterial results of Progetto MINCIO-PO are integrated by the results of another project which investigates water macroinvertebrates of River Mincio and its tributaries: the Progetto MACROINVERTEBRATI is held by a school network made by 1 Senior High School (1 class, 29 students + teachers) and 9 Junior High Schools (21 classes, 515 students + teachers). Both projects are co-ordinated and supported by Labter-Crea and last the whole school year.

During the last two years, ISIS Malignani worked in Comenius Multilateral Project: "A European approach to Earth Observations and Phenology in the Globe Program" with two groups: one for aerosol and one for phenology.

Currently two schools in Italy are working in Aerosol Campaign (ITI Feltrinelli Milano e ITI Malignani Cervignano) Some new schools have recently asked to join GLOBE Italy so to take part in our activities. Next September in Friuli Region a GLOBE training workshop for teachers of primary, middle and secondary schools will be organized. GLOBE workshops will be announced in each Regional School Office.

The web site [www.globeitalia.it](http://www.globeitalia.it) is active.

**EVENTS 2014\*\*\* according to the GLOBE Hydrology, Land Cover, soil, aerosol, phenology Protocols:**

## WORLD WATER DAY

**RIVERS IN SPRING, the World Water Day Celebration in Mantova** with the patronages of Italian Ministry of Environment and the Protection of Territory and Sea and EXPO 2015

March 21, 2014, more than 3000 children, students, teachers and citizens took part in the great event - Rivers in Spring - in Mantova, Northern Italy, to celebrate the World Water Day 2014 for the 14<sup>th</sup> time: people gathered on Mantova Lakes (Mincio River), to carry on scientific, naturalistic and artistic activities, or make footing and boat excursions, all activities in the environment to sensitize people to action in defence of it. The relation water-energy (the international theme proposed by

UN WATER), the aware consumption of the natural resources and the access to water resources as a natural human right were some topics of the event.

In 56 workstations 62 activities were carried out by children of Elementary Schools, students from Junior and Senior High Schools, members of the various bodies of the regional system coordinated by Regione Lombardia and Mantova Province, volunteers of various groups of Civil Protection, Regional Environmental Protection Agency's technical operators, volunteers of the Mincio Park and the Parco Oglio Sud, experts of technical Reclamation, volunteers of ethnographic museums, the Club Alpino Italiano (CAI), the Mantova Diving Club, the Italian Federation of Sport Fishing, etc. .

In this context special importance was given to the monitoring activities of surface water, according to GLOBE project methodologies. In fact, GLOBE ITALY schools (ISIS Malignani from Cervignano del Friuli (Udine), ITIS Feltrinelli from Milano and IS Fermi and IS Strozzi from Mantova) implemented a RING TEST, namely the comparative contextual analysis of the same samples of lake water. The results obtained by the four schools are being compared and communicated to the media.

ISIS MALIGNANI from Cervignano del Friuli also presented its activities concerning the GLOBE 2014 EUROPEAN AEROSOL CAMPAIGN and AGRINKNOWS, an inter-regional project Italy-Slovenia, assessing the risk of groundwater pollution testing hexavalent chromium.

## **EARTH DAY 2014 IN ITALY**

Two events are planned in Italy to celebrate Earth Day 2014 related to GLOBE Project: the first one, ALL THE ENERGY OF THE WORLD (4/12/2014), is a relevant output of the activities of GLOBE ITALY network, the second one, EARTH DAY IN AQUILEIA (4/15/2014) is the result of an intense activity of ISIS Malignani in Cervignano del Friuli (Udine), a leading GLOBE school in Italy, coordinating plenty of schools in its area.

**ALL THE ENERGY OF THE WORLD** is the first event and will be held in the Park Desenzani of Castiglione delle Stiviere, Mantova, Italy on Saturday, April 12, 2014. The event is organized by the Municipality of Castiglione, Labter - Crea and Mantova Province, in collaboration with many other partners.

The event saw the participation of institutions, public and private agencies, associations for the protection and defense of the environment, enterprises for the production of renewable energy and the processing of waste and schools for a total of 42 locations where activities were held aimed at saving energy, reflect on use of energy, encourage the use of renewable energy. This event is a direct effect of the activities of GLOBE ITALY, LABTER-CREA Mantova and ISIS Malignani Cervignano del Friuli

**"EARTH DAY"** was hosted on April 15, 2014, by Aquileia city. The event, promoted locally by ISIS Malignani Cervignano in collaboration with schools, institutions, organizations, agencies, associations of Friuli Venezia Giulia, is the 4<sup>th</sup> edition of Earth Day in Friuli Region.

The scenario in which this year the event fell, the Roman city of Aquileia founded in 181 BC, is a unique organization, in which the precious archaeological site, scientific and cultural activities and the modern city coexist allowing a contextual fruition of different areas of interest. The exhibits proposed for Earth Day with their location, ideally exceed the fences that surround the archaeological excavations to create a link between science, history and life, and offer ideas to new generations so that, from the understanding of scientific phenomena as well as history, they are moved to be active citizens and make informed decisions.

