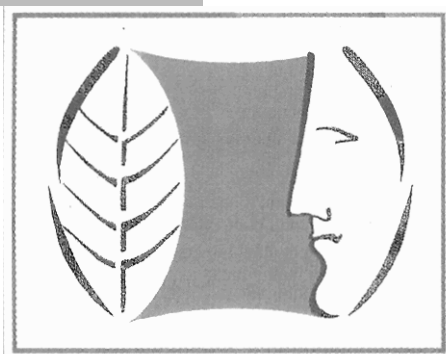


# ENVIRONMENT AND SOCIETY:

## Education and Public Awareness for Sustainability



Proceedings of the Thessaloniki  
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## SESSION 2

### "GLOBAL LEARNING OBSERVATIONS TO BENEFIT THE ENVIRONMENT (GLOBE): AN INTERNATIONAL PROGRAMME FOR ENVIRONMENTAL AWARENESS AND EDUCATION"

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#### 1. INTRODUCTION

Global Learning and Observations to Benefit the Environment (GLOBE) is a hands - on international environmental science and education programme. GLOBE links students, teachers and the scientific research community in an effort to learn more about our environment through student data collection and observation. The Programme started as an initiative of Al Gore, Vice President of U.S.A., and was thereafter endorsed by the General Assembly of the United Nations. Currently 58 countries participate in GLOBE: 25 from Europe, 2 from North America, 10 from Central and South America, 5 from Asia and the Pacific, 14 from Africa and 2 from the Middle East (Table 1).<sup>1</sup>


























































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|--|---|--|--|
|  Argentina          |  Egypt       |  Kenya            |  Palau                    |
|  Australia          |  El Salvador |  Kyrgyzstan       |  Portugal                 |
|  Austria            |  Estonia     |  Korea, South     |  Romania                  |
|  Belgium            |  Fiji        |  Luxembourg       |  Russia                   |
|  Benin              |  Finland     |  Madagascar       |  Senegal                  |
|  Bolivia            |  The Gambia  |  Marshall Islands |  South Africa             |
|  Canada             |  Germany     |  Mexico           |  Sweden                   |
|  Chad               |  Greece      |  Moldova          |  Tanzania                 |
|  China              |  Iceland     |  Mongolia         |  Trinidad and Tobago      |
|  Costa Rica         |  Ireland     |  Morocco          |  Tunisia                  |
|  Croatia            |  Israel      |  Netherlands      |  Turkey                   |
|  Czech Republic     |  Italy       |  Norway           |  United States of America |
|  Denmark            |  Japan       |  Peru             |  United Kingdom           |
|  Dominican Republic |  Jordan      |  Poland           |  Uruguay                  |
|  Ecuador            |  Kazakhstan  |  |  |

Table 1. GLOBE Countries

1. By the time of submission of the article, the number of countries was 70

The goals of the Programme are:

- to enhance the environmental awareness of individuals at national and international level;
- to contribute to the scientific understanding of the Earth's environment and
- to help all students reach higher levels of achievement in science and mathematics.

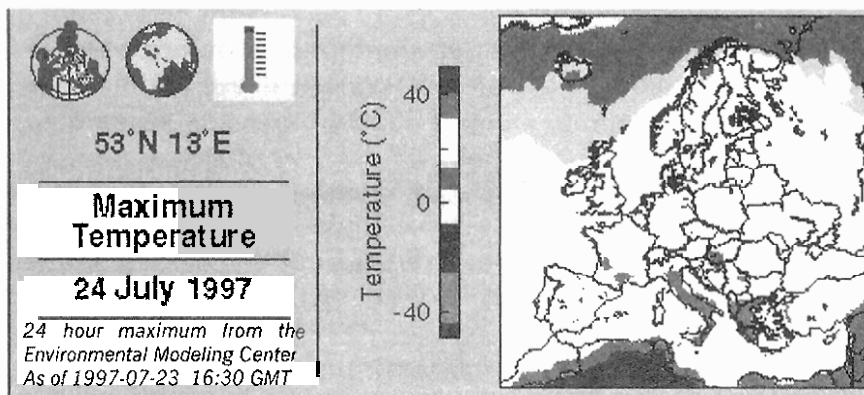


Figure 1. Map of maximum temperature for Europe as provided through the GLOBE/ALEXANDROS network.

A significant provision - as well as major parameter - of GLOBE is the use of Internet and the World Wide Web for creating a communication platform which links the 5,500 schools from the countries which presently participate in GLOBE. On the basis of this platform environmental measurements from each school are transferred to a global environmental data base hosted by major scientific institutes in the U.S.A. (NASA, NOAA, etc.) and processed to produce global and regional environmental maps (*Figure 1*). The prospects and potential of this communication platform have proven highly substantial especially for schools in geographically remote areas. They support the development of an open learning environment and they have proven supportive for the co-operation among schools in different countries on environmental issues which require transboundary environmental data as well as for the acquaintance of students with communication technologies and techniques. Thus a unique "environmental education and information society" has been developed to benefit students and the environment.

### WHAT IS A GLOBE SCHOOL?

Although any school can participate in GLOBE, a number of common characteristics have been defined with respect to a what a GLOBE school is:

- It is a school selected and nominated by the country.
- It may be a primary or secondary school; it may also be a technical school.
- It is a school equipped with an environmental station with commonly specified - at the international level - instrumentation.
- It is a school connected to the INTERNET; the Programme does not exclude schools which can not be supported with the appropriate network.

