

Report of the Director

75 years of research at the Sphinx observatory! In late 2012, the Sphinx observatory – Jungfrauoch's landmark – celebrated three quarters of a century of scientific service. If the observatory could speak, it would certainly have fascinating tales to tell about scientists, visitors, workers and distinguished guests that were there over the many years.

I am in the very fortunate situation to sum up the activities that were undertaken at the infrastructure of HFJSG at Jungfrauoch and Gornergrat over the course of 2012.

When celebrating the long history of a research institution one generally highlights the achievements in past but often forgets the present-day research. With the new exhibition at Jungfrauoch, we tried to do both by mainly focussing on science being currently conducted at Jungfrauoch, but with a glance back at the past. The exhibition is open to everyone visiting Jungfrauoch, or a part of it can be viewed on our homepage.

New activities are progressing well at the observatory Gornergrat South – after two years of silence – with the installation of telescopes within the framework of the “*Stellarium Gornergrat*” project. The new project focusses on educating young students of secondary and high school level in basic astronomy.

The Foundation HFSJG

On April 2, 2012 the new science exhibition was opened to the public. It is situated near the Sphinx hall and easily accessible by everyone visiting Jungfrauoch. The favourable location guarantees that a large number of tourists catch at least a glimpse of the many research activities going on at Jungfrauoch.



Figure 1: Inauguration of the Science Exhibition on April 2, 2012. Delegation of the invitees from SCNAT, Paul Scherrer Institute, Federal Laboratory for Material Science and Technology, Federal Office for the Environment, Federal Office for Meteorology and Climatology, MeteoSwiss, Université de Liège (Belgium), University of Bern (left), snapshot of the exhibition during the inauguration speech of the director (right)

2012 was an interim year regarding the meeting of the Board of the HFSJG Foundation, which as per its by-laws is held every other year. Therefore the statement of accounts for the year 2011 was approved and the HFSJG administration was given discharge by the Foundation's Board by correspondence ballot voting. The HFSJG bookkeeper, Mr. Christian Gasser has stepped down from his HFSJG mandate after many years of work for our Foundation as auditor and bookkeeper. I express my sincere thanks to Mr. Gasser for his dedicated commitment for the Foundation. Mrs. Theres Trachsel, at trachsel - administration & treuhand, Bern, took office on January 1, 2012.

At the end of May 2012, the HFSJG secretary, Mrs. Louise Wilson, retired. I would like to take this opportunity to thank Louise for her long (more than 15 years) engagement with our Foundation. I feel that I am not overstating by saying that everybody loved her for her friendly and helpful behaviour. I personally appreciated her exact and thorough work and her

spoken and written communication skills as well as her talent to sense what is expected. Thank you, Louise, for all your help.

Our new secretary, Mrs. Claudine Frieden, commenced her employment in spring 2012 in order to guarantee a good transfer of the many tasks within the HFSJG administration.

The Jungfrauoch Commission held its annual meeting on October 25, 2012, at the Hotel Royal - St. Georges, Interlaken. The table of contents of the White Paper, which was initiated at the Jungfrauoch Commission meeting in 2011 and briefly described in the last year's report of the director, was presented by the HFSJG director. The decision was taken to distribute this strategic document in a first step to all members of the Commission for consultation. After modification with the incoming remarks, the White Paper will be the basis for the final document that will be worked out by the working group members "Strategy planning Jungfrauoch" in close collaboration with representatives of the Jungfrau Railway. This final document will be presented for approval to the SCNAT as well as at the meeting of the HFSJG Board to be held on October 25 and 26, 2013, in Interlaken.

The 192th SCNAT annual congress was organized jointly by members of the Jungfrauoch Commission and the Swiss Committee on Polar and High Altitude Research. The congress was devoted to the pioneer in polar and high altitude research, Alfred de Quervain, the initiator of the research station at Jungfrauoch.

The Astronomic Commission meeting was held on January 20, 2012, in Bern. The issues of space limitation at the Sphinx observatory as well as the continued emissions from the construction work at Jungfrauoch were lively discussed. Potential solutions like an over-pressurized laboratory to minimize local contaminations, were mentioned but require an in depth consideration. Funding for ICOS was mentioned but at the time of the meeting no further information was available. In the meantime, we have assured secured funding for the period 2013-2016. The final planning and scheduling of the science exhibition was discussed with a presentation of the responsible design company KARGO. Furthermore, the HFSJG president announced that a working group of the Jungfrauoch Commission was built to write a strategic document (White Paper).