This event is a direct effect of the activities of GLOBE ITALY, LABTER-CREA Mantova and ISIS Malignani Cervignano del Friuli. In fact, from September to April each year, in preparation for this event, over 3.000 students from primary, middle and high school, work in the laboratories of ISIS Malignani to do experiments on the issues of soil, climate, atmosphere, phenology in accordance with the GLOBE protocols

The initiative, in its fourth year, aims to promote an environmental culture based on a continuing project aimed to develop sensitivity to environmentally sustainable management. The day offers a multitude of activities (60) such as environmental monitoring laboratories of integrated science teaching chemistry, physics, biology, earth sciences, history, archeology and fun experiences with the use of products of the earth.

**PROGETTO MINCIO-PO 24a edizione (Mincio Project, 24th edition)**: in May, rivers Mincio and Po monitoring day in Mantova and Verona provinces, more than 600 students and teachers of Junior and Senior High Schools involved in the water quality testing in monitoring stations distributed along the River Mincio from its origin from Garda Lake to its confluence into Po river and 2 monitoring stations located on the Po river, before and after its confluence into Po river. The tests are made according to GLOBE and GREEN hydrology protocols. Other parameters like Escherichia coli and Heavy Metals are tested, as requested by the Italian law. Particular features: tutoring methodology, final Report presentation and dissemination among community.

**A SCUOLA SUL FIUME 15a edizione (To school on the river, 15th edition)**: may 14th, more than 550 students and teachers of Junior and Senior High Schools will monitor and study the waters in south Friuli. Using GLOBE and GREEN protocols river Chemical/Bacterial parameters, Microinvertebrates and IFF (Indice di Funzionalità Fluviale, River Functionality Index) will be investigated by students and teachers, in cooperation with public agencies. During this event, experienced students of secondary schools will tutor younger or inexperienced students.



# ISRAEL

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Cooperating organizations: Ministry OF Education, Ben & Jerry's company.

Participating schools: 138 schools : 78 Elementary schools, 38 Junior High Schools , 2 High Schools.

Funding by: Ministry Of Education. USA Grant .

GLOBE protocols: Atmosphere & Climate , Hydrology & Plants Phenology.

Description of the program and recent activities:

138 GLOBE Israeli schools are actively joining the GLOBE program in Israel from different sectors: Jewish Sector , Arab Sector , Bedouin Sector , Druze Sector . The Globe Program in Israel helps different teachers in charge of activities connected with environmental education even those who are not specialists. Some are trained, the majority use methodological guides and protocols which, suggest problem-situations on the theme of the environment such as: How to protect nature and how to implement Globe according their demands. GLOBE improves student understanding of science because it involves them in performing real science - taking measurements, analyzing data, and participating in research in collaboration with scientists. GLOBE students contribute data for scientists to use in their research.

**Main Events 2014 :**

1. March 2014 , a reception was held at the vice USA Ambassador house for Ben & Jerry's company delegation from Vermont , USA , to have the possibility to cooperate in the Globe Program in Israel in which more schools can afford themselves to purchase devices & instruments for the GLOBE Program .

2. May, 2014 , the Israeli Globe Annual ceremony will be held among 25 best schools from different regions which are awarded for their science research campaign , others for their collaboration in the local level / international level ' others for entering the most data in the Globe website .

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**Cooperating organizations:** University of Latvia, Daugavpils University, Embassy of USA, National Centre for Education, Nature Conservation Agency, local municipalities

**Participating schools:** 22, active - 10

**Funding by:** Ministry of Education and Science, Embassy of USA, schools, parents, local municipalities

**GLOBE protocols:** atmosphere, hydrology, land cover, phenology, soil, aerosols (all are translated in Latvian). Seasons and Biomes project.

**Description of the program and recent activities:**

At present there are 22 schools, who are involved in GLOBE programme in Latvia. Students mostly do investigations during afterschool activities or project weeks, but some teachers use the project also in science lessons. The most popular study area is atmosphere, hydrology, phenology. Some schools send pictures to Markus Eugster in the Seasons and Biomes project.

Year 2013 in the GLOBE Latvia.

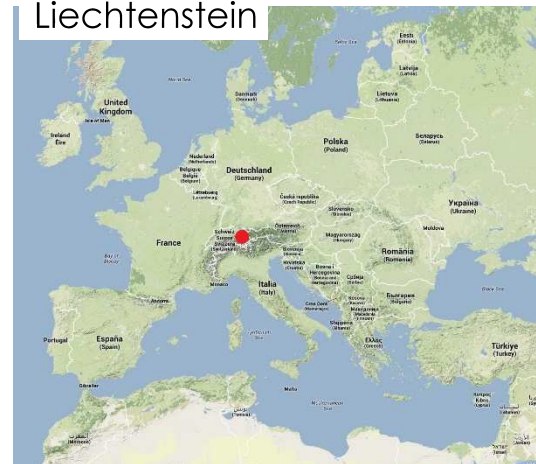
1. The daily work in the project was performed in all project schools. Two workshops were organized for the project teachers.
2. The traditional GLOBE Games were organized in October in Ramuli Primary School. As we did not get funding enough, we organized just one day event.
3. Two GLOBE schools – Livani 1. Secondary School and Uzvara Secondary School actively participate in the GLOBE Comenius Project, which finished May 2013 with Final Conference in Latvia.
4. Information and presentations about GLOBE program possibilities were prepared and presented during the different events – Annual Conference of Environmental Educators Association and workshop for environmental educators coordinators in the National Centre for Education.
5. GLOBE Latvia was involved as partner in the EU LLP Multilateral project „Motivate and Attract students to Science”.

