

## **Report of the Director**

The period covered by this report is characterized by structural changes, both within the Foundation HFSJG as well as in the research stations. The general format of this report, different from previous years, reflects some of these changes and of the accompanying circumstances.

### **The Foundation HFSJG**

On October 8, 1999, the Board of the Foundation HFSJG met at the Victoria-Jungfrau Grand Hotel in Interlaken for its regular meeting held every odd numbered year. Beside the members of the board, the 'Jungfrauoch Commission' of the Swiss Academy of Natural Sciences, the 'Astronomic Commission HFSJG', and a number of distinguished guests were in attendance. The annual activity reports of 1997 and 1998 as well as the statement of accounts for both years were approved unanimously and with no abstentions. The extensive and excellent scientific output, which resulted from the research at Jungfrauoch and Gornergrat, was recognized with great pleasure and satisfaction. The president also informed about ongoing discussions between the Foundation HFSJG, the Swiss National Science Foundation, and Dr. Charles Kleiber, Secretary of State for Science and Research, concerning the future financing of the Swiss contribution to the operational and maintenance costs of the research stations.

In the management and administration of the Foundation significant changes had to be noted. The most important one concerned the leadership of the Foundation. On December 31, 1999, after 42 years of devoted and enthusiastic commitment to the International Foundation HFSJG, Professor Hermann Debrunner resigned as its President and as Director of the High Altitude Research Stations Jungfrauoch and Gornergrat. In recognition of the outstanding services he rendered to the Foundation, the Board of the Foundation HFSJG elected him as Honorary President. Further changes included the office of the treasurer and of the second auditor. As of December 31, 1999, Mr. Ernst Stäger, resigned as the treasurer. His valuable services to the Foundation are gratefully acknowledged. The new treasurer is Mr. Karl Martin Wyss. Dr. Klaus Fröhlich was elected as the second auditor, succeeding Professor Gustav Andreas Tammann. Due to the fact that as of April 1, 1999, no further stellar astronomy has been done at Jungfrauoch, the Foundation no longer needs an astronomical assistant. The very valuable services rendered to the Foundation by Dr. Noël Cramer, the first astronomical assistant employed in 1968, and Dr. Bernard Nicolet, are highly appreciated and gratefully acknowledged.

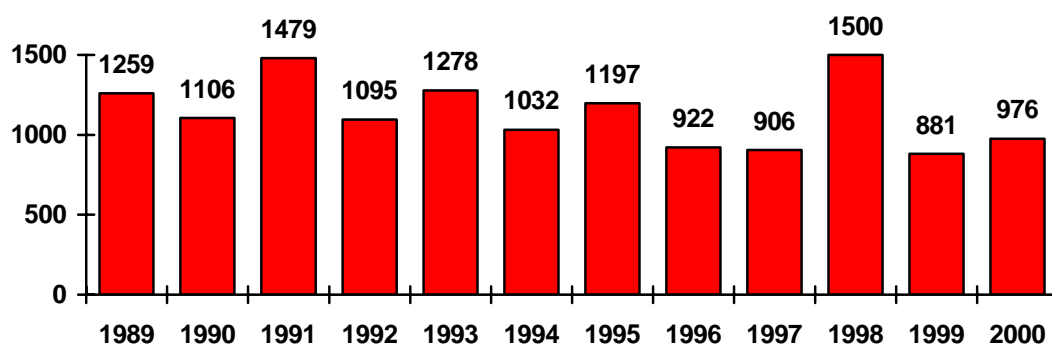
The new leadership with Professor Gustav Andreas Tammann, Astronomisches Institut of the University of Basel, as new President of the Foundation HFSJG, and Professor Erwin Flückiger, Physikalisches Institut of the University of Bern, as new Director of the research stations Jungfrauoch and Gornergrat, took over not only a well-managed institution but also two world-famous research stations with high-standard infrastructure and excellent staff. Thanks to the foresight of Hermann Debrunner, a number of upcoming action items were already identified and possible solutions prepared. One of the most important tasks is assuring future financing of the Foundation, in particular the Swiss contribution.

