



Europe and Eurasia Country Reports

2016



GLOBE Program Region
Coordination Office
Europe and Eurasia

Regional Meeting –
Cologne, Germany

26. 9. 2016 – 30. 9. 2016

Belgium

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Cooperating organizations: none

Participating schools: Königliches Athenäum Eupen (KAE); Robert Schuman Institut (RSI), Pater-Damian-Sekundarschule (PDS); Bischöfliches Institut Büllingen (BIB), all four (from 8 in total) secondary schools

Funding by: Ministry of Education of the German Speaking Community of Belgium

GLOBE protocols used in country: mainly atmosphere, aerosol measures, soil protocols, pH of water Protocols

Number of schools currently reporting data (2016): none

Description of the program in your country and recent activities in 2016: participation of teachers in the GAC in Cologne financed by the ministry of education

KAE: GLOBE is used in level 7-12 in geography and science classes, measuring of temperature, atmospheric pressure, air moisture, soil moisture and pH of water around their school and during excursions.

RSI: GLOBE is used in level 7-12 in geography classes and starts now with measuring of temperature, atmospheric pressure, air moisture, (material funded by the ministry of education), preparing a climate conference, aerosol measuring, had a "climate day" in 2015

Preparing cooperation with GLOBE Germany, France and GLOBE Netherlands for students and teachers in collaboration with "Haus Ternell, centre CRIEE"

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: 217; 7.381 604 data reported to GLOBE ; 2.876 Honor rolls

309 teachers trained; 38 pre-service teachers trained

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). There is no participation fee, but they or their school pay for traveling and accommodation costs if workshop is not close to their place. Involved are 4-6 trainers, depending of the size of the groups. ETTA funds trainers (travelling, accommodation and their wages).

In last 2 years, we changed the model of teacher training. At the beginning of GLOBE implementation, we started with 4 days training module and trained all basic protocols. Feedback that we got from participant warned us that it was all too much content for them, that they are all mixed up. Very often the same person came to repeat the training once again. The other reason for abandoning that model was that it was too demanding financially (for ETTA, but most of all for participants and their schools) and in terms of duration, because it is often a problem when teacher is absent for 4 days from the school.

Several years after, we decreased the number of days to three and selected basic protocols, but each participant could be trained in two, mostly 3 investigation fields. Using that model, we had rather complicated schedule, because there were parallel sessions, not just because participants chose different topics, but also because there was a group attending advanced protocols. Great advantage of such model was to have beginners in GLOBE and experienced teachers in a certain moment together. It was great exchange of the experiences. Beginners are often puzzled or skeptical about the implementation in school, and when they hear actual experiences from other teachers, it is very helpful and inspirational. Recently we abandoned that model too, because of financial aspects – mostly because of accommodation costs for the participants and trainers. ETTA was asked by school principals and by the Ministry of education to decrease the costs of professional development seminars.

In last 2 years, we came to decreased number of days in our training model to 1 day, exceptionally 2 days. ETTA always organize workshops in the schools, because schools are funded by the Ministry of Education, and therefore we do not pay for the use of rooms, computer labs and techniques.

In one-day or two-day module, after common plenary session, participants pick certain field of investigations (land cover, atmosphere, water, soil) and use the whole day just to learn and practice this one field of protocols. They can learn other topics in next workshop that could be organized on national level in 6 months or a year, on regional workshop, organized by regional center or using e training. We recommend to new schools to organize visit to nearby GLOBE school, where GLOBE students can act as peer trainers to new students interested in GLOBE.

Anyone could attend GLOBE trainings organized by ETTA – they are open to all teachers. However, not all trainees 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.

In 2016. Croatian Annual GLOBE Conference and Competition was organized in Zadar, the strong GLOBE center, where there are 4 active GLOBE schools. Participated 132 students and 43 teachers from most active GLOBE schools in Croatia. In annual meeting GLOBE students represent their school and activities are designed for school teams of 3 students. Each school team compete in GLOBE survey and present GLOBE research project (project is not obligatory). Research projects, when still in the stage of an idea or plan were presented on regional meetings in early spring. Schools send short description to scientific reviewer, who gives the suggestions about corrections or additional work needed to complete the research in correct way. 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, is not real science at all, or is not related to GLOBE. 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 and GLOBE teachers from other schools). Students also answer the questions about their research to the judges and to audience. Projects are presented in 4 parallel sessions, so among judges there is never a mentor of presented project.

We are proud of our school who won YLACES support because they had quality research projects. One of them got scholarship to attend Annul partner meeting in Colorado. We are also proud of our recently formed GLOBE alumni team of eight registered former students.

Czech Republic



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Organization and Human resources (how many people work on GLOBE, what is the capacity, background of the organization):

Delivering our programs to over 94.000 children a year, TEREZA is the leading NGO in the field of environmental and science education for schools in the Czech Republic. More than 800 schools take part in 3 international programs we run: GLOBE, Eco-Schools and LEAF.

TEREZA has been a country coordinator of the GLOBE program since its very beginning in 1995. Since 2012 we have been appointed by the international GLOBE office to host the GLOBE Program Regional Office for Europe and Eurasia. There are three people working in the GLOBE country coordination office plus two people working in the GLOBE Program Regional Office for Europe and Eurasia.

Funding by:

Ministry of Education, Youth and Sports, Ministry of the Environment, Prague City Hall, State Environmental Fund of the Czech Republic, U.S. Embassy Prague, Neuron Fund for Support of Science

Cooperating organizations/individuals (national and international level):

U.S. Embassy Prague, Scientific Board of the GLOBE Czech Republic, Institute of Botany of the CAS, Czech Hydrometeorological Institute, European Space Education Resource Office (ESERO)

GLOBE schools (what types, how many, etc.):

132 registered schools, about 2/3 elementary schools and 1/3 high schools

GLOBE areas (what areas of investigations you/schools focus on? What areas you plan to develop?):

The most favourite areas among Czech students and teachers are Atmosphere and Hydrology (according to telephonic inquiry made in 2014). Popularity of Biometry and Land Cover is rising. During the school year 2015/2016 we promoted landscape explorations (Land Cover, Biometry, Remote Sensing) under the umbrella of theme of the year called "Landscape under Magnifying Glass". This school year we would like to keep on focusing the "Landscape issues" including Remote Sensing approaches. Moreover we plan to involve our schools in the upcoming phenology campaign so we are going to support phenological projects and issues with stress on IBSE.

Program implementation in the country and recent activities (trainings, field campaigns, school-to-school projects, events):

Trainings for teachers

From September 2015 to June 2016 we organized trainings for teachers focused on developing inquiry based methods in the GLOBE program (28 teachers in total) and one workshop for teachers and students supporting the topic of the school year (22 participants in total).

Topic of the year: "Landscape under Magnifying Glass"

For the school year 2015/2016 we were supporting teachers and students who conducted inquiry based investigations on the landscape. Monthly we provided them with training activities developing research skills in all steps of scientific process and using GLOBE protocols and data (Ground Cover, Biometry, Remote Sensing). 34 schools actively participated in total.