GLOBE Country:

# Liechtenstein



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Cooperating Organizations: None

Participating schools: 1

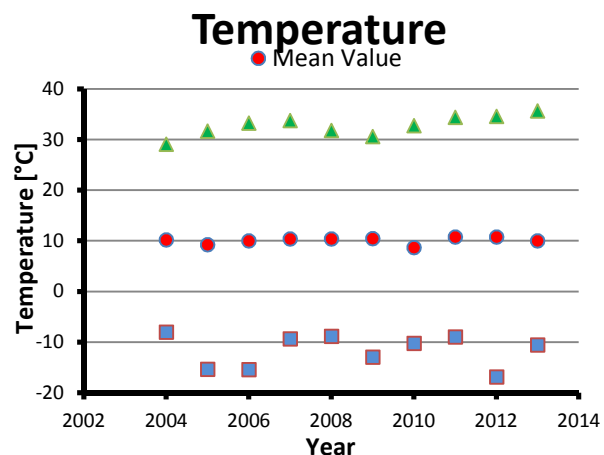
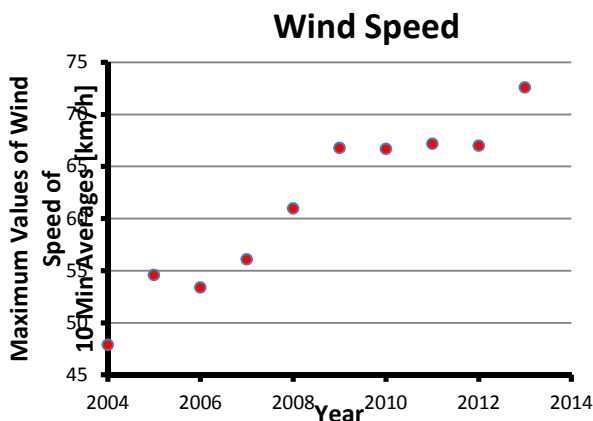
Funding by: Ministry of Education

GLOBE protocols: Atmosphere, Soil, Hydrology

Description of the program and recent activities:

GLOBE Liechtenstein is presently located in one school, the Liechtensteinisches Gymnasium in Vaduz. There are two main activities:

- (1) Atmosphere data are automatically collected (<http://meteovaduz.schulen.li>). The climate data are part of a local network ([www.wetterring.at](http://www.wetterring.at)) that makes weather forecasts for our region. GLOBE Liechtenstein has been collecting data meanwhile for ten years. Data recording becomes more and more important, because **long-term observations** become possible.
- (2) Freshwater studies with students during biology lessons using a modified protocol for the determination of macroinvertebrates.
- (3) Soil temperature observations





# Lithuania



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**Participating schools:** 11 active (41 all in all)

**Funding by:** Ministry of Science and Education of the Republic of Lithuania, schools (at local level).

**GLOBE protocols:** Atmosphere, Land cover, Hydrology, Soil protocols.

## Description of the program and recent activities:

The GLOBE Program in Lithuania was launched in 2002 when the Ministry of Science and Education of the Republic of Lithuania together with The Lithuanian Centre of Non-formal Youth Education (former Lithuanian Center of Young Naturalists) started to coordinate this Program.

Lithuanian GLOBE schools work on environmental measurements and observations. 41 school participate in the GLOBE Program officially; eleven schools send reporting data and participate in GLOBE events regularly. There are more than 150 students in the Program.

GLOBE teachers' training course was on held 14-15 June, 2013. The course took place in The Lithuanian Centre of Non-formal Youth Education and was dedicated to new teachers and the ones with a few years' experience.

Participants worked in eight workshops and had possibility of improving their skills in such topics as: Atmosphere and Climate: Automated Air and Soil Temp, Clouds, Max; Min; Current Temperature, Precipitation, Site Definition - ATM, Surface Temperature; Earth as a System:





Budburst, Green-down, Green-up, Site Definition - Earth as a System; Hydrology: Alkalinity, Conductivity, Dissolved Oxygen, Freshwater Macroinvertebrates, Nitrates, pH, Site Definition - Hydrology, Temperature. Also there were a lot discussions and practice how to send GLOBE data correctly and how to use the GLOBE program website in general.

The annual Students and Teachers' GLOBE conference "Possibilities of Learning GLOBE" was held on 13-14 December, 2013. The main aims of that conference were to develop the knowledge of students in different fields of the environmental investigation, to familiarize with the possibilities of environment measures in the GLOBE program as well as improve collaboration between students and teachers.

The presentations of the GLOBE research and observations were delivered by the students of "GLOBE schools". They presented the results of the investigations of the atmosphere, land cover, phenology protocols, and related themes. It was an excellent opportunity to learn more from each other and it could also inspire the students for the future. The participants also conducted in research cooperation with the scientists of Vilnius Gediminas technical University on the topics in a



mobile laboratory. They worked in groups and investigated air pollution, electromagnetic fields, and acoustic level. A Lector from Vilnius University delivered presentation about satellite earth research. Students were surprised by how many measurements can be made from the space.