The Astronomic Commission, which has the function of a users' committee to strengthen the Foundation's internal and external communication, had its regular spring and autumn meetings in 1999 and 2000.

In view of enhancing the public outreach of the Foundation, a webpage was established (<http://www.ifjungo.ch/>). This webpage is in continuous evolution and is expected to become an important tool in communicating the role of the Foundation HFSJG and the excellent research conducted at Jungfrauoch and Gornergrat.

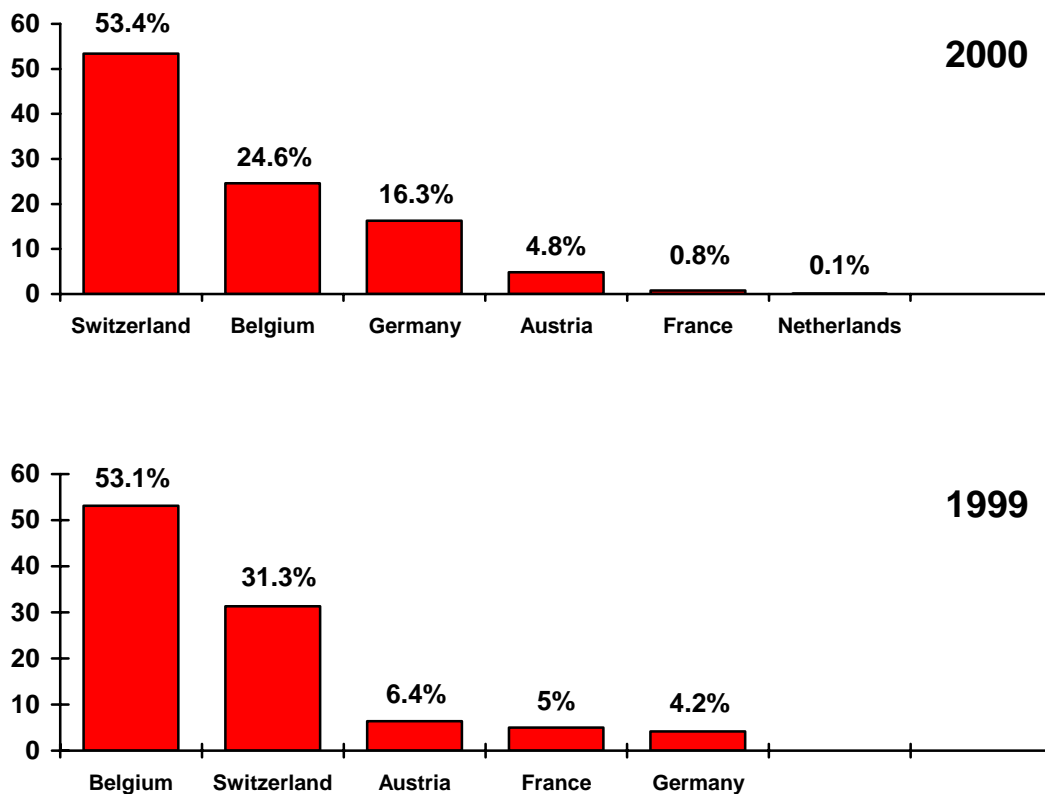
### The High Altitude Research Station Jungfrauoch

As can be seen from the individual reports and the detailed statistics, the High Altitude Research Station Jungfrauoch continued to be a unique place of lively and exciting research activity. Figure 1 summarizes the number of working days spent by scientists at Jungfrauoch since 1989. Figure 2 shows the relative number of working days for 1999 and 2000 by country. With the exception of the United Kingdom and Italy, all member countries of the Foundation benefited from the excellent research conditions offered at Jungfrauoch. Researchers from Italy are working exclusively at the Astronomical Observatory Gornergrat North. The United Kingdom was last represented at Jungfrauoch in 1998 and will again be very active in 2001 within a measurement campaign on tropospheric photochemistry (FREETEX 2001). Scientists from Belgium, in particular from the 'Institut d'Astrophysique et Géophysique de l'Université de Liège', continue to be a prime user. In fact, the Liège 'Migeotte' group celebrated its 50<sup>th</sup> anniversary of research work at Jungfrauoch in May 2000. A one-day symposium in Liège, attended by top representatives of the European and Belgian scientific and political scene, impressively documented the outstanding work conducted by the Belgian group at the forefront of research first in solar physics and later in atmospheric and environmental science.