- Each country defines a limited number of scientists/educators who are specially trained in International GLOBE Workshops. Following these scientists (called GLOBE trainers) have the responsibility for training the teachers who are nominated by each GLOBE school. In this way, a common training approach is followed universally.

### DUTIES OF STUDENTS IN A GLOBE SCHOOL

Students in a GLOBE school:

- perform environmental measurements periodically and according to the GLOBE requirements;
- report the measurements to the world environmental database of GLOBE;
- maintain the environmental station at their school in good condition;
- analyse and exploit GLOBE measurements.

### 3. GLOBE ENVIRONMENTAL MEASUREMENTS

Within GLOBE, students can enhance their education through involvement in hands - on, scientifically valid environmental research. Students participating in the Programme:

- observe and measure several environmental parameters accurately and objectively;
- classify weather and climatic events as well as environmental phenomena based on similarities, differences and interrelationships;
- solve problems by experimentation;
- interpret collected data in order to define environmentally sound conclusions;
- explore and understand the uncertainties inherent in the scientific measurements;
- communicate information learned through their scientific investigations;
- understand the environmental processes in their area;
- comprehend the physics behind environmental problems.

Currently, the thematic domains of GLOBE are:

**Atmosphere:** The students conduct daily measurements of air temperature, cloud cover and precipitation.

**Hydrology:** The students conduct weekly to monthly measurements of water temperature and pH of a water body in the vicinity of their schools.

**Land Cover/Biology:** The students identify (annually) the dominant local land cover types and conduct a number of related biological measurements.

**Soils:** The students take soil samples and analyse them to determine the characteristics of various soil layers. They also conduct daily to monthly measurements of soil moisture at various depths and locations.

In addition to these direct investigations, there is also a supportive one concerning the use of GPS (Global Positioning System), i.e. the definition - using a small hand held receiver - by the students of the latitude, longitude and elevation of their study sites. The measurement protocols have been designed so as to be appropriate for primary and secondary education students and to ensure accurate and reliable measurements for use by the international environmental science community. The Programme fosters the creation of a broad research team, comprised of students and teachers in

collaboration with environmental scientists for the purpose of generating knowledge about the Earth as an interconnected system. In addition the Programme plans the integration of new scientific protocols.

#### 4. THE PROGRAMME "ALEXANDROS"

GLOBE is implemented in Greece under the auspices of the Ministry of Environment, Physical Planning and Public Works and the Ministry of National Education; the University of Athens has the scientific and technical responsibility for the Programme. The Programme was given the name ALEXANDROS to reflect the potential of the Programme; Alexandros, Alexander the Great, in addition to being a major propagator of civilisation and science, when he was educated by Aristotle, he was not just provided with knowledge but he was trained to be the man who would be able to apply it.

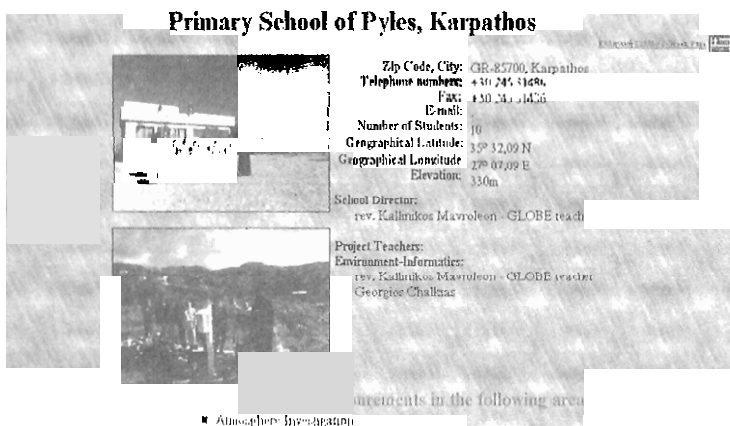


Figure 2. A view of the Home Page of the primary school of Pyles, Karpathos.

they also present their profiles and activities through specially constructed - by the University of Athens - WWW pages (Figure 2).

(further details for the GLOBE/ALEXANDROS are provided at the electronic address <http://www.di.uoa.gr/~globe/> and for GLOBE at the address <http://www.globe.gov>).

#### 5. A FIRST ASSESSMENT

A first assessment of the progress of the Programme is satisfactory. The Programme demonstrated a considerable thrust and succeeded in motivating teachers and students. The construction of Home-Pages for all Greek schools allowed the presentation of the activities of these schools within GLOBE/ALEXANDROS and supported the co-operation activities of the Greek schools with schools abroad.

#### REFERENCES

1. International Programme GLOBE, edition of the Ministry of Environment, Athens 1995.
2. Teacher's Guide-The GLOBE Programme, second edition, GLOBE Office, 1996.
3. Report regarding the Educational Workshop, University of Athens, March 1996.
4. Various publications and reports of the GLOBE Office, 1995, 1996, 1997.

During the implementation of GLOBE/ALEXANDROS in Greece, 24 schools were included in the network. These schools reflect a wide geographic coverage of Greece; they also reflect all levels of education, i.e. at the primary and secondary levels, at the technical secondary level, etc.

Twenty three out of the twenty four schools have now Internet access and