# MACEDONIA

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Cooperating organizations: Ministry of Education and Science, Faculty of Civil Engineering, Faculty of Forestry (University "St.Cyril and Methodius, Skopje), Hydrobiological Institute-Ohrid.etc)

Participating schools: 18

Funding by: Ministry of Environment and Physical Planning

GLOBE protocols: Earth as a System, GPS Protocol, Land Cover, Atmosphere, Water, Phenology, Soil and GLOBE at night

## Description of the program and recent activities:

The GLOBE Program in Macedonia started in 1998. Activities concerning the GLOBE Program implementation are carried out by the Ministry of Environment and Physical Planning (MoEPP) through the Macedonian Environmental Information Center. During the period of the GLOBE Network presence in Macedonia, it has raised great interest among students and teachers in primary and secondary schools. Until now, we have included 18 schools, 14 secondary schools and 4 primary schools. Seven GLOBE seminars have been organized so far, resulting in 71 GLOBE teachers trained and participating in the Program in their schools on voluntary basis.

Since the commencement of the Program in our schools, the following Protocols have been applied in the schools: Earth as a System, GPS Protocol, Land Cover, Atmosphere, Water, Phenology, Soil and GLOBE at night.

In 2008, the MoEPP prepared and published the GLOBE Teacher's Guide in Macedonian based on the GLOBE Teacher's Guide and it is available to all teachers and students also on the new web site of the GLOBE Program.

In 2010, Macedonia hosted the 6th Annual Conference of the GLOBE Europe/Eurasia (1-6 June, Ohrid). The event gathered around 70 participants from 23 countries of Europe and Eurasia.

In the process of the programme implementation, we encounter financial problems regarding the support for the programme for supply of new equipment. But, all enrolled schools remain enthusiastic for their work and continue using the available equipment. Unfortunately, last year, one elementary school stopped participation in the programme, due lack of human resources. Also, several professors have retired or left the schools which work with the programme, and at the moment only 51 GLOBE teachers are active.

Due lack of finances for trainings, many teachers have a problem with entering new data on the new GLOBE webpage, but we hope that we will overcome these challenges and the available data from measurements will be soon uploaded.

Despite the difficulties they cope with, Macedonian GLOBE schools have made respectable achievements at European and global levels. Also, it has to be underlined that GLOBE has been an inspiration and contributed

knowledge and data for student's participation in many national competitions in other subjects, like physics and astronomy, as well as GLOBE teachers' participation in international scientific gatherings.

In brief, the latest achievements worth mentioning include:

#### 1. SOU, "Orde Copela", Prilep

- GLOBE teacher Karolina Damjanovska, professor of Physics at SOU, "Orde Copela", Prilep, in 2013 has successfully defended her Master Thesis titled "High school project for Protection of the night sky – project based learning". For successful finalization of her work, measurements for light pollution have been used, in accordance with GLOBE at Night Protocol. Measurements from year 2008-2012 have been used. The thesis also contains definitions and explanations for light pollution and its effects, surveys by students and wider public. It is very important that as a result from her work, several public campaigns were launched, where the public was able to witness the measurements and learn how to reduce light pollution.
- From the measurement according to the Atmosphere Protocols, the student managed to use the available data for their final exams in the SOU, "Orde Copela", Prilep.
- In 2013, David Damjanoski participated at the regional Astronomy contest and won the first prize, and at the national level, he won second prize. The theme of the project was inspired again by "Globe at night".
- Preparations have already started on behalf of Karolina Damjanoska, as a parent mentor to her two sons, for the participation at Dark Sky Rangers contest in Portugal, this year, using data from GLOBE at Night.



#### 2. SOU, "Goce Delcev", Valandovo

- Physics Professor Stojan Manolev, while performing measurements in the Atmosphere Protocol, finalized a project with his students, titled "Project based learning – atmospheric measurements and research on climate change in Valandovo". The aim of the project, beside the training on measurements, was to learn how to use the instruments, correct interpretation of data, correctly following the prescribed steps of the Protocol, establishment of a database, and comparative data analysis.
- What is important for this school is the fact that throughout the years, they have established excellent cooperation with both kindergartens and elementary schools. In 2013 they have organized a workshop for the children in one elementary school and one kindergarten, and they have managed to present and explain the basics of the Atmospheric Protocols. What is interesting to note is that the GLOBE teachers were surprised on the amount of interesting questions by the children.
- The GLOBE team has also produced a brochure titled "Lets discuss the environment", which was distributed to all elementary schools and kindergartens in Valandovo.
- In the framework of these activities, the professors have made an artistic contest for the children, where they were able to paint, draw, and sketch images of the sky, natural phenomenon, rain, snow, clouds etc. but instead of awarding only first prize, they awarded prizes to all participants – because all works have been recognized as being wonderful.