Collaboration with GLOBE teachers and mentors

11 GLOBE teachers trained as GLOBE mentors started to offer their support to another GLOBE teachers (mostly new GLOBE coordinators at schools). They held consultations, provided excursion in their schools, gave lessons open to another teachers, organised MiniGLOBE Games or workshop at GLOBE Games, some were coaching their younger colleagues, or training school teaching staff etc. Some of them started to act as leading teachers in their regions where they inspire other teachers or head teachers for GLOBE.

Czech GLOBE STAR

American Center in Prague (cultural center of U.S. Embassy in Prague) hosted the first year award called **Czech GLOBE STAR** on April 20, 2016. Meaning of this award is to highlight the best practice at GLOBE schools during past school year – hereby nominate them for the international GLOBE STAR award. Historically the first Czech GLOBE STARS are students from Anglo-Czech High School (CAG) in České Budějovice for their systematic long time protect of their local stream, students and teachers from Kunratice Elementary School for organizing succesful international event GLOBE Games 2015, and Dělnická Elementary School in Karviná for exemplary implementation of IBSE in the school curriculum and providing skilled support for another GLOBE schools in the region.



Czech GLOBE STAR seems to be a good new tool for developing closer collaboration between TEREZA Educational Centre and U.S. Embassy Prague.

19th GLOBE Games in Karviná

GLOBE Games enabled students from the Czech Republic and other European countries to share results of their GLOBE scientific projects based on their own inquiry during the Student scientific conference, to learn from researchers and experts, and to experience the research field work in unique environment – the area of former coal mines, nowadays developing the process of revitalization. At the same time, the event supported GLOBE teachers by introducing them new powerful tools and projects for teaching science through the GLOBE Program. 300 students, teachers and CC's in total participated on the event including 9 international school teams from Norway, Latvia, Poland, Slovakia and Croatia.

Aerosols in Europe Campaign

2 Czech schools equipped with Calitoo photometers were actively involved in the European project "Aerosols in Europe" leading by Norway.

Your plans and ideas for next year:

Organize GLOBE Games 2017 in Moravské Budějovice.

Participate in Phenology Campaign for Europe and Eurasia.

Organize workshops for teachers on the country level as well as in the regions

Develop collaboration with GLOBE mentor-teachers – three new teacher will be trained next year.

Develop collaboration with GLOBE Scientific Board.

Conduct new topic of the year – "A Year with Jara" – Inquiry Based Science Education in phenology investigation.

Czech GLOBE STAR 2017 – about the date of Earth Day 2017

Estonia

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Organization and Human resources (how many people work on GLOBE, what is the capacity, background of the organization)

NGO GLOBE Estonia, 3 people in the board!

Funding by:

Estonian Environmental Investment Centre (project-based)

Estonian Ministry of Education and Research

Tax Gambling Council (project- based)

Estonian Research Council (project-based)

Cooperating organizations/individuals (national and international level):

Embassy of the United States in Estonia; Estonian Physical Society, Estonian Ministry of Education and Research, University of Tartu

GLOBE schools (what types, how many, etc.):

79 in list, 24 active in measurements and campaigns, public schools involved

GLOBE areas (what areas of investigations you/schools focus on? What areas you plan to develop?):

Soils, atmosphere, phenology, hydrology, land cover/biometry,

Program implementation in the country and recent activities (trainings, field campaigns, school-to-school projects, events):

- Daily observations based on GLOBE protocols
- Competition of students' research papers (annual), January to May. Terms and conditions are set by researchers from the Universities.
- GLOBE Expedition – GLOBE Estonia summercamp (annual), in cooperation with scientists from different universities in Estonia (University of Tartu, University of Life Sciences in Estonia, Tallinn University), Voore, Estonia 8.-10. August
- GLOBE Students' conference (annual, based on research papers), held in Suure-Jaani in september 2016, (annual, reports, new courses),
- Teacher's seminar held in December 2015 in Tartu (measurements and protocols), - GLOBE protocols, research.
- The Earth day celebration – 22.04, in cooperation with the embassy of the US, planting trees.
- Photo Competition "GLOBE Estonia 20" – 150 photos were sent!

Your plans and ideas for next year:

Daily observations based on GLOBE protocols

Competition of students' research papers (annual), January to May. Terms and conditions are set by researchers from the Universities. Conference will be in September in Palupera

The Earth day celebration – 22.04, in cooperation with the embassy of the US (annual event)

GLOBE Learning Expedition – GLOBE Estonia summercamp (annual), in cooperation with scientists from different universities in Estonia (University of Tartu, University of Life Sciences in Estonia, Tallinn University – Bogs, lakes, forest in South-Estonia!

Teacher's seminar in November/December 2016 in Tartu (measurements and protocols), - GLOBE protocols, research projects

GLOBE Student's seminar – data mining, data analysis – February

GLOBE France



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Funding organization: CNES (Centre National d'Etudes Spatiales)

Participating schools: 25 (for this year's measurement campaign), 55 Globe Schools (not all active)

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

Program and recent activities:

Globe France was started as a pilot project **12 years ago**, when CNES signed a memorandum of understanding with NASA; an extension of this agreement was signed 16th 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 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 4 GLOBE *resources teachers* who help us shape development of the program and train the 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 participate to the 2 *measurement campaigns* during the school year and we organize a *student conference* at the end of the school year 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 they are not yet GLOBE teachers. The data from GLOBE teachers are either entered directly or transferred to the GLOBE database.

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Organization and Human resources (how many people work on GLOBE, what is the capacity, background of the organization)

Free organisation, managing board with 5 persons : Marita Veltrup, Sonja Drzensla, Thomas Beer, Jörg Hüttenhoff), teachers working without fees, everybody is GLOBE member for at least 10 years.

Funding by: fund raising, competitions, public support.

Cooperating organizations/individuals (national and international level):

Institut für Klima- und Wetterkommunikation, Hamburg, Max-Planck-Institut für Meteorologie , Hamburg, local institutions like enterprises and local administrations of the members`home cities, University of Cologne.

GLOBE schools (what types, how many, etc.):

About 50 schools of all types (primary to 2nd level). Some schools only offer data, they don`t cooperate in a further way.

GLOBE areas (what areas of investigations you/schools focus on? What areas you plan to develop?:

The GLOBE-schools work on all different protocols. We plan to develop to work with phenology, with the atmosphere protocol in comparison with social developments(social aspects of climate change)

Program implementation in the country and recent activities (trainings, field campaigns, school-to-school projects, events):

Lectures about different aspects of the GLOBE program at the university of Cologne, students' meeting in Paderborn in June 2016, students' meeting in Eupen /Belgium in September 2016, workshop with refugees in Bad Lippspringe in May 2016

Your plans and ideas for next year:

1. We want to deepen the cooperation with Belgium and focus GLOBE games in the area of the Western European countries.
2. We want to develop the cooperation with GLOBE – Ghana.
3. We plan to deepen the cooperation with UBI (Initiative for environmental education) in Westfalia.
4. We want to intensify the cooperation with the GLOBE-schools and with other organisations in the later national parc development and discussion in our area.



2016

Italy

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Participating schools: 73 schools are officially part of GLOBE program in Italy – 8 schools are actively working in the GLOBE Program at this moment, even not upload date.

