Final Report

Research at Jungfraujoch – "Top of Science"
International Conference in Celebration of the 75th Anniversary of the High Altitude Research Station Jungfraujoch
Interlaken, Switzerland, September 11-14, 2006

1 Summary

The purpose of the High Altitude Research Station Jungfraujoch is to enable and support scientific research of international significance that must be carried out at an altitude of 3500 meters above sea level or for which a high alpine climate is necessary. It was therefore more than appropriate for the International Foundation HFSJG, which operates the scientific station, to celebrate the 75th anniversary of this unique research infrastructure in the form of a scientific conference. The goal of the conference was to encourage interdisciplinary dialogue among researchers doing high-level, internationally recognized research at Jungfraujoch and/or other high altitude stations in greater Europe.

The conference took place in Interlaken, Switzerland, from September 11-14, 2006. The sessions were held in an ideal setting at the congress center of the Casino Kursaal Interlaken, in direct visual contact with the Jungfraujoch.

During three days an overview of historical, present, and future aspects of high alpine research was given in 18 invited plenary talks. Emphasis was laid on international networking and interdisciplinarity, which reflect the nature of research work at Jungfraujoch. Specific topics from astrophysics, atmospheric chemical compounds and mixing, climate, environmental sciences, glaciology, and medicine were addressed in 44 poster presentations.

The conference was attended by 91 persons from 10 countries (including the Slovak Republic, Bulgaria, Russia, and Japan). Thanks to the broad funding (see list of sponsors) a very large part of the participants were students (23) and early-career scientists. The conference was concluded by an excursion to Jungfraujoch with a visit of the scientific station and ongoing experiments. The proceedings of the conference will be published as refereed contributions in a special issue of *Science of the Total Environment.*

2 Description of the scientific content of and discussion at the event

At the opening ceremony, the participants were welcomed by Prof. Gunter Stephan, vice rector of the University of Bern, manifesting the close and long-standing relationship between the University of Bern and the Foundation HFSJG. Prof. Hans Balsiger, president of the Foundation HFSJG, emphasized the significance of the scientific station at Jungfraujoch by showing a few examples of research work before its existence and pointing out infrastructure milestones and the varying scientific disciplines. He also gratefully acknowledged the generous support provided by the Jungfrau Railway from the very beginning. Mr. Daniel K. Keuerleber, director of MeteoSwiss, the Swiss Federal Office of Meteorology and Climatology, brought the greetings of his institution, which has a close connection with the scientific station through the operation of a meteorological observatory at Jungfraujoch with an even longer history.

In the Jubilee Session following the opening ceremony, Mr. Walter Steuri, CEO Jungfrau Railways Group, first presented a well documented review on „Railway and infrastructure development in the last 75 years". To the amusement of the audience, his presentation

included several anecdotes illustrating the close relationship between the railway and the scientific station. Mr. Steuri was followed by Prof. Thomas Stocker, world-renown specialist on environmental research and climatology, who gave an outstanding overview on "Climate and environmental information from extreme locations". In a fascinating presentation he reviewed pioneering environmental research work done at the high altitude locations Jungfraujoch, Mauna Loa (Hawaii) and Dome Concordia (Antarctica). Then, Prof. Erwin Flückiger, in his function as the director of the High Altitude Research Stations Jungfraujoch and Gornergrat, gave an illustrative overview of "Scientific highlights in the last 75 years". Finally, in the award ceremony of the Swiss Academy of Sciences' commission Atmospheric Chemistry and Physics ACP, Prof. Urs Baltensperger, the president of the commission, and Dr. Michel J. Rossi, chairman of the award committee, presented the 2006 ACP Award to Dr. Stefan Reimann and to Dr. Jasmine Calisesi. The award was given to these two scientists in recognition of the pioneering environmental research work they conducted at Jungfraujoch in recent years. The Jubilee Session was concluded by the first poster session and an ice-breaker-party.

During the following two days an overview of historical, present, and future aspects of high alpine research was given in 16 invited plenary talks. The sessions were organized under the categories "Vertical Profiles and Long Records", "Long Records and Climate", "Vertical Mixing and Profiles"; "Health Influence", and "Networks". The disciplines covered by the oral presentations and the respective number of contributions were:

Atmosphere / Climate:	9
Radiation / Meteorology:	2
Glaciology:	2
Medicine:	2
Miscellaneous:	1

Emphasis was laid on the international networking and the interdisciplinarity that reflect the nature of research work at Jungfraujoch.

