

## **Report from the GLORIA-Europe Workshop Tulbinger Kogel/Vienna Woods, Austria in October 2002**

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*The Global Observation Research Initiative in Alpine Environments (GLORIA)* is going to establish a world-wide observation network to determine climate-induced threats on high mountain biodiversity, and to take advantage of the indicative value of sensitive alpine organisms for the documentation of the ecological implications of climate change. Based on standardised observation settings at summit areas throughout the world, climate change impacts on vegetation patterns and cover, soil temperature and soil surface structure will be assessed at different elevation levels, from the low-temperature-determined treeline upwards.

GLORIA contributes to international activities such as GTOS (the *Global Terrestrial Observation System*, established by FAO, IUCN, UNEP, UNESCO and WMO), the *Mountain Research Initiative* (of IGBP, IHDP and GTOS), and the *Global Mountain Biodiversity Assessment* (an initiative of DIVERSITAS).

For further information see also the GLORIA web site: [www.gloria.ac.at](http://www.gloria.ac.at).

The ongoing pilot project *GLORIA-Europe*, funded within the *5th RTD-Framework Programme* of the European Union (see the report on the kick-off meeting in Mountain Research and Development, vol. 21/3, Aug. 2001), is a network of so called target regions settled in the major mountain systems of Europe, i.e., the Sierra Nevada, the Pyrenees, the Alps, the Apennine, the mountains of Corse and Crete, the Carpathians, the Caucasus, the Ural, the Scottish mountains and the Scandes. The particular partner groups who are based at universities or other institutions, including private SMEs, were responsible for the setting of standardised permanent plots at different summit areas positioned along the elevation gradient, and selected for representativeness. The partner groups established the observation sites according the *GLORIA field manual* which was elaborated in a broad discussion among GLORIA partners throughout the world.

The interest in the GLORIA observation approach (*Multi-Summit approach*) has increased tremendously during the past years. Therefore, the GLORIA consortium appreciated the participation of guests from Europe and overseas. GLORIA sites have been already set in the Andes, in New Zealand, as well as in Switzerland and Italy in addition to the GLORIA-Europe sites, and are going to be established in the Rocky Mountains (USA). Geographers from the university of Erlangen provided a physiographic frame for the position of additional target regions on a global scale and of so called master stations which should serve for the interpretation of the summit observation by carrying out basic scientific investigations such as experimental approaches.

The second day of the workshop was dedicated to a first synoptic presentation of the data sets, sent in by the partners to the central *GLORIA* database in Vienna, followed by a final discussion on the field manual. Finally, the participants agreed upon a publication strategy and discussed about future steps.

What has *GLORIA-Europe* achieved since its start on 1 January 2001:

- 1) 72 already established and documented permanent observation sites with detailed data on vascular plant species (in some places also bryophytes and lichens), and on the soil temperature;
- 2) A standardised, and proofed, observation methodology - the *GLORIA field manual* is now ready for publication, and will probably be produced as an official publication of the European Union;
- 3) A unique data set on plant diversity and patterns at European high grounds. It is the first time that comparable data sets according to a standardised methodology are available from very different parts of Europe.
- 4) An active *GLORIA* community of 18 scientific teams, 4 teams representing user requirements, and associated teams from Europe and overseas countries;
- 5) A hard working co-ordination team skilled in managing a complex scientific working community.

The funding for *GLORIA-Europe* will end by the end of July 2003. A final meeting is scheduled for April 2003 in Crete. At this meeting the synoptic publications on diversity patterning in alpine environments, on generalities on biodiversity distribution over Europe as well as on effects of climate warming will be discussed. The database containing all the *GLORIA* data sets will be made available for the consortium and guest contributors.

The next steps are foreseen to establishing master stations for which protocols for extended monitoring have to be designed. At master stations also other organisms than plants should be included in the monitoring activities (e.g. soil organisms such as nematodes). Investigations of causal relationships should be carried out to enable causal interpretation of the observed changes.

The establishing of a world-wide network is thought to be best implemented within the coming *6th RTD Framework Programme* of the European Union. However, the "*GLORIA-philosophy*" tries to encourage anybody who is willing to start ecological monitoring in a mountain region. The *GLORIA field manual* guarantees that his efforts will be based on a well-tested approach.

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