Rainfall Protocol explanation

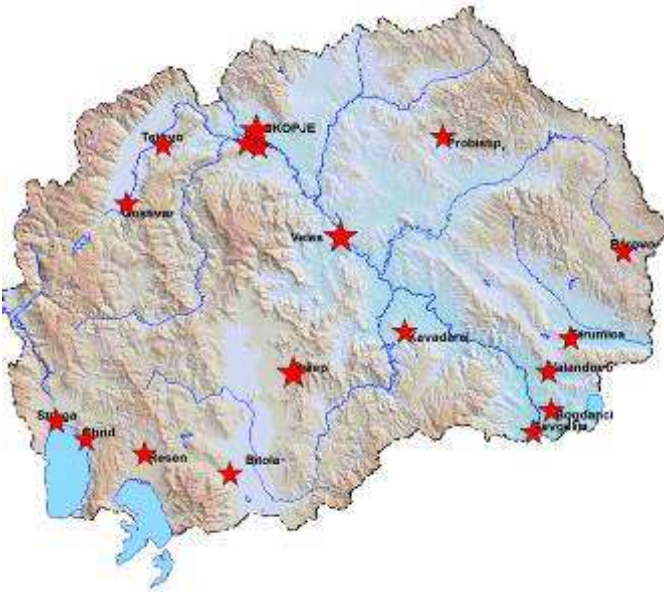


Explanation about type of clouds



Brochure "Lets discuss the environment"

Macedonian GLOBE schools have well established cooperation with the GLOBE schools from the countries in the Region, especially Croatia and Bulgaria.



GLOBE schools in Macedonia

The GLOBE students in Macedonia enjoy the support of their fellow "real" scientists from the Universities and scientific institutions in the country. Yet, it has to be noted that there is enormous interest in GLOBE activities in Macedonia and with stronger national financial support, valuable results could be expected. Unfortunately, at the moment we have several requests by schools, to be exempted from the GLOBE programme, because of lack of financial support for activities.



# Netherlands

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## Participating schools:

50 secondary schools everywhere in the country

## Funding by:

- Schools pay €250,- per school per year
- 2 small sponsors
- Training fee for course with University Utrecht

## Cooperating organizations and protocols:

### *GLOBE protocols:*

- **Weather** and **aerosols** together with *Dutch Royal Meteorological Institute (KNMI)*:
- **Water** we are currently looking for a scientific partner and have talked to some organizations that are very enthusiastic and would like to work with apps that they developed to measure water quality

### *Non GLOBE protocols (developed by Dutch institutes):*

- **Soil** together with *National Institute for public Health and the Environment (RIVM)*: 'living soil'. Students investigate living organisms in the ground and relate that to the respiration of the soil (amount of CO<sub>2</sub> exhausted) using the respiration kit developed by RIVM
- **Phenology** with *Wageningen University*: (using the national network [www.natuurkalender.nl](http://www.natuurkalender.nl))



## Description of the program and recent activities:

### **GLOBE Netherlands Foundation**

On the 25<sup>th</sup> of March we officially installed the GLOBE



Netherlands foundation with 7 board members:

- Jacqueline Cramer** (chair), former minister environment
- Arnold van Vliet** (secretary), scientist Wageningen University. Biologist that is most on the news in Netherlands
- Manon Zwart** (treasurer), head sustainability RIVM
- Pieterneel Levelt**, head climate observations KNMI, prof earth observation and remote sensing Delft University
- Harrie Eijkelhof**, directeur Freudenthal Instituut for Science and

Mathematics Education,

- Ton Reckman**, very experienced GLOBE teacher of Damstede in Amsterdam
- Frans Snik**, developer of iSpex (smartphone app to measure air pollution), Leiden University



### Measurement campaign

We started the measurement campaign with a day at the National Institute for public Health and the Environment (RIVM). Scientists from participating institutes trained the 50 participating schools (see picture). 30 of these schools were not yet GLOBE school, but considering to become one. During the measurement campaign scientists from above mentioned institutes give feedback to schools about the results on the [GLOBE blog](#) that we made on [www.globe.gov](http://www.globe.gov). Schools that enter most data can win prizes, just like students who upload the best research report, photo or movie. One of these prizes is an interview on a very well listened to radio show.



### Course scientific research with GLOBE with University Utrecht

This course we have given on a national level for teachers from all over the country (9 teachers participated) and as an 'in company' training on one school where 15 teachers from all science subjects participated.

The course exists of 5 sessions spread out over half a year. In these sessions teachers learn how they can teach students to do proper scientific research using GLOBE (or if they wish other materials).

We see that a lot of schools have difficulties implementing a learning trajectory about doing science and that we have something to offer them.

Teachers pay €1282 to attend the course and it shows us that schools can pay for the GLOBE program as long as it is really offering them something they need.

### GLOBE ambassador

We welcomed a new GLOBE ambassador: the director-general of the National Institute for public Health and the Environment (RIVM) who is helping us for example by introducing me to the director of the Dutch Union of Water boards to see if we can start a cooperation with GLOBE water.

# Norway



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## **Cooperating organizations:**

Ministry of Education, University of Oslo and University of Environment and Biology

**Participating schools:** app 80. Of these are app 12 active at the moment

**Funding by:** Ministry of Education

## **The Tree Ring Project**

The Tree Ring Project is a project in the Student Climate Research Campaign. Schools in Norway, The Czech Republic and Croatia will work together with scientists in a two-year project.

[Home page](#)

[Student research projects](#)



## **Closing workshop at Dalen September 17.-20. 2013**

The Tree Ring Project organized its final workshop September 17.-20. 2013 at Dalen in Norway. The main focus this time was on student research projects and school to school collaboration. During two days at Dalen students presented their work in plenary in an excellent way. The youngest ones were 13 and the oldest ones were 19 years of age. There were 44 teachers and trainers and 59 students from 20 schools representing Norway, Croatia and the Czech Republic).