GLOBE Italy is a local network of schools and scientific institutions. 73 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, and so the real number of schools working in GLOBE is larger than the apparent one. The networks are the following:

- 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 network of schools (2 Junior High Schools with 3 classes, 78 students, 6 teachers and 2 Senior High Schools with 4 classes, 66 students and 9 teachers) investigate the waters of the Mincio watershed (Lombardia Region) in 9 monitoring stations, in collaboration with a number of local institutions and agencies (research, environmental protection, health protection). The chemical/bacterial results of Progetto MINCIO are integrated by the results of another project which investigates water macroinvertebrates of River Mincio and its tributaries: the Progetto MACROINVERTEBRATI is held by Bertazzolo Junior High School in Mantova with 3 classes, 77 students and 5 teachers. Both projects are co-ordinated and supported by Labter-Crea and last the whole school year.

- Progetto MAGO, held by Piubega Junior High School with 3 classes, 53 students and 4 teachers, assisted by Labter-Crea experts, monitoring the water quality of Seriola-Piubega, a channel belonging to River Mincio water basin, according with GLOBE Protocol, in connection with a movement of active citizens against the pollution of surface waters used for irrigation, that damages agricultural crops and makes it unmarketable agricultural products quality of that territory. Also this project lasts the whole school year.

Funding by: regions, and private foundations through calls for proposal, municipalities and schools own budget. About 20.000 euro.

GLOBE protocols*:

Weather and aerosols,

Hydrology with E.T.P. Regional Laboratory of Hydrobiology of Friuli Venezia Giulia

Soil with CRA and University Department of Agriculture and Environmental Sciences (DISA) Udine

Phenology/land cover with CFR (Regional Forestry Group).

The protocols are not integrated in the national curricula but schools insert them in special activities called u.d.a. (a period full immersion, max two weeks of cross curricular teaching)

Cooperating organizations: Labter-Crea (Territorial Laboratory - Reference Center for Environmental Education) in Mantova, ISIS Malignani Cervignano del Friuli (UD), University Department of Agriculture and Environmental Sciences (DISA) Udine, E.T.P. – Regional Laboratory of Hydrobiology of Friuli Venezia Giulia, CFR (Regional Forestry Group).

Description of the program and recent activities:

Conferences on COP21 in Mantova (April 2016) 28 April 2016: the conference "The Paris Agreement under the microscope: the COP21 in hopes, disappointments and expectations" was organized five months after its conclusion to reflect on its results. Speaker: Thomas Venturini, Associate Professor of Digital Humanities Dept at King's College London and coordinator of the MediaLab of Paris; Organizers: Mantova Climate Alliance and Labter-Crea, together with IIS Bassa Friulana, Globe Italy, Mincio Park, Oglio Sud Park; Target: students, teachers, Mantova community

The River Mincio Contract. In May 2016 Labter-Crea officially joined the River Mincio Contract, a negotiated planning for the rehabilitation of the river basin. The goal is to propose some solutions "re" - thinking the problems of the area, that is to try to solve problems, by means of a careful reading of the territory, with the contribution of each entity involved. At the moment, the Contract has been signed by the following bodies: Regione Lombardia and Regione Veneto, Mincio Park, 3 Provinces (Mantova, Brescia and Verona) and 34 municipalities located in these three provincial territories, Autorità di Bacino del Fiume Po, Agenzia Interregionale per il Po (AIPO), ARPA Lombardia (the Environmental Protection Agency for Lombardia Region, 3 Consortia for Land Reclamation, Corpo Forestale dello Stato RNO Bosco Fontana, GAL Colline Moreniche del Garda and many no profit environmental organizations and associations.

Under this Agreement, in collaboration with IIS Bassa Friuliana and GLOBE ITALY, presented 2 Action Cards:

Action n. 1 monitoring of macro-algae and algal blooms in Mantova Lakes, for the refinement of the algorithms required in the use of satellite imagery for environmental investigations. Monitoring will be made by 6 classes of Junior Secondary Schools in Castellucchio, Campitello, Mantova (Bertazzolo) and Goito. Students and teacher will be trained and coordinated by two researchers of IREA CNR in Milan. The survey will take place in the first five months of 2017.

Action n. 2 a Teacher and Environmental Educator Training Workshop on River Restoration, particularly in the light of climate change, which is deeply modifying the rainfall regime. The course will be taught by experts from CIRF, the Italian Consortium on River Restoration. The workshop will be made on 14th and 28th October.

Progetto GLOBE-SEREN@ (Emilia Romagna Region) Network of schools established in 2002 on the initiative of ITIS Belluzzi, a GLOBE school in Bologna, with large experience in environmental monitoring carried out as part of comprehensive environmental education projects, implemented with environmental control agencies and with scientific and educational research centers. It comprises ITIS Belluzzi, school leader, and 8 comprehensive schools, with five monitoring stations.

For aims, school network and different roles of students, go to the site (www.globeitalia.it) ARPA-SIMC (the Regional Environmental Protection Agency of Emilia Romagna Region), in collaboration with local CNR section, support the detection system (continuity of the data), decide the placement of weather shelters, provide sensors for measuring continuous, support data storage system, manage the central data base, define the storage information tables (structure - quality control), manage the System Data processing; train teachers/students.

In short, schools, ARPA and CNR form a community that collects scientific data on atmosphere to better understand the climate change and communicate the results to the community.

Svalbard Expedition. In the ambit of the project called RESEt (Research and Education Experience Svalbard www.resetsvalbard.it) a class from Liceo Fabio Filzi, secondary school in Rovereto, Trento with the teacher Matteo Cattadori, (expert in the creation of educational projects in Polar Sciences) undertook a study trip to the Svalbard Islands for a two-weeks study programme. The program of the expedition was developed in collaboration with CNR, the Italian National Research Council. the aim is climate change.

The main idea is to visit international research stations that operate in this area and get to know methods and techniques of their work of scientific investigation also through the running of small experiments and measurement collection on site. "The class - said Prof. Cattadori - placed sensors in the waters, in the air and in the permafrost of Svalbard; they will be used to collect data on temperature variations for the purpose of better understanding the climate change.

In March 2017 the sensors will be recovered so that the survey results will be analyzed and evaluated."

20 companies and associations have joined and supported the student project with crowdfunding campaign on SchoolRaising.

The students have also activated small-scale collaborations with the University of Trento and the University Centre in Svalbard; as well as attracting expressions of interest from international bodies such as polar disclosure PEI (Polar International Educator), APECS (Association of Polar Early Career Scientists)." www.resetsvalbard.it fbook

<https://www.facebook.com/Progetto-reset-una-classe-alle-Svalbard-337950279742413/timeline/?ref=hl>

<https://www.pressreader.com/>

Recently Cattadori was certified Globe Teacher, accordingly Liceo Filzi has entered the national network of GLOBE ITALY schools. Thank to that some experimental data collected by the class will be entered in the GLOBE Database.

Further action is being planned for 2017.

