

Sparkling Science >  
Science linking with School  
School linking with Science

Interim Report, August 7<sup>th</sup> 2009

**TOP-KLIMA-SCIENCE**

**Hydrologic Balance and Global Change:  
Future Outlook for Mountain Areas in  
the Face of Changes in Land Use and  
Climate**

**LEADING INSTITUTION**

University of Innsbruck, Institute of Ecology  
Coordinator: Univ.-Prof. Dr. Ulrike Tappeiner  
Contact: [ulrike.tappeiner@uibk.ac.at](mailto:ulrike.tappeiner@uibk.ac.at)

**SCIENTIFIC CO-OPERATION PARTNERS**

University of Innsbruck, Institute of Botany and Botanical  
Garden EURAC Bolzano

**SCHOOL INVOLVED**

HLFS Kematen for agriculture and food industry, Tyrol



**BM.W.F<sup>a</sup>**

[www.bmwf.gv.at](http://www.bmwf.gv.at)

Austrian Federal Ministry of  
Science and Research

## TOP-KLIMA-SCIENCE Students Research Alpine Water Balance

Using an innovative research approach, the central aim of Top-Klima-Science is not only to deepen the understanding of the water balance in the Stubai valley (Tyrol), but also to quantify how changes in land use practices at different elevations affect it.

Scientists are working together with 50 students from two classes who attend the HLFS Kematen for agriculture and food industry. In order to simulate and to gain insight into the effects of climate change and the expected 2 to 5 degrees (C) increase in temperature, vegetation from high alpine areas are brought to lower elevations. The study provides scientific input for modelling of the local hydrology and the possibility to analyze the effects of various scenarios of land use in regard to climate change.

Even though there was a period of nervous anticipation at the beginning of this large and complex cooperative project between ecologists from the University of Innsbruck and the European Academy Bolzano (Italy) and teachers and students from the school in Kematen, at the end of the first year there is clearly a very positive outcome. Dr. Kerstin Zangerle, one of the HLFS teachers, summarized the project development during the first measurement day, “as the school year proceeded, the project became more and more concrete for all of us. I think that within this time we have grown together and become a more constructive team. I also think that for the students it was a new and important hands-on experience, as they worked together with the scientists on an equal level in assembling the lysimeters. As we speak the first class is in the Stubai valley conducting the first measurements – I’m excited to hear how the students feel about it.”

In all 25 measuring sites were selected at three different elevations (valley bottom, hillside and sub-alpine/alpine) from a span of 900 to 2400 m above sea level and outfitted with automated climate stations. Out of these 25 sites, 13 were surveyed for soil characteristics and plant communities. Students and scientists assembled more than 300 small lysimeters and gathered data on four measuring days. The measurements spanned an entire daylight period from sunrise to sunset, and data was collected on transpiration as well as infiltration parameters and leaf and soil hydrology. The analysis and interpretation of the results will be carried out in the school year 2009/2010. At that time the remaining sites will be outfitted with lysimeters and field measurements will be conducted in early summer 2010.



## TOP-KLIMA-SCIENCE A “Win-Win Situation“ for Science and Education

“I want to gain more understanding about the results and I want to be able to interpret them”, so said 70% of the participating students about the project, and more than 80% said that they were already looking forward to getting the results of the field work measurements. This is a clear signal of the importance to fully integrate the students into the research process and to awaken their scientific curiosity.

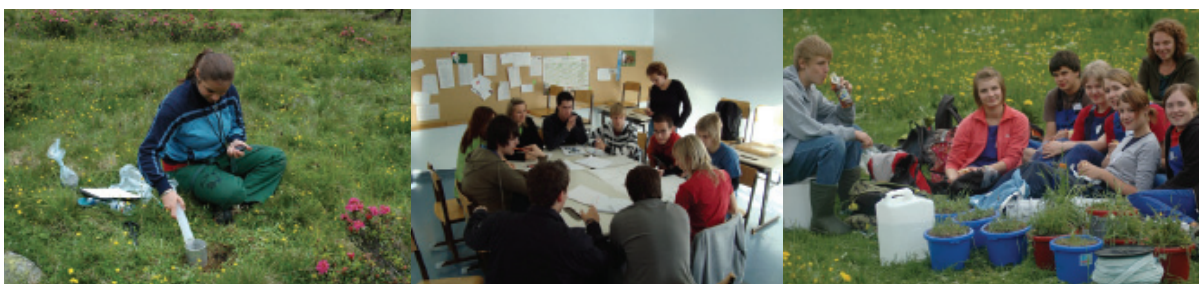
Another important aim of Top-Klima-Science is for students to directly experience and understand how important and relevant scientific knowledge is for their own process of decision making and their future. A participating student (18 years old) summarized this by saying: “Since I am involved in agricultural practices at home, this project is extremely interesting. I can certainly adopt some of the concepts we are learning here at home. Working together with experts, like those from the university, you always learn something new and come away thinking, ‘I could do this a little differently and I need to be careful with my actions’. This is simply important – it’s our life. We need land and soil. Too little people understand this.”


The project is continually evaluated to analyze, among other things, if the interest in scientific research enhances in the course of such a cooperation. “What the surveys show is that the participating students have little relation to science. After an initial period of scepticism the students showed that they take the work seriously and they started to understand how the project findings can be relevant to their future work and lives”, said Dr. Suzanne Kapelari, coordinator of the Technical Didactics Centre for Natural Sciences West at the University of Innsbruck.

Dr. Georg Leitinger, ecologist at the University of Innsbruck, expressed his enthusiasm about the cooperative work with the students by saying, “their eagerness and readiness to work is the best indication of the youth’s interest in answering environmentally relevant questions. These types of projects are an important investment in future generations as their influence on the shaping of our future living space should never be underestimated.”

### Further information

<http://www.uibk.ac.at/ecology/forschung/klimawandel.html.de>  
<http://www.hblakematen.at/projekte/zukunftsperspektiven.php>





Sparkling Science >  
Science linking with School  
School linking with Science

oead'  
OeAD-GmbH

[www.bmwf.gv.at](http://www.bmwf.gv.at)

BM.W.F<sup>a</sup>

Austrian Federal Ministry of  
Science and Research