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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

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SCIENTIFIC CO-OPERATION PARTNERS

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SCHOOL INVOLVED

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Austrian Federal Ministry of
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TOP-KLIMA-SCIENCE

Students investigating Global Change in Mountain Areas

The main object of Top-Klima-Science was to quantify the basic parameters of ecosystem water balance of agricultural areas managed with varying intensity starting at the valley bottom and going up to the alpine zone in the Stubai Valley (Tyrol) using an innovative spatial approach.

In an international cooperation, the Institute of Ecology of the University of Innsbruck and the Institute for Alpine Environment of the European Academy Bolzano (EURAC) worked together with the partner school hlfs Kematen. Two classes with about 50 students were involved in every part of the project: starting with developing scientific hypotheses to field work, data analysis and the presentation of results.

For Top-Klima-Science a total of 25 measuring sites were distributed in three altitudinal belts (valley bottom – slope level – subalpine/alpine zone) in the whole Stubai Valley. All sites were equipped with automatic weather stations and the respective vegetation and soils were analysed. Then students and scientists joined forces to install more than 300 small lysimeters to measure the diurnal course of evapotranspiration and related parameters of microclimate, soil water balance and plant physiology during seven major field campaigns in June and July of 2009 and 2010. By transplanting soil/vegetation-monoliths from high altitudes to lower sites and vice versa the effects of an increase of temperature by 2-5 °C (as predicted by many climate change scenarios) could be analysed. This extensive workload would not have been realisable without the co-operation with a partner school.

“At the end of Top-Klima-Science, I think we can be upbeat about the results of the project: After a cautious beginning, students, teachers and scientists came together to form a constructive team during the course of the project.”

Mag.^a Gabriele Pallua (form teacher 3B, hlfs Kematen)

The most exciting part of the project followed after the quality control of measured data: joined data analysis. Due to the direct integration into data analysis (and the complete scientific process), the students experienced the importance of recognising scientific knowledge as a relevant basis of their own decisions and actions. The results were then published among others in two articles in agricultural magazines which were written by the students.



Important investment in future generations

„I am living on a farm, so the project is very interesting for me. There are things I learned in the project which I can apply at home.“ Student (18 years, hlfs Kematen)

“I was broadening my horizon with knowledge about climate change, statistics and views in the Stubai Valley.“ Student (16 years, hlfs Kematen)

Not only these statements by students involved in the project but also the specific results are showing that the knowledge gained within Top-Klima-Science is not only theoretical but relevant and applicable. Thus, the decisive factor in future climate scenarios will be if increasing temperature will lead to more water shortage for plants. If this is the case today's yield will only be obtained with irrigation. As a consequence, the management of higher altitude areas will be profitable again as the available water is used more efficiently there due to slightly lower temperatures. From this point of view the lingering loss of mountain meadows and pastures is even more critical as they might play an important role in the future of agriculture in the Alps.

But Top-Klima-Science was a rewarding experience not only for the students at the hlfs Kematen:

“As a teacher I was profiting from the interdisciplinary approach and tasks during the course of the project and from the cooperation with scientists. To sum it up: My classes were benefitting from this project!“ MMag.^a Ingrid Tschugg (teacher at the hlfs Kematen)

Project leader Univ.Prof.ⁱⁿ Dr.ⁱⁿ Ulrike Tappeiner is also very content with the progress of the project and is convinced that not only the directly involved students, teachers and scientists are benefiting from such projects:

“Projects like Top-Klima-Science are an important investment in future generations because they make students aware of the future consequences of today's actions. Therefore, it is important to be open-minded and creative in order to achieve a sustainable management of living space.“ Univ.Prof.ⁱⁿ Dr.ⁱⁿ Ulrike Tappeiner





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