The meeting of the Board and the General Assembly of the Sphinx AG took place at Jungfrauoch on June 6, 2012. The HFSJG president as well as the director attended.

The webpage of the Foundation was further developed. Besides easy access to projects by means of diverse searching tools, details about the scientific exhibition including video sequences are also placed on the website.

The High Altitude Research Station Jungfrauoch

As can be seen from the individual reports and the lists and statistics, the High Altitude Research Station Jungfrauoch remains a lively site for high level science. In 2012, 34 (2011: 28) institutions were active at Jungfrauoch. More than half of the total 47 (2011: 40) research projects were primarily based on remote controlled automated monitoring around the clock.

The involvement of the many research groups in international programs such as the Global Atmosphere Watch (GAW) or the Network of Detection of Atmospheric Composition Change (NDACC) is a key prerequisite of the top level research being conducted at Jungfrauoch. The presence and active role in national and international networks is important in order to improve the visibility of a station. In this regard Jungfrauoch plays a major role with the involvement in about 30 programs (Table 1).

The fact that there was no direct involvement from Austria or the United Kingdom in 2012 does not display the overall picture since there have been collaborations of these countries with other European institutions that are active on Jungfrauoch as documented by the collaborations visible in Figure 3 as well as on the HFSJG Webpage (<http://www.hfsjg.ch/jungfrauoch/researchprojects/overview.php>). At the time of writing this report, institutions from the UK are actively participating at Jungfrauoch within the

framework of the current CLACE campaign (Cloud and aerosol characterization experiments).

By number of projects, Germany and Belgium were again the most frequent users after Switzerland (Figure 2). Similarly, the number of working days spent at Jungfraujoch is dominated by Swiss, Belgian and German groups. (Figure 5).

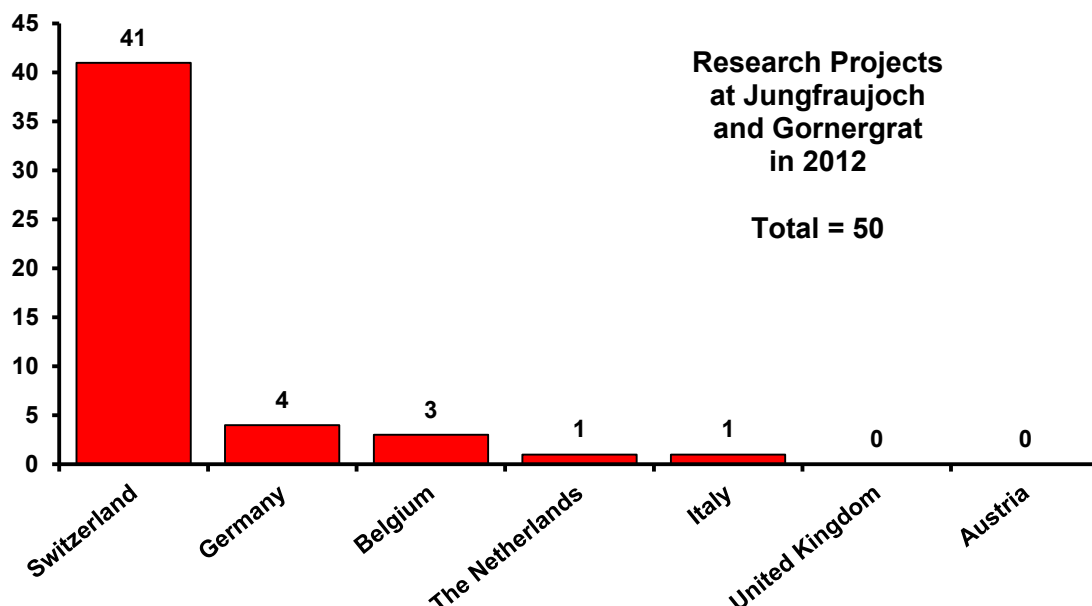


Figure 2: Number of research projects at the High Altitude Research Station Jungfraujoch and Gornergrat in 2012 by country

A significant increase of overnight stays was recorded in 2012 (815 in 2012, 439 in 2011). This is mainly due to two large medical campaigns that were hosted by our custodians at Jungfraujoch. Scientists spent a total of 1004 person-working days at Jungfraujoch. As shown in Figure 5, this is also a major increase over the previous year (2011: 536). However, the trend to remote operation of experiments is progressing further and therefore campaigns are very welcome from any research field.