Each school presented their research projects and their school to school collaboration. The students could also learn from dendroclimatologists Andreas Kirchhefer how their results could be used to compare climate in the three countries. As scientist Vladimir Kusan said to the students: "We can use your results easily because we don't need to rely only on the quality of your measurements, but we can actually study the core you have drilled."

During the days at Dalen we visited Åmdals Verk Mines and Rui, two of the tourist attractions in Tokke County. In the evenings the students from Vest-Telemark high school organized volleyball tournament and other social activities.

We are very satisfied with how the teachers and students have transformed the idea of tree rings into real work in the science classroom, and how much international collaboration has resulted from the project. So enjoy all the presentations from this workshop.

**A great thank you to all teachers and students for their good work during these two years from**

Karl Torstein Hetland, Country Coordinator Norway and Project Manager

Diana Garasic, Country Coordinator Croatia

Ilona Krpcová, Country Coordinator Czech Republic





# Poland



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**Cooperating organizations:** Faculty of Geophysics and Faculty of Biology, Warsaw University, Warsaw University of Life Science – SGGW, Institute of Geophysics Polish Academy of Sciences, Space Research Centre of the Polish Academy of Sciences,

**Participating schools:** about 160, actually active about 60

**Funding by:** National Found for Environmental Protection and Water Management, local government and companies were funding some activities on local level, schools.

**GLOBE protocols:** atmosphere and climate, hydrology, soil, land cover, phenology, additional projects

**Description of the program and recent activities:**

On April 22, 1997 („Earth Day”) Poland signed the agreement for cooperation in the GLOBE Program. Ministry of National Education named Centrum UNEP/GRID-Warsaw as the Country Coordinator, responsible for management, oversight and facilitation of the GLOBE Program in Poland. In 1999 Advisory Board (consists of the 6 specialist, scientists, university teachers) of the program has been established. Until now, almost 550 teachers from 380 schools have been trained. About 160 schools is listed on the server of the GLOBE program, out of which about 60 carry out regular measurements and submit reports (at the moment).

Each year we organize workshops for teachers:

- Basic workshop for new teachers (part I) – GPS, Land cover (part 1), Atmosphere, Google Earth – 2 days, 20-25 participants, May
- Basic workshop for new teachers (part III) – GPS, Hydrology, Soil, Land cover, Phenology (part 2) – 2 days, 20-25 participants, October
- Advance and Improving workshop – 2 days, 40 participants, together with teachers conference in March

and conferences:

- Nationwide GLOBE Teachers Conference – 2 days, 60 participants, March
- Nationwide GLOBE Schools Principals Conference – 1 day, 55 participants, April
- Student's Seminar, Polish GLOBE GAMES – 4 days (each year), about 300 participants, June

another kind of activities:

- New information and function of Polish GLOBE webside [www.globe.gridw.pl](http://www.globe.gridw.pl)
- GLOBE Program promotion during educational conferences

Organized every year in 2012-2014 Polish GLOBE Games are dedicated to individual modules. In 2013, we were in the sea and we have studied the elements associated with Module B. For example, the greenhouse effect radiation, albedo, aerosols.