An Italian scientist entered in the GLOBE International Scientist Network (GISN) in 2016: Vito Vitale, a researcher on atmospheric physics at the CNR of Bologna, which will be of great help and support for GLOBE ITALY, training teachers and classes, delivering equipment, intercalibrating instruments

EVENTS 2016* according to the GLOBE Hydrology, Land Cover, soil, aerosol, phenology protocols.**

WORLD WATER DAY 2016 - RIVERS IN SPRING (Fiumi di Primavera), the World Water Day Celebration in Mantova

On March 22, 2016, about 3.000 children, students, teachers and citizens took part in the great event - Rivers in Spring - in Mantova, Northern Italy, to celebrate the World Water Day 2016 for the 16th time: people gathered on Mantova Lakes (Mincio River), to carry on scientific, naturalistic and artistic activities, or make foot, boat excursions, all action in the environment to sensitize people to take action to defend it.

WATER AND JOBS, the worldly theme chosen by UN WATER for WWD, the relation water-energy-food, the aware consumption of the natural resources and the access to water resources as a natural human right are some topics of the event (COP21). Other local important topics: the relation Mantova, named National Culture Capital 2016, and water (the water culture), the River Mincio Contract, a participatory negotiation path between regions, provinces, organizations, agencies, associations and groups of citizens for the recovery of the Mincio River basin waters, water saving in agriculture, etc.

In about 61 workstations 72 activities were carried out by children of Elementary Schools, students from Junior and Senior High Schools, scientists of Italian National Research Council-IREA in Milan, experts of Inter-regional Agency for the River Po (AIPO), and Mincio Territories Consortium Remediation (Consorzio di Bonifica Territori del Mincio), volunteers of various groups of Civil Protection, volunteers of the Mincio Park and the Oglio Sud Park, experts in the management of hydroelectric power stations, volunteers of ethnographic museums, the youth group of the Italian Alpine Club Mantova Section (CAI), the Mantova Diving Club, the Fishing Sport Italian Federation, etc. .

3 GLOBE Senior High Schools took part in the event: IISS della Bassa Friulana (Globe school leader at national level) in Cervignano del Friuli (Udine), IS Fermi and IS Strozzi in Mantova.

Students from Friuli Region presented the Globe Field Measurement Campaigns and run workshops on Mantova Lake water monitoring according to Globe and Green Protocols; they discussed on water-soil interaction, presented a case study on a river resurgence and an operating model of ground water. IS Fermi students managed a dynamic model of aeroponics culture and an integrated hydraulic system dynamic model with a biological purification cycle. Water conservation in agriculture (COP21 theme) and scientific experiments to measure the toxicity of irrigation water are the two activities run by IS Strozzi Mantova.

A GLOBE STAR was assigned to Labter-Crea and partners for WWD 2016 in Mantova.



WWD216 in Mantova Report and Image Galleries at: <http://www.labtercrea.it/gma-2016/gma2016.htm>

EARTH DAY 2016 IN ITALY

Earth Day at Torviscosa (Udine), April, 22 2016

On the 22nd of April 2016 in Torviscosa the EARTH DAY has taken place, an event organized by ISIS Bassa Friulana- ITT Malignani Cervignano del Friuli, in cooperation with the School Network Territory and Biodiversity, Torviscosa comune, LabterCrea GLOBE School Network and a number of local institutions. The sixth edition of Earth Day entitled "Feed the mind to feed the Earth" was linked to After EXPO theme, with a series of exhibit (64) centered on: agriculture, feeding, new technologies for life, scientific research, new materials, protection of environment.

TORVISCOSA, the place chosen for this edition, in our region is the place where agriculture, industrial innovation, history, culture and natural environment meet. About 1.780 students participated, from elementary to high school. Older students and experts of ETP, ERSA, Universities of Udine and Trieste (participating in Territory and Biodiversity, Landscape Observatory, Interreg and Globe projects) tutored younger or less expert students. The evening before a conference was held, with the theme: New borders of innovation in agriculture. The event was followed by local and regional televisions and was later broadcasted in the news. The day activity was completed by a Concert about Earth. Supported by Special Projects of Regione Friuli Board.



Land Art , Torviscosa Earth Day 2016

Earth Day at Parco Desenzani in Castiglione delle Stiviere (Mantova), 4th edition, 22-23-24 April, 2016

The Earth Day in Castiglione delle Stiviere, with a format imported from the model invented by the network of schools of Friuli coordinated by Istituto Superiore della Bassa Friulana Friuli (ex ITIS Malignani) in Cervignano del Friuli, was held over three days: from 22nd to 24th April. The first day dedicated to schools, the second and the third ones to public bodies, associations, trades, companies.

Reduce, Reuse and Recycle Waste was the theme of the event, promoted and organized by the Municipality of Castiglione delle Stiviere, in collaboration with Labter-Crea and other public and private bodies.



Lot of topics related to the title of the event were covered in 32 stations set up under 3 large marquee tents, as well as during the conferences and actions taken in these three days.

To prepare the community to the event, which in four years has become the main social event of the Castiglione area, the town council had organized several evening meetings.

More than 2.500 students and teachers and about 1.500 citizens had taken part in it.

Image Gallery at: <http://www.labtercrea.it/gdt2016-castiglione/immagini/gdt2016-castiglione-gall-imm.htm>

PROGETTO MINCIO 26a edizione (Mincio Project, 26th edition): April 27, 2016 River Mincio monitoring day in Mantova . About 159 students and teachers of Junior and Senior High Schools involved in the water quality testing in 9 monitoring stations distributed along the River Mincio from its origin from Garda Lake to its confluence into Po river. The tests have been made according to GLOBE and GREEN hydrology protocols. Other parameters like Escherichia coli were tested, as requested by the Italian law. Particular features: tutoring methodology, final Report presentation, dissemination among community, taking part in River Mincio Contract.

Report: <http://www.labtercrea.it/pm-2016/pm-2016.htm>



Image Gallery at: <http://www.labtercrea.it/pm-2016/immagini/pm-2016-galleria-immagini.htm>

A SCUOLA SUL FIUME 17a edizione (To school on the river, 17th edition):

April 29th, more than 500 students and teachers of Junior and Senior High Schools (4 Globe schools) <monitored and studied the waters in west Friuli, Tagliamento River. Using GLOBE and GREEN protocols , Microinvertebrates and IFF (Indice di Funzionalità Fluviale, River Functionality Index) river Chemical/Bacterial

parameters were investigated by students and teachers, in cooperation with public agencies. During this event, experienced students of secondary schools will tutor younger or inexperienced students.



Summer School from 13 to 15 September 2016 a full- immersion activity, 23 students from 4 High Globe Schools have enrolled.

The Summer School "Landscape Observatory 2.0" is one of the actions included in the special project Environmental Observatory - STOP and HAVE A LOOK . The target of the project actions is to develop an advanced culture of the territory based on its knowledge. Such knowledge can be built by acquiring technical competences and by using scientific instruments provided by international projects (GLOBE e FYR), new instruments to gather data – use of drones, use of the QGIS software to build thematic maps. The maps produced were uploaded on GLOBE site and OBSERVATORY site



ISRAEL



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Cooperating organizations:

Ministry OF Education, Ben & Jerry's company, Globisens Company .