**Figure 1:** Number of working days spent by scientists at the High Altitude Research Station Jungfrauoch during the past years.

The low number of working days in 1999 and the increased relative number of Swiss researchers in 2000 are related to a structural change in the use of the 76-cm telescope and to a special measurement campaign. The astronomers of the 'Observatoire de Genève', of the 'Instituut voor Sterrekunde der Katholieke Universiteit Leuven', and of the 'Groupe Européen d'Observation Stellaire (GEOS)', who were the main users of the Jungfrauoch telescope, will work in the future mainly with the telescopes of the European Southern Observatory (ESO) in La Silla, Chile, and of the European Northern Observatory (ENO) on the Canary islands Tenerife and La Palma. Therefore, as per March 31, 1999, the astronomical observatory at Jungfrauoch was closed. After revisions in the mechanical and electronic steering, the telescope at the Sphinx



**Figure 2:** Relative number of working days at the High Altitude Research Station Jungfraujoch by country.

Observatory is now used by the ‘Air Pollution Laboratory’ of the Swiss Federal Institute of Technology in Lausanne (EPFL), for the operation of a LIDAR, and by the ‘Laboratoire de Physique Solaire de l’Université de Liège’, for the operation of an infrared spectrometer. This transition clearly shows the present dominance of climate and environmental research at Jungfraujoch. This dominance is underlined by the extensive ‘Cloud and Aerosol Characterization Experiment (CLACE)’, which took place from mid-January to the end of March 2000 under the leadership of the Paul Scherrer Institute (PSI).

The research of the EPFL group is conducted within the ‘European Aerosol Research LIDAR Network to establish an Aerosol Climatology (EARLINET)’ (<http://lidarb.dkrz.de/earlinet/>). The CLACE campaign was a part of the ‘Global Atmosphere Watch (GAW)’ of the ‘World Meteorological Organization (WMO)’ ([http://www.wmo.ch/web/arep/gaw\\_home.html](http://www.wmo.ch/web/arep/gaw_home.html)). The GAW program as well as the ‘Infrastructure Co-operation Network ENVINET’, focusing on multidisciplinary environmental research in Northern Europe (<http://www.npolar.no/envinet/>) include several of the research projects at Jungfraujoch. These examples clearly demonstrate that thanks to its location and unspoiled environment Jungfraujoch has strengthened its position as a key station in European and global measurement networks.

The extensive research conducted at Jungfraujoch during 1999/2000 is summarized in the reports of the individual groups.

Initiated by Prof. Debrunner, an evaluation of the long-term experiments in

environmental sciences at Jungfrauoch was made in summer 1999 by a team of international experts (Prof. H. Grassl, World Meteorological Organization, Geneva, Prof. J. Heintzenberg, Institute for Tropospheric Research, Leipzig, and Prof. C.N. Hewitt, Institute of Environmental and Natural Sciences, Lancaster University, Lancaster). The evaluation process included a highly appreciated two-day symposium in Grindelwald where the responsible scientists presented their work. The review underlined the significance of Jungfrauoch as a unique and outstanding site for environmental science, the high standard of the experiments, and the good infrastructure offered by the research station. In addition, recommendations were made on how effectiveness could be improved.

As in previous years, the scientific work again attracted a number of visitors. Several groups initiated meetings of international scientific committees in the Jungfrau region and combined these meetings with an excursion to Jungfrauoch, e.g. the Steering Committee meeting of the 'Network for the Detection of Stratospheric Change (NDSC)' from September 11-13, 2000, in Thun, organized by Prof. N. Kämpfer, University of Bern.