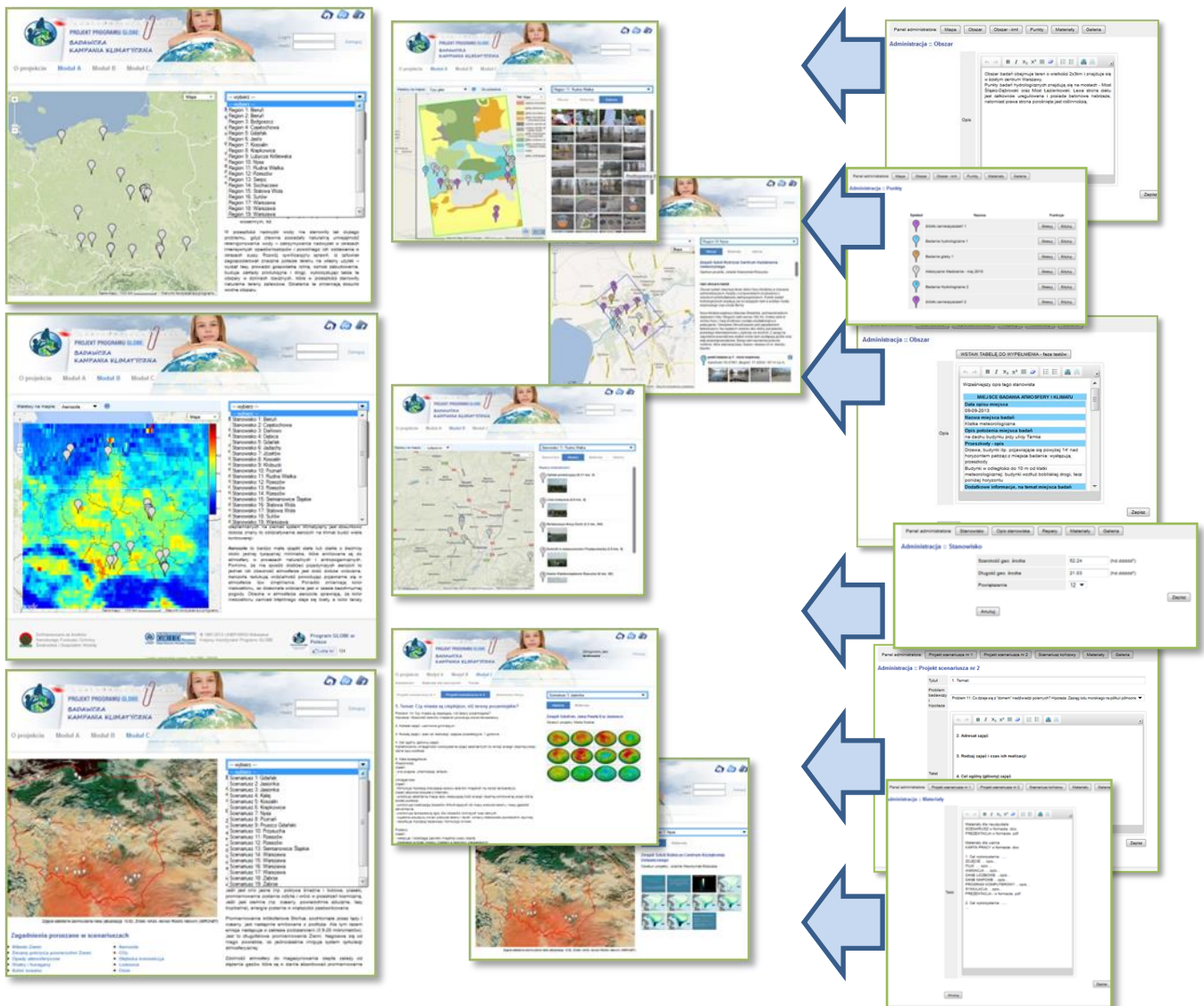
Designed in Poland for the period 2012-2014 the additional educational activities, which are an extension of the formula GLOBE Program, fit perfectly in the Student Climate Research Campaign. On the basis of the protocols and experience GLOBE Program and in collaboration with researchers propose an extension of previous studies of students in three modules:

- A. The diagnosis and prevention of the effects of flooding (based on hydrological and soil protocols),
- B. Examination contamination of the atmosphere (based on atmospheric research - aerosols),
- C. Satellite climate lesson (based on a study of land cover and satellite images).

This year, we finish our Campaign. About 20 schools participated in each module. The result for the module c is the creation of 18 lesson plans on climate issues carried out using satellite images.

They were prepared materials for teachers - Guide Research Campaign on Climate GLOBE Interactive website dedicated project was created, administered with the participation of teachers. It was created administrative panel for teachers. They and their students developed information available on the website.

Below we present screenshots depicting the contents of the portal in the field of individual modules.



# Russia

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**Cooperating organizations:** Russia Ministry of Education and Science

**Participating schools:** 108

**Funding by:** GLOBE schools.

**GLOBE protocols:** weather, water, soil.

New direction of GLOBE Program development – more wide using the remote sensing satellite monitoring data. Now 3D models of every GLOBE school can be constructed and shown on the Google Earth pages.



We are trying to use Russia Federal University network to implement GLOBE program in all Russia Federal Districts.

We have in Rostov-on-Don an expert group of around 10 GLOBE teachers who works with us to shape and develop the program. They come together a few times a year and work together on specific subjects.



The **GLOBE** Program

**Rostov-on-Don, Russia**

**Ребята МБОУ СОШ № 61 после уроков в школе занимаются экспериментальной работой в рамках международной**



# Switzerland



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**Cooperating organizations:** Members of [GLOBE Switzerland association](http://www.globe-swiss.ch) grouping Teacher Training Colleges and Scientific Institutions like University departments, Swiss Parks Network and a school book edition.

**Participating schools:** 159

**Funding by:** Federal Office of Environment. Foundations and MeteoSwiss for current projects.

**GLOBE protocols:** atmosphere, hydrology, phenology, soil; SAB; Elementary GLOBE.

Complementary national protocols (Biodiversity): Bioindication Makrozoobenthos and landscape ecology (addition to intl. hydrology protocols) with [national database](http://www.infoflora.ch), Micro/Macrofauna, School pond, Invasive Neophytes (datas are sent to [www.infoflora.ch](http://www.infoflora.ch) where they are used by science).



**Description of the program and recent activities:**

The GLOBE Program in the Switzerland started in 1998, the official guarantor is the Federal Office of Environment FOEN (Ministry of Environment), the Association GLOBE Switzerland is the national coordinator. In Switzerland obligatory school is in charge of the 26 cantons, there is no Ministry of Education in the closer sense. That's why the national coordination is sometimes a challenge, additionally we have the four national languages in the different regions.

Because national trainings are more difficult to organize under these conditions (differences in curricula, languages, holiday times...) we go to schools and make direct and adapted visits or trainings. If interested we offer GLOBE trainings to in-service teacher groups (25 last year, 9 new schools). As we know the teachers then (and mostly the school directors), direct school support after the trainings is much easier.

What concerns preservice-teacher we regularly get invitations from teacher training institutes in the regions to present GLOBE (short inputs) or to train the students (whole days).