Participating schools:166 schools :

116 Elementary schools, 48 Junior High Schools , 2 High Schools.

Funding by: Ministry Of Education. USA Grant .

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

Description of the program and recent activities:

126 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 2016 :

1.**October 2015** : Opening Globe National Conference in Ramat Hanadiv (a nature reserve ,northern part of Israel), where teachers and principals met face to face from different sectors to collaborate on a common research .

2. **January , 2016** : Opening a national workshop for new globe teachers .
A multiculture teacher meeting where science & culture meet together.
3. **March ,2016** : Each globe school celebrate during the month "the Green Day"
So that students make different activities concerning the Globe Program for their community .
4. **May 2016** : Recruiting new globe teachers for next year – Globe Meeting
Where teachers , globe students from different schools present
their projects or Globe curriculum implemented in their different
disciplines at school .
5. **May the 31st ,2016** - The Israeli Globe Annual ceremony will be held among 26
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 and also Best Globe Video
Contest .

Recent Photos :



GLOBE DAY IN SHEVAH MOFET TEL AVIV.



GLOBE SCIENTIFIC RESEARCH IN TURAAN D Elementary School.



Skype Meeting with an Ukranian globe school and Globe Shaab Junior school .



GLOBE SOLAR PATTERN IN SALAH A DIN BEDOUINSCHOOL –RAHAT.



A COLLABORATIVE PHENOLOGY RESEACH OF AN INVASIVE PLANT DEVELOPMENT IN 2 GLOBE SCHOOLS FROM DIFFERENT AREAS IN ISRAEL .

Kyrgyzstan

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Country report of the “Globe” club at the National computer gymnasium

Since October of the 2015-2016-academic year the “Globe” club worked together with our students from the 9th, 10th and 11th grades. 15 students of our school were involved in general and we worked together according to the following plan. We’ve tried to get more information about all ecological problems in Kyrgyzstan. Our work included all 5 directions mentioned in “Globe” program.

As we know they are

- Atmosphere (weather and climate)
- Hydrology (measure of water)
- Soil (moisture, temperature)
- Biology
- Phenology (reaction of plants and animals to weather and climate)

In November participants have known all necessary information about Globe international ecological program.

Our plan included the following topics:

General information about Ecology
The planet Earth.
The environment.
Lithosphere and its global ecological problems.
Hydrosphere and its ecological problems.
The causes of atmosphere pollution.
Biosphere problems.
The environmental problems facing the Earth.
Green-house effect. Ozone depletion.
Nature of Kyrgyzstan.
Ecological problems in Kyrgyzstan.

In November in a special laboratory we’ve studied the soil composition from different regions of Kyrgyzstan. It’s moisture, temperature and general description.

Since January the 7th grade students have started participating. Their main goal was to measure the temperature in Bishkek every three hours and make up a table.

The 9th, 10th and 11th grades students have written reports which should consists of 200 words on different topics such as The atmosphere of Kyrgyzstan, The land of Kyrgyzstan, Biosphere of the Issyk-kul lake, How mollusks create peat, Ecology of waters in Kyrgyzstan etc. Participants have written research works and sent them to the head office in the USA.

We’ve done a good work with the 11th grade student Isakov Marlen about water ecology in Kyrgyzstan.

In details, Marlen has taken water from different parts of Bishkek. He researched the harmful effects of aquatic microorganisms in different parts of the city.

Ulan Chabaldaev, an 11th grade student worked on the topic: “The bad influence of refuse to people”. To research it more widely we’ve taken some photos of a city dump near our capital. Ulan has tried to research about harmful substances in smoke coming out after burning a dump. But because of absence of special equipment we couldn’t define harmful substances in the air.

Begimay Ismailbekova and Elnura Satieva, students from the 9th grade researched and made a video about The Nature of Kyrgyzstan and Protected areas of Kyrgyzstan.

Malika Amankojoeva worked on the topic “The land of Kyrgyzstan”. She has made some photos of the land from different parts of Kyrgyzstan. She has studied the soil composition.

In conclusion, working on the “Globe” program we had some problems because of that we’ve recently started to participate. But we’re going to apply efforts. We’re interested in the program. Therefore we’ll try to be more active.

In future we’re going to involve our elementary school pupils and teachers and to give an opportunity for them to work together with scientists in the “Globe” program.

Latvia



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

Participating schools: 24, 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 24 schools, who are involved in GLOBE programme in Latvia. Only 3 are currently reporting data, 8 schools reported during whole year 2016. 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 are atmosphere, hydrology, phenology. Some schools send pictures to Markus Eugster in the Seasons and Biomes project.

Year 2016 in the GLOBE Latvia.

1. The daily work in the project was performed in all project schools. One workshop was organized for the project teachers – soil protocols + new GLOBE applications
2. 5 GLOBE teachers participated in the 2nd Open MASS Project conference in Warsaw



3. Rujiena Secondary school students and teacher participated in the GLOBE Games in Czech Republic.
4. GLOBE Latvia is involved as partner in the EU LLP Multilateral project „Motivate and Attract students to Science”.
5. 2 GLOBE teachers piloted MASS Project learning materials and shared their experience leading workshop in the Annual Conference of Environmental Educators Association.



The Former Yugoslav Republic (FYR) of Macedonia

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Funding by: Ministry of Environment and Physical Planning

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

GLOBE schools: Until now, we have included 26 schools, 14 secondary schools and 12 primary schools.

GLOBE areas:

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

Program implementation in the country and recent activities:

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. Despite of the constraints, we have achieved certain progress within the possibilities, namely:

The Bureau for Education Development of the Republic of Macedonia initiated reforms in the school curricula of the subjects mathematics and natural science. The curricula are based on introduction of Adapted curricula for mathematics and natural science from Cambridge International Examination Centre. For the purposes of efficient implementation of the adapted curricula, the Bureau for Education Development organized trainings of the natural science teachers in primary schools in the Republic of Macedonia, for 7th, 8th and 9th grades. The trainings involved around 350 schools and 1400 teachers. It is important to point out that the Ministry of Environment and Physical Planning delivered GLOBE Manual for Teachers in Macedonian, prior to the commencement of the training courses.

Practical implementation of the new curricula has commenced this September and we are happy to note that the number of teachers asking for access to the GLOBE web site to enter data and become GLOBE teachers is increasing on regular basis.

Your plans and ideas for next year:

For the next year, we expect that all teachers that have received training in the application of GLOBE protocols will be able to contribute to the GLOBE Programme not only by sampling, testing and analyses, but also by entering the obtained data in the GLOBE database portal, which is currently insufficiently practiced.

If we manage to secure stable financial source as allocation in the Budget of the Ministry for the purposes of the GLOBE Programme, we will be able to procure chemicals, instruments and other requirements necessary for uninterrupted performance of the activities.