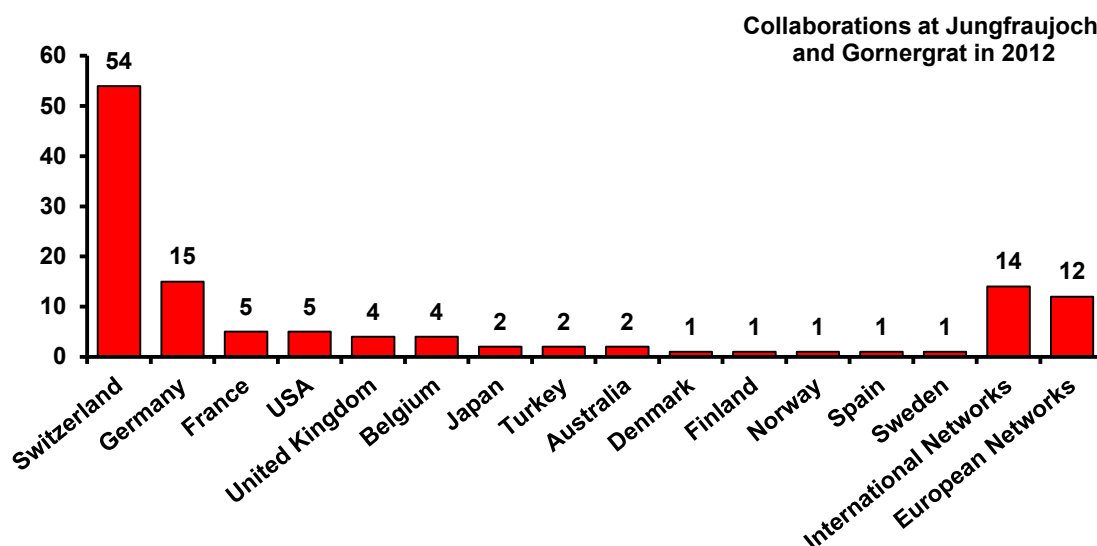


Figure 3: Number of collaborations at the High Altitude Research Station Jungfraujoch and Gornergrat in 2012

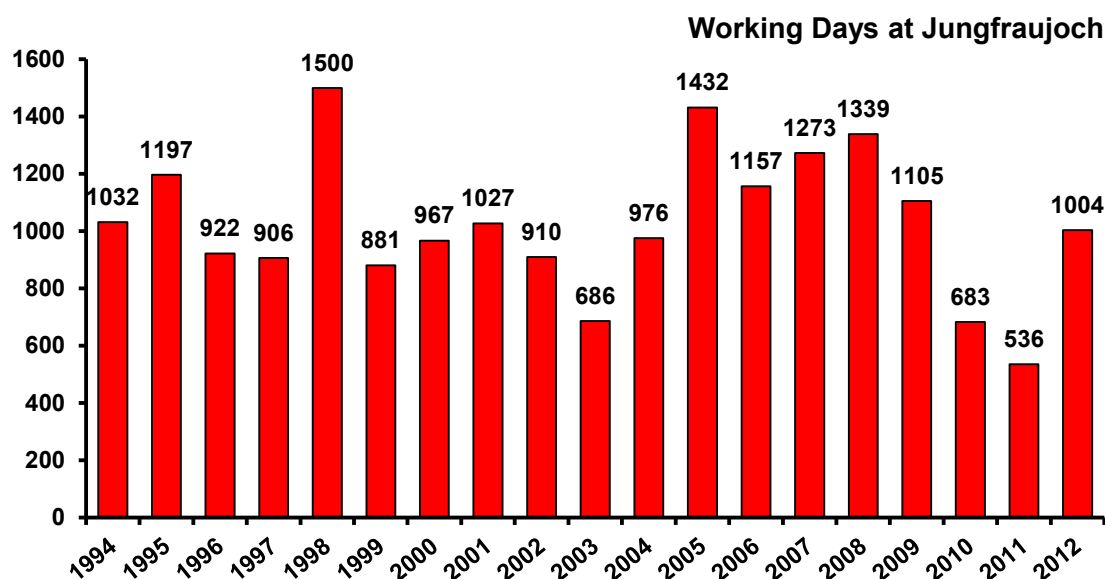


Figure 4: Number of working days spent by scientists at the High Altitude Research Station Jungfrauoch during the past years