In order to provide the researchers with optimum working conditions, the infrastructure needs continuous maintenance. In 1999 we started the first of three phases to exchange the old and leaky windows at the research station. During the year 2000, the second phase was successfully completed. The last part is scheduled for 2001. In late 2000 the machine producing liquid nitrogen, which is heavily used for a number of experiments, had to undergo a complete revision. In addition, following an official inspection as required by law, several repairs and improvements of the electrical installations were completed by the end of 2000. Discussions took also place with the management of the Jungfraubahnen on how to avoid or minimize disturbances of the scientific measurements by emissions in connection with ongoing and planned construction work. For the construction of the new Plateau exit and tourist hall at Jungfrauoch, no combustion engines should be used. We highly appreciate these efforts and are grateful to the Jungfraubahnen for their willingness to cover the significant related additional costs.

Optimum working conditions are for the most part also the result of the work of our custodians. End of June 2000, Mrs. Rachel and Mr. Paul Kuster-Piller retired after more than ten years of devoted service to the Foundation HFSJG. In 1989, Mrs. and Mr. Kuster took over the duty of the main custodians at the research station Jungfrauoch. In 1997 they reduced their working hours and continued as substitute custodians in shifts with Mrs. Therese and Mr. Hansruedi Staub. The new substitute custodians, Mrs. Susanne and Mr. Kurt Jenni have worked in well at the research station.

### **The High Altitude Research Station Gornergrat**

Due to its unique location, its environment, and the good infrastructure, the High Altitude Research Station Gornergrat, including the two astronomical observatories Gornergrat South and Gornergrat North as well as a 'container laboratory', continued to serve as an excellent basis for astrophysical research.

The Astronomical Observatory Gornergrat North is subleased to the Italian 'Consiglio Nazionale delle Ricerche (CNR)'. It is equipped with a 1.5m Cassegrain-Infrared Telescope (TIRGO). The telescope and related instrumentation is run by the 'Centro per l'Astronomia Infrarossa e lo Studio del Mezzo Interstellare (CAISMI)' with the

assistance of the ‘Osservatorio Astrofisico di Arcetri’ and the ‘Dipartimento di Astronomia e Scienza dello Spazio of the Università di Firenze’ (<http://www.arcetri.astro.it/irlab/tirgo/index.html>). Recently, Italy has opened a new national 3.5m telescope at the Canary Island La Palma, the Telescopio Nazionale Galileo (TNG). For a limited time period between 1999 and 2000, until the infrared camera for this new telescope was completed, the main TIRGO instrument ARNICA was used for the TNG. Meanwhile, as described in more detail in the respective special report, an advanced new mid-infrared camera was developed for Gornergrat North. With this new equipment, TIRGO has a bright future despite the increasing number of infrared instruments that recently became accessible for online remote operation.

The Observatory Gornergrat South is subleased to the ‘Universität zu Köln’. Here, the ‘I. Physikalisches Institut der Universität zu Köln’ has installed a 3m radio telescope (KOSMA). The KOSMA telescope with its receivers and spectrometers allows the observation of interstellar and atmospheric molecular lines in the millimeter and submillimeter range. The most advanced technical equipment combined with the excellent observing conditions at Gornergrat allow astronomical observations up to the highest frequencies accessible to ground based instruments.

Both instruments at Gornergrat are accessible to guest investigators. The scientific results achieved during the past years have found worldwide recognition. Details of the activity during 1999 and 2000 can be found in the individual reports. The outstanding quality of the research is impressively documented by the fact that the August 20, 2000 issue of ‘Astrophysical Journal Letters’ is entirely devoted to research work done at Gornergrat South.

Since 1998, on the Belvedere plateau, the Space Research and Planetary Sciences Research Division of the Physikalisches Institut of the University of Bern is operating a solar neutron telescope (SONTEL; <http://kspc4.unibe.ch/sontel.html>). This detector is the European cornerstone of a worldwide network initiated by the Solar-Terrestrial Environment Laboratory of the Nagoya University for the study of high-energy neutrons produced in energetic processes at the Sun. In September 1999 the detector was upgraded to its final configuration. It is expected that this detector will play an essential role in the study of solar neutron events during the maximum and declining phase of the present solar cycle.