Malta

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Your plans and ideas for next year:

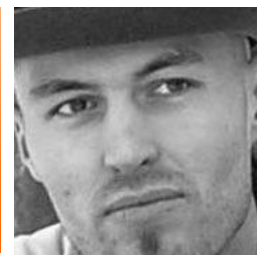
Malta became part of GLOBE in 2007 and work on its implementation started immediately through a series of informal interviews with heads of school and persons directly involved in science education. The overall feedback about the programme was very positive, with individuals hailing it as a golden opportunity to make science education more relevant. The major stumbling block identified by practically all the people contacted was the current science curriculum that was defined as too content oriented rather than inquiry based. So we sought to address this incompatibility issue. Colleagues from the University of Malta and the Education Directorate developed a vision for science education based on “doing” science that was accepted as the guiding document for the science curriculum.

Now that we have the policy in place, this year we intend to start with the implementation of GLOBE by:

- a) Initiate training for (i) science teacher trainers at the Faculty of Education, (ii) science education officers from the Ministry of Education, (iii) heads of science departments in schools, and (iv) science peripatetic teachers. This training would involve introducing participants to GLOBE and preparing them for the next stage.
- b) Organise a national seminar to launch the Pilot Programme, i.e. introduce GLOBE in 6 representative schools (2 Primary, 2 Secondary, 2 Post Sec.). Schools will be supported by the trained staff from (a).
- c) Monitor and evaluate the progress of GLOBE in schools.
- d) Organise a second national seminar to open up GLOBE for all other interested schools.

Netherlands

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Participating schools:

80 secondary schools from everywhere in the country have a paid membership

Funding by:

Program funding:

- Schools pay €290,- per school per year
- 1 small sponsors (€750 yearly)

Project funding:

- Training fee for course 'science education' with University Utrecht
- GLOBE Science School project (see below), funded by Prins Bernhard Cultuurfonds and 6 participating schools
- Phenology app, to be connected to database, funded by European Space Agency and ministry of environment
- Science Fair for bilingual schools, funded by institute for internationalization (EP-Nuffic)
- Investigation of light used by citizens in their houses done with spectrometer by students.

Cooperating organizations and protocols:

GLOBE protocols:

- **Weather** and **aerosols** together with *Dutch Royal Meteorological Institute (KNMI)*:
- **Water** together with *Wageningen University*

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 CO₂ exhausted) using the respiration kit developed by RIVM
- **Phenology** with *Wageningen University*: (using the network www.naturetoday.com)



Description of the program and recent activities:

GLOBE Science School project

We did an investigation on what GLOBE could offer to schools in such a way that we really help them solving an issue that they have. The result was that 'learning to do research' is still not on the level that schools would like it. It is taught fragmentary with hardly a connection between subjects. Funded by a national donor we have developed a GLOBE learning trajectory on 'doing science', 'sustainability' and 'internationalization'. With 6 schools (that each pay €3,000 from their school budget) we did a pilot project last school year to

implement the learning trajectory and start with a whole school cross-curricular GLOBE approach. This school year we have contracted 5 new schools to do the same project.

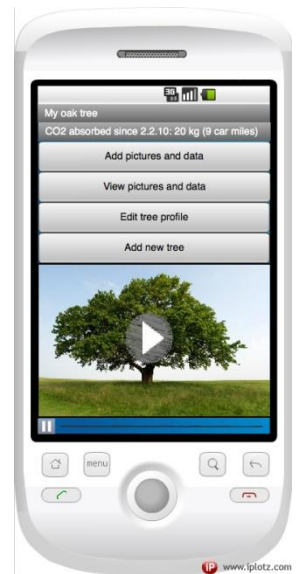
Phenology app and campaign

The EU MYGEOSS fund has finally funded the phenology app that we will show in Cologne.

This smartphone app will give students the opportunity to follow the development of a tree during the year by taking pictures that are automatically combined into a *time lapse* movie. In this way they contribute to science and learn how nature reacts to climate change.

We will organize a European campaign for phenology investigation for which the app can be used:

www.globe.gov/web/european-phenology-campaign



Science Fair for bilingual schools

We have started a cooperation with the organization that certifies bilingual schools in the Netherlands. We organized our first Science Fair at Wageningen University where students of secondary education will share their GLOBE results in English to each other and to the scientific jury. It was very successful so we organize it again in 2017.



New website

We developed a new fresh looking website: www.globenederland.nl

New opportunities

We are currently talking with different partners to see if there are opportunities. A water project with local water boards, outreach with the phenology app with Disney, new app Trashhunter for investigation of litter and its relation to the Plastic Soup in the oceans.

Norway



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Cooperating organizations:

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

Participating schools: app 80.

Funding by: Ministry of Education

Activities in 2015 and 2016

“Aerosols in Europe”

Workshop in Oslo March 4.-5. 2015



We had our startup workshop at the University of Oslo with 23 teachers from 15 Norwegian schools. At the workshop we focused on the climatic importance of aerosols and how to do measurements with the CALITOO instrument.



September 16.–19. 2015 we organized the first international workshop in Nove Mesto in The Czech republic. Our main goal having the workshop was to learn all about how and why to do aerosol measurements. Our two scientists Marianne Lund and Bjørn Samset gave excellent lectures about aerosols and climate change.

Our second goal at the workshop was to let the schools get to know each other and make plans for the future collaboration.

We would like to say a big thank you to GLOBE Regional Office (Bara, Dana and Ilona) for their great help in organizing the workshop.

All in all we were 53 participants from 25 schools from 6 countries.

During the project we received 35 student projects. You can find them all [here](#)

The closing workshop will be in Longyearbyen on October 21-23 2016.

Participating schools:

TWIN SCHOOLS AEROSOLS IN EUROPE			
School name	Country	Norwegian school 1	Norwegian school 2
Prirodoslovna i grafička škola Rijeka	Croatia	Vest-Telemark vgs	
School for nurses Vrapce	Croatia	St. Olav vgs.	
Technical school Daruvar	Croatia	Vågsbygd vgs	Polarsirkelen vgs
SOŠ pro ochranu a obnovu ŽP - Schola Humanitas, Litvínov	Czech Republic	Vardafjell videregående skole	
SPS Karvina	Czech Republic	Charlottenlund vgs	Bodin videregående skole
Lycée de la Mer	France	Hammerfest videregående skole	
Lycée Palissy	France	Jessheim videregående skole	Lambertseter videregående skole
Afek	Israel	Ole Vig videregående skole	
IIS Cavazzi	Italy	Sandsli vgs	Aust-Lofoten videregående skole
Istituto Tecnico Industriale Statale Malignani	Italy	Haram Vidaregåande Skule	
Gymnasium Schloß Neuhaus	Germany	Røros videregående skole	

Poland

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Organization and Human resources (how many people work on GLOBE, what is the capacity, background of the organization):

UNEP/GRID-Warsaw Centre is celebrating its 25th anniversary this year. Our Centre was established in 1991 as a member of the GRID (Global Resource Information Database) global network developed by the United Nations Environment Programme (UNEP) to foster sustainable management of natural resources. We are one of the few specialized centres in charge of collecting, processing and facilitating access to environmental data and information.

We are well recognized leader of environmental and geo- education. Our GLOBE team consist of few trainers working in UNEP/GRID-Warsaw Centre. We also have one Master Trainer and we cooperate with a number of scientists and experts who help in GLOBE implementation.