Specific topics from astrophysics, atmospheric chemical compounds and mixing, climate, environmental sciences, glaciology, and medicine were addressed in 44 poster presentations. To emphasize the importance of the poster contributions, all posters were on view in the coffee break / lunch area during the entire time of the conference. This allowed ample time for discussions. Awards were given to the best three poster contributions:

1st prize: *On-line and flasks measurements of CO_2, $\delta^{13}C$, and O_2 at Jungfraujoch*, Three symbiotic posters (M. Leuenberger et al., C. Uglietti et al., and F.L.Valentino et al.)
2nd prize: *Forbush decreases and cloud cover* (J. Calogovic et al.)
3rd prize: *A 1000 year climate history from an Alpine ice core* (M. Sigl et al.)

The conference was attended by 91 persons from 10 countries (including the Slovak Republic, Bulgaria, Russia, and Japan). Thanks to the broad funding (see list of sponsors) a very large part of the participants were students (23) and early-career scientists. In a special session organized by PD Dr. Eva Schüpbach, research and career aspects of relevance to this important group were addressed. Results of these discussions were presented during the final plenary session.

In his concluding summary at the closing ceremony, Prof. Heinz Gäggeler stated that the name of the conference (Research at Jungfraujoch – "Top of Science") was fully justified. The high quality and well focused presentations provided a comprehensive overview on scientific activity at high alpine research sites, and, in particular, at Jungfraujoch.

In the evening of September 13, 2006, a social dinner event was organized at the folklore restaurant Spycher of the Kursaal Interlaken. The conference was concluded by a full day

excursion to Jungfraujoch on September 14, 2006, with a visit of the scientific station and ongoing experiments.

During the conference, MeteoSwiss, the Swiss Federal Office of Meteorology and Climatology, had an exhibition on display about its key weather station at Jungfraujoch and its leading role in the Global Atmosphere Watch (GAW) program of the World Meteorological Organization (WMO).

The proceedings of the conference will be published as refereed contributions in a special issue of *Science of the Total Environment.* PD Dr. Markus Leuenberger is acting as the guest editor.

3 Assessment of the results and impact of the event on the future direction of the field

The event provided an excellent opportunity to bring together researchers of different fields working at Jungfraujoch and/or other high altitude stations in greater Europe. The goal of the conference to encourage interdisciplinary dialogue was fully achieved. The conference program allowed ample time for discussions. Scientists obtained better insight into the variety of research being done at Jungfraujoch and other European high altitude stations, and how their own activity and work done by others can be related. The meeting also provided an opportunity for the participants to get better acquainted. This will greatly enhance the exchange of information across disciplines in the future, and several ideas about joint research projects were already brought up.

During the past, the focus of research at Jungfraujoch has changed several times. Today, Jungfraujoch is a renowned site for environmental research. It is the only accessible observation point in Europe with adequate infrastructure that is within the free troposphere most of the year. It is the highest research station in Europe that is accessible all year round by rail. The Research Station Jungfraujoch is therefore unique for ground-based observations of the free troposphere done by atmospheric chemists and physicists as well as other environmental researchers from all over the world. The discussion of advanced measuring techniques, new analysis methods, and coordinated observation programs during the conference is expected to contribute significantly to the strengthening of collaborative research and to the further promotion of the site as a key station in INTROP related research.

The large number of participants from 10 countries clearly emphasized the international aspect of the research station Jungfraujoch and of the research work conducted at this site. The excellence of the research and the recognized importance of nationally and internationally coordinated work clearly document the necessity of this unique high-standard infrastructure in the high alpine environment, and will help significantly in securing financial support in the future.

The motivation and promotion of the rising generation of scientists is an essential issue for the development of the fields of research being dealt with at Jungfraujoch. The conference provided an ideal platform for the large number of participating students and early-career scientists to present their work and to have discussions with colleagues of similar status as well as with established scientists. The special session addressing research and career aspects of relevance to this important group of young scientists was highly appreciated.

The high quality and well focused presentations provided a comprehensive overview on scientific activity at high alpine research sites, and, in particular, at Jungfraujoch. Many participants proposed the repetition of such a possibility to exchange results and ideas in the future.

4 Acknowledgments

The success of the conference would not have been possible without the initial idea and permanent support of the board and staff of the Foundation HFSJG, the help of the organizing committee, chaired by Prof. Heinz Hugo Loosli, the manifold sponsors, the staff of Casino Interlaken, and last but not least: the help of many persons, in particular Louise Wilson, who did the real work before and during the meeting.

Research at Jungfraujoch – "Top of Science"
Snapshots from the scientific conference in celebration of the 75th anniversary of the Research Station Jungfraujoch, held in Interlaken, September 11-14, 2006.

Patronage

International Foundation High Altitude Research Stations Jungfraujoch and Gornergrat

and the following commissions of the Swiss Academy of Sciences scnat

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