A great help for the successful scientific work done at Gornergrat is the continued support provided by the Burgergemeinde Zermatt, as the owner of the Gornergrat Kulm Hotel, and the Gornergratbahn. Concerning the infrastructure, partial renovation work has been done to both the North and South towers. A few remaining action items will be addressed in 2001. In spring 1999, Mr. Fernando Clemenz, who up to then managed the Gornergrat Kulm Hotel with his wife Fabienne, took over the office as the director of the Matterhorn Group in Zermatt. Mr. Daniel Kern succeeded him as the new director of the Kulm Hotel.

## **Summary and Acknowledgements**

The research conducted at the High Altitude Research Stations Jungfrauoch and Gornergrat during the two-year period 1999/2000 was again extensive, of high standard, and internationally well recognized. Due to the unique observational and measuring conditions, the Jungfrauoch station has established itself as a key station in a number of European and global measuring networks for climate and environmental studies. For the same reasons, Gornergrat is a unique center for outstanding

astronomical and astrophysical research. The Foundation HFSJG, therefore, continued its excellent performance and ensured the perspectives for a bright future. The hard work and the efforts of all who contributed to this success are highly appreciated and gratefully acknowledged. We also thank all members of the Foundation and their representatives for their support. In particular, we thank the Swiss National Science Foundation for the significant Swiss contribution, and its Division II, headed by Dr. Jean-Bernard Weber, for the supportive and benevolent collaboration.

Operation of the High Altitude Research Stations Jungfrauoch and Gornergrat would not be possible without the hard work, the help, and the support of many individuals and organizations.

For the Jungfrauoch station, our thanks go to our custodians, Mr. and Mrs. Staub, Mr. and Mrs. Jenni, and the now retired Mr. and Mrs. Kuster. With their devotion to duty, their competence, and their ability to create a familiar atmosphere in the station, they are providing the basis for all scientists to do good work. A special thanks goes to the Jungfrau Railway Holding Ltd and to the Jungfrau Railways. Without their goodwill and their substantial help the research station at Jungfrauoch could hardly be operated. Both the Board of the Jungfrau Railway Holding Ltd under its president Dr. Georg Krneta and former president Mr. Erwin Reinhard, as well as the management and personnel of the Jungfraubahnen under Chief Executive Officer Walter Steuri, are always open and positive towards our needs, which quite often conflict with touristic objectives. We gratefully acknowledge the generous direct and indirect support and appreciate the continued interest in the research activity and scientific output. Thanks to personal relationships characterized by mutual respect and confidence we are optimistic that together we can keep Jungfrauoch as a unique site for top quality scientific experiments and observations.

For Gornergrat our thanks go first to all the scientists of the 'Centro per l'Astronomia Infrarossa e lo Studio del Mezzo Interstellare (CAISMI)', the 'I. Physikalisches Institut der Universität zu Köln', and the 'Physikalisches Institut' of the University of Bern. We then thank the BVZ Holding AG and, in particular, the Gornergrat-Monte Rosa-Bahnen with its president of the board, Mr. René Bayard. The substantial continuous support provided by the Gornergrat-Monte Rosa-Bahnen, by Chief Executive Officer Bruno P. Melnik and his entire crew, has been essential for the success of the scientific work. Finally, we are extremely grateful to the 'Burggemeinde Zermatt' under the presidency of Mr. Erwin Aufdenblatten. Without their goodwill and support it would not be possible to operate a world-famous astrophysical observatory at Gornergrat.

Finally I would like to thank the administration HFSJG. The former and present treasurers, Mr. Ernst Stäger and Mr. Karl Martin Wyss have been of invaluable service to the Foundation. We have greatly appreciated the knowledgeable support and auditing by Mr. Christian Gasser. Last, but not least, I would like to thank Dr. Urs Jenzer, the technical assistant HFSJG for electronics and computers, for his proficient work, and our secretary, Ms. Louise Wilson, for excellency in running the administrative office and her competence and kindness in the daily contacts with staff and scientists.

Bern, February 2001

Erwin Flückiger  
Director of the Research Stations  
Jungfrauoch and Gornergrat