Funding by: There is no official funding for GLOBE in Poland. Program activities are supported by money coming from different projects (funded from national and international sources) and some sponsors. School don't pay for participation in GLOBE (no standard fee). However, teachers pay some attendance fee to take part in workshops and trainings.

GLOBE schools (what types, how many, etc.):

There is a wide range of young people involved in GLOBE in our country – very young children in primary schools as well as older youth in secondary and high schools. There are about 60 schools active in the Program (taking part in the research, data collection and reporting, etc.), although teachers from ca. 180 schools were trained on how to use GLOBE protocols.

GLOBE areas (what areas of investigations you/schools focus on? What areas you plan to develop?):

Polish schools are involved in data collection from all basic GLOBE protocols. The most popular area is the atmospheric research.

Program implementation in the country and recent activities (trainings, field campaigns, school-to-school projects, events):

Last year implementation of GLOBE in Poland was focused on schools' own activities:

- We invited schools to participate in the MASS project (Motivate and Attract Students to Science) and to pilot educational materials prepared by the project team. About 15 teachers took part in that activity (see pictures below);
- We prepared the activity for the Earth Day 2015 called "Lesson for Mother Earth" encouraging students and teachers to go outside and have at least one outdoor activity around April, 22nd.

Moreover, we tried to engage business in GLOBE by implementation of the contest called "Nature Observers". On the basis of GLOBE methodology we proposed series of activities related to biometry measurements, phenology research as well as weather observations (see pictures below). Employees of the biggest chemistry companies in Poland were invited to take part. The contest is still going on. Results will be announced in December.

In October 2016 we are organising the next teachers' meeting (14th national conference) as well as trainings in atmosphere and hydrology modules.



Students implementing MASS activities



"Nature Observers" contest

Your plans and ideas for next year:

1. In 2017 we are going to celebrate 20th anniversary of GLOBE Program in Poland. So our main goal is to encourage schools to organize local activities presenting their great experience and work they've done for the last years + to organise national GLOBE Games to gather all community together.
2. We would like to have our schools more involved in GLOBE campaigns. Only few took part in this activities so far. To achieve this goal fostering of cooperation between language and science teachers is crucial - language barrier is still the main factor influencing lack of Polish GLOBE schools involvement.
3. Further development of cooperation with business is important to provide financial support to keep GLOBE active in Poland.

Switzerland



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Cooperating organizations: Members of [GLOBE Switzerland association](#) grouping Universities of Teacher Education and Scientific Institutions like University departments, Swiss Parks Network and a school book edition.

Registered schools: 174

General Funding by: Federal Office of Environment.

GLOBE protocols: atmosphere, hydrology, phenology, SAB; Elementary GLOBE, GLOBE at Night, SMAP.

Funding of Trainings: Workshop fees and general funding

Project funding:

- [LERNfeld](#): Agriculture in context climate change and biodiversity. Funded by 3 foundations and the Federal Office of Environment, Division Biodiversity (2014-2016). GLOBE protocols (soil) and non-GLOBE protocols.
- [PhaenoNet](#): Phenology platform. With integrated GLOBE protocols and non-GLOBE protocols. Funded by Federal Office of Meteorology and Climatology and Federal Office of Environment (2014-2016)
- Climate Change Education and Science Outreach Project (2016-2017, CCESO). With partners from education and climate research (3 Universities of Teacher Education, Oeschger Center for Climate Change, ProClim). Common development of education concept on climate change (inquiry based) based on curricula, elaboration of a model for teaching planning (all school levels).

Non GLOBE Protocols

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

Development in Switzerland

We are still strongly working on regional GLOBE centers Ticino, Romandie (French part), East and North of Switzerland and are developing regional centers. The regional GLOBE centers are now all integrated in Universities of teacher education.

We have new and constructive contacts to US Embassy in Bern. Ambassador Mrs Levine is going to visit a GLOBE school in November and will discuss GLOBE activities with the students of this class of Markus Eugster (SIMB). The collaboration with the US Embassy should support us by the development of GLOBE student or teacher meetings together with scientists here in Switzerland. We want to start strengthening as soon as possible the national network what is quite a challenge for reasons of language diversity.

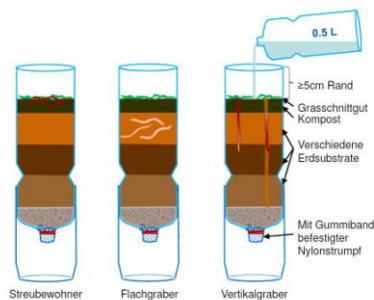


Informations on national projects with links to international offer

GLOBE in context agriculture – [LERNfeld](#)

With the project LERNfeld GLOBE Switzerland intends to reinforce science outreach and education in context agriculture, climate change and biodiversity. The collaboration of teachers with their classes, of farmers on their farm and young scientists assure a link to environmental research and outdoor learning (in farm area) on inquiry based level.

In LERNfeld a strong link to GLOBE soil protocols is assured. Examples: Investigations of **soil moisture, nutrients** and **pH** on different soil transects on selected meadow types. Other investigations: Ringworm activities and their contribution to soil quality. Here at example the GLOBE learning activity “Just passing trough” has been integrated.



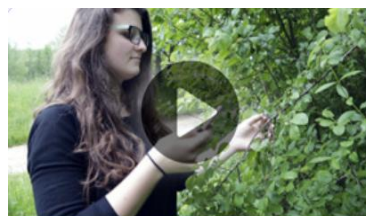
Effect of different ring worm types and students their activity on water flow in the soil (« Just passing through »)

Young scientist discussing with GLOBE

[PhaenoNet](#) – Explore the seasons. A citizen science project initiated by GLOBE Switzerland

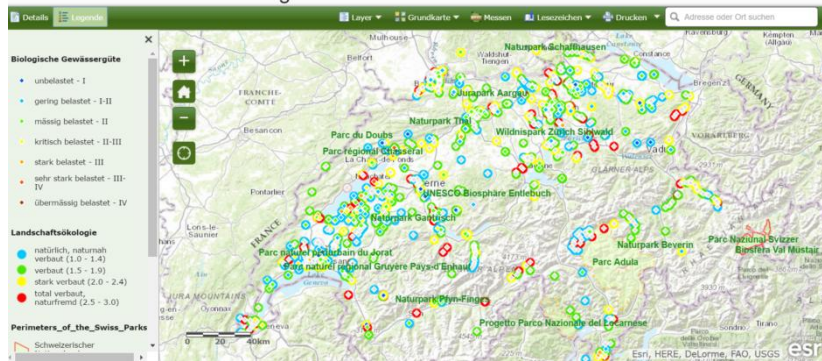
This citizen science project is still growing, in 2015, 71 expert observers of MeteoSwiss (3000 datas) and 450 Citizens (Schools, students and other citizens, 5000 datas) participated in an active way by observing the seasonal changes of selected species. To promote the offer we have developed several videos ([introduction](#) and [tutorials](#)).

The integration of GLOBE phenology (budburst, green-up, green-down) allows the connection to GLOBE even if at the moment the data base interface isn't existing.