Other possibilities to promote the GLOBE program is to make presentations in context of specific topics and target audience (education, science, 28 last year).

**Development**

## **GLOBE in context agriculture**

One of the major projects GLOBE Switzerland is developing now is a science outreach project in context agriculture, climate change and biodiversity. Partners from science (ETH Zürich, Forum Biodiversität scnat) and teacher colleges (PH FHNW) have been working since autumn 2013 on that topic. Project time is 2013-2016, the funds are contributed by 4 partners (foundations, FOEN).



The main targets of the project are the elaboration of learning activities (including where useful GLOBE protocols), the organization of experiments in farm or school areas (for students) and the development of a concrete dialogue and collaboration between students from ETH Zürich (science) and the schools. The project is entitled LERNfeld, what means learning field. As it seems many of the GLOBE soil protocols will be integrated. GLOBE Switzerland is the main coordinator of this process.

### ***Seasons and biomes (SAB)***

Funding for the international GLOBE SAB project is used up but many of the participants continue to use this project. In Switzerland SAB continues to live in the sub-project SIMB (Seasons in my biome <http://www.seasonsandbiomes.net/index.html>) which got the Swiss KPS award 2013. It includes phenology (green-up and green-down / PhenoCam) and seasonality (snow / freeze-up and break-up / frost-tubes and permafrost / SIMB), is spread in teachers' workshops and even develops as a new seasonal observation will start in 2014.

Many participants from all over the world contribute to the SIMB photo collection where you can compare seasonal changes:



<http://www.seasonsandbiomes.net/112pictures.php>

The PhenoCam project ([http://www.globe-swiss.ch/de/Angebote/GLOBE Jahreszeiten/PhenoCam/](http://www.globe-swiss.ch/de/Angebote/GLOBE_Jahreszeiten/PhenoCam/)) is developed in collaboration with the CCES (Competence Centre for Environment and Sustainability at the ETH Zurich) and will be implemented in 2014. There was already a first teachers' workshop.

### ***Exchange and share***

A Swiss secondary school class could participate in the Estonian GLOBE Camp 2013 which was a real and excellent GLOBE learning expedition. Although Switzerland is at the moment only a partner country in the EU Erasmus project, a Swiss school tries to join a planned project - assumed that it will be approved - to foster cross-border understanding and exchange.





# Ukraine



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**Cooperating organizations:** Ministry of Education and Science of Ukraine, Ministry of Ecology and Natural Resources of Ukraine, National Ecology and Nature Youth Center of Ministry of Education and Science of Ukraine

**Participating schools:** 133.

**Funding by:** Ministry of Education and Science of Ukraine.

**GLOBE protocols:** Atmosphere and Climate, Earth as a System, Hydrology, Land Cover and Biology, Soil.

**Description of the program and recent activities:**

Ukraine has joined GLOBE in 1999. Since 2001 the Program is headed by Volodymyr Verbytskyi, director of National Ecology and Nature Youth Center of Ministry of Education and Science of Ukraine. GLOBE in Ukraine is a part of extracurricular program. There are 246 educational institutions of natural sciences orientation in Ukraine which are coordinated by National Ecology and Nature Youth Center. More than a 100 of them are familiar with GLOBE. About 20 of such establishments are actively involved with the Program.

In 2013-2014 GLOBE Program was recommended by the Ministry of Science and Education for implementation in secondary and extracurricular educational institutions. Thanks to this many schools became interested in the Program and expressed their wish to get involved.

In order to maintain teacher's and students' interest in GLOBE, provide them with training, and recruit new members Ukrainian GLOBE team in 2013-2014 have conducted several activities.

**Annual GLOBE Seminar-cum-Workshop for teachers, trainers and scientists.** This year the event was held in Kherson Ecology and Nature Center. The meeting was attended by 18 representatives from 15 regionals and 17 teachers from Kherson region. All attendees were trained in "Hydrology" and "Land Cover/Biology" protocols. Additionally, there was a training session on GLOBE web-site operation. Scientists from Kherson Hydrobiological Station and Chornomorskyi Biosphere Reserve were scientific consultants at field practices. Next meeting is going to be in Chernihiv.

More than 30 regional consultations, webinars and seminars were carried out after Annual GLOBE Seminar-cum-Workshop. In Ukraine training system is based upon network of regional Ecology and Nature Centers. Teachers who received GLOBE training are invited to share their experience at regional meetings on the basis of Ecology and Nature Centers.

In 2014 we created a new web-site ([www.nenc.gov.ua/globe](http://www.nenc.gov.ua/globe)) to provide teachers, students and interested public with all necessary information on GLOBE Program in Ukraine. Moreover, we started a Facebook page in order to engage young active students who use social networks. Many instructions, manuals and other supportive materials were either developed or translated into Ukrainian from English.

To promote GLOBE Program our team conducted several webinars. GLOBE Calendar Art Competition was organized for students. The best students were awarded with honor diplomas. Their works were featured in Ukrainian GLOBE Calendar as well as in international GLOBE Art Calendar 2014.

Two of Ukrainian GLOBE schools were involved in international projects. The schools joined Global Engagement in Science Teaching Project by Mr. Do-Yong Park (USA) and presented their results at Skype conference.