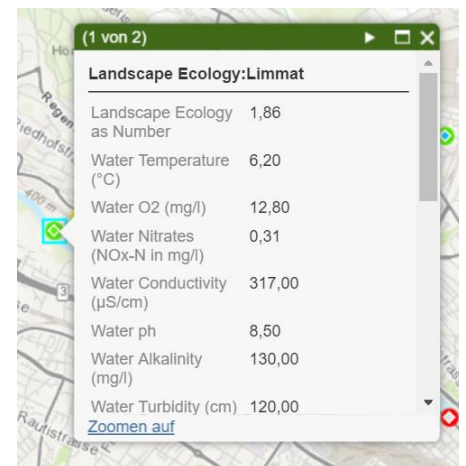


[GLOBE River](#) – Ecomorphology, biological water quality and GLOBE Hydrology protocols

WebGIS Bioindikation Fließgewässer



Connecting the interactions of landscape quality, biological water quality and hydrological parameters. We are working on tutorials to support this systemic approach.



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Organization and Human resources (how many people work on GLOBE, what is the capacity, background of the organization)

National Ecology and Nature Center is an educational institution of the Ministry of Education and Science of Ukraine, a component of the system of extracurricular education for gifted and motivated school students. It is also a coordination center for 155 regional educational institutions of environmental orientation. GLOBE is part of a program of national integration into European and world educational space.

There are three people working in GLOBE coordination office in Ukraine, however the center has capacity to include other people during organization of events or competitions. Also, there are active regional educational institutions which participate in the program development. We have 4 active regional coordination centers (Rivne, Sumy, Chernivtsi, Uzhgorod).

Funding by:

Main funding: Ministry of Education and Science of Ukraine. Other sponsors: Kyiv Energy Agency.

Cooperating organizations/individuals (national and international level):

Ministry of Education and Science of Ukraine, Kyiv Energy Agency, Minor Academy of Sciences of Ukraine, Ukrainian Hydrometeorological Center, State Space Agency of Ukraine, Palladin Institute of Biochemistry.

GLOBE schools (what types, how many, etc.):

There are 435 schools and educational institutions registered on the website, actively participating schools – about 60. The GLOBE network in Ukraine includes not only secondary schools, but also regional environmental education centers that are part of system of afterschool education in Ukraine.

GLOBE areas (what areas of investigations you/schools focus on? What areas you plan to develop?):

The most popular areas among Ukrainian GLOBE students are phenology (green up / green down), atmosphere (air temperature, clouds), and biometry. We would like to increase interest in soil investigations and hydrology (freshwater macroinvertebrates).

Program implementation in the country and recent activities (trainings, field campaigns, school-to-school projects, events):

Today GLOBE in Ukraine includes about 60 active schools and teachers almost from every region of Ukraine. There are total amount of 28,091 data entries and 80 honor rolls. In 2015 GLOBE in Ukraine has been working on several tasks:

- Provide training and support for existing GLOBE teachers and schools;
- Engage students and schools in GLOBE through events, competitions and campaigns;
- Involve new teachers;
- Develop translated materials and instructions;

- Enhance international cooperation.

Student Phenology campaign “Cherry Ukraine 2016”



In 2016 GLOBE Ukraine conducted a second Student Phenology Campaign “[Cherry Ukraine 2016](#)”. The aim of the campaign was to engage students in investigation of vegetation cycles of wild cherry (*Prunus cerasus*) and Nanking cherry (*Prunus tomentosa*) and to encourage to learn more about the environment.

This year the campaign gathered 448 students and 60 teachers from 60 educational institutions of 17 regions of Ukraine. The observation lasted from April first to May 20. According to GLOBE protocols students observed budburst and measured the length of the leave twice a week. At the same time they collected data about solar noon air temperatures every day.

As previous year, the campaign was combined with online training for teachers. New teachers who joined the campaign had to attend a webinar and complete several tasks. After that they received GLOBE certificates.

The campaign had several actions and activities including the action “Who is first?” where students had to photograph and send pictures of the first opening cherry buds. At the end, students and teachers were able to see their results on a simple infographics and share their conclusions and ask questions about the vegetation cycles of cherry during the concluding webinar with the leading expert in horticulture, head of the Horticulture Department at National Ecology and Nature Center Petro Mazur.

As a result 41 schools received GLOBE Honor Rolls and the number of data entries have increased from 22 000 to more than 28 000 during the period of campaign.

GLOBE Games Ukraine

On 22-24 of June 60 students and teachers from different parts of Ukraine participated in the first ever GLOBE Games in Ukraine. The event took place on the territory of National Ecology and Nature Center, Kyiv.



During three days participants attended workshops from the leading scientists in hydrology, botany, meteorology, water chemistry, astronomy and others. With the help of experts students learned about research field work and scientific research outdoors. After the workshop with scientists student teams were able to test their knowledge participating in the fun science quest while teachers learned about new tools and methods of environmental education. During the first day students were able to present the results of their work in GLOBE during the year.

The event was supported by Ministry of Education and Science of Ukraine, Ministry of Ecology and Environmental Protection, Kyiv Energy Agency and project UNIDO in Ukraine. The scientific support was provided by Palladin Institute of Biochemistry, Kholodny Institute of Botany, Glushkov Institute of Cybernetics, Ukrainian Hydrometeorological Center, and State Space Agency of Ukraine.

Students not only learned how to conduct practical research and presents their work, but also learned how be leaders and what traits a modern scientist should possess.

Annual Seminar-cum-Workshop for teachers

From 7 to 9 June teachers from Ukraine were participating in annual GLOBE workshop that took place in Sumy, Ukraine. Workshop was organized by National Ecology and Nature Center together with Sumy Regional Non Formal Education Center and was held in the format of conference combined with GLOBE training. During 3 days teachers from 10 regions of Ukraine were presenting their work, sharing experiences and discussing ideas for GLOBE implementation in the regions. The event was supported by Regional Department of Ministry of Education and Science of Ukraine. During the expedition to natural boundary teachers were trained in Soil pH, Freshwater Macroinvertebrates and Biometry Protocols. The scientists from Sumy National Agriculture University, Sumy State University and Desniansko-Starohytskyi National Park accompanied them.

Other trainings:

- 2 regional workshops for teachers were held in Rivne region. Altogether 38 teachers received GLOBE certificates;
- 1 online training for teachers during "Cherry Ukraine 2016. More than 60 teachers received certificates;
- 2 webinars for all GLOBE teachers;

International cooperation

- In 2016 Ivano-Frankivsk City Environmental Station cooperated with Shaab School (Israel). The students exchanged data about precipitation and temperature and organized numerous online meetings. The cooperation continues to the next year.
- Sumy Secondary School №2 cooperated with primary school in Trebic (Czechia).
- GLOBE at My School Picture Contest.

Your plans and ideas for next year:

- Conduct traditional annual events (annual seminar for teachers, webinars).
- GLOBE Games 2017.
- Participate in European Phenology Campaign and Virtual Science Fair.
- Conduct regional workshops in active regions.
- Create a forum for teachers for information and experience exchange between teachers.
- Create a short booklet for dissemination at schools and institutions.
- Try to incorporate GLOBE training for teachers into existing system of improving qualification for teachers.
- Translate new GLOBE protocols on soil and hydrology.