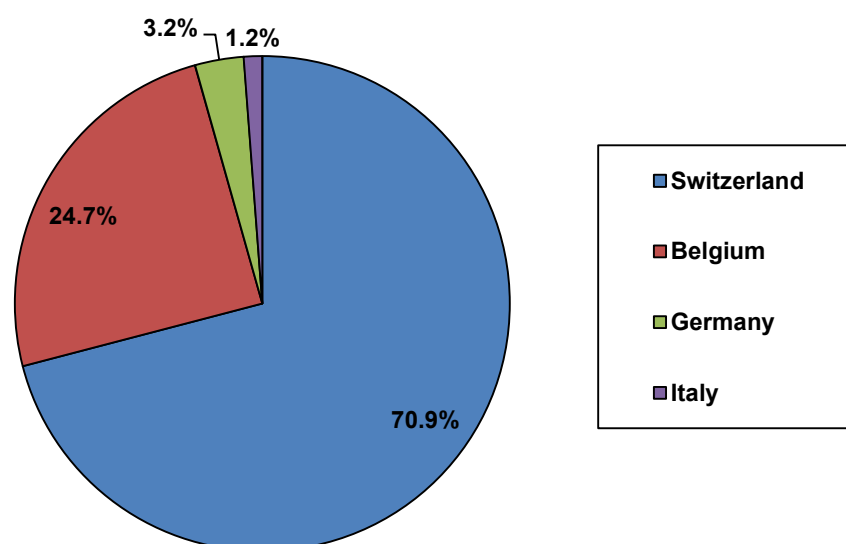


Figure 5: Percentage of person-working days in 2012 at the High Altitude Research Station Jungfrauoch per country

The research conducted at Jungfrauoch resulted in the following output in 2012:

- 32 refereed publications
- 48 conference presentations / posters
- 3 popular publications and presentations
- 8 data publications and reports
- 2 Master (1) and secondary school (1) theses, and
- 5 book / edited books

Scientific results obtained at Jungfrauoch were presented by the various research groups at a number of international conferences in 2012, e.g. at the European Geophysical Union, General Assembly, Vienna, Austria, April 22-27, 2012 (A), at the 8th FENS Forum of Neuroscience 2012, Barcelona, July 14-18, 2012 (E), at the 11th Atmospheric Spectroscopy

Applications meeting (ASA 2012), united with the “12th HITRAN Conference”, Reims, August 29-31, 2012 (F), at the NDACC-IRWG Annual Meeting, Wengen, Switzerland, June 11-15, 2012 (CH), at the EUREF'12: Paper contributions to the EUREF-Symposium in Paris, June 6-8, 2012 (F), at the ACCENT-IGAC-GEIA Conference, Toulouse, June 11-13, 2012 (F), at the SBSTA Science meeting, Bonn, May 13, 2012 (D), at the 23rd European Cosmic Ray Symposium, Moscow, 2012 (RUS), at the AAAR 31st Annual Conference, Minneapolis, Minnesota, October 8-12, 2012 (USA), at the 12th International Global Atmospheric Chemistry (IGAC) Science Conference, Beijing, September 17-21, 2012 (CHN), at the HALOE and ACE-FTS infrared solar observations, poster presentation at the Quadrennial Ozone Symposium QOS 2012, Toronto, August 27–31, 2012 (CDN), at the 15th International Conference on Laser Optics, St. Petersburg, June 25-29, 2012 (RUS), at the European Aerosol Conference (EAC), Granada, September 02-07, 2012 (ES), at the Geological Society of America, Annual meeting, Charlotte, North Carolina, November 4-7, 2012 (USA), at the ICCP-2012, Leipzig, July 30 – August 3, 2012 (D), at the AGU Fall Meeting, San Francisco, December 3-7, 2012 (USA), at the Joint European Stable Isotope Users group Meeting (JESIUM 2012), Leipzig, September 02-07, 2012 (D), at the Quadrennial Ozone Symposium QOS 2012, Toronto, August 27–31, 2012 (CDN), at the 29th International Physics Congress, Bodrum, September 5-8, 2012 (TR).

Again, a large number of refereed publications and conference contributions are explicitly linked to our research facility. This convincingly documents the importance of the Jungfraujoch Research Station within the European setting, in particular in the field of environmental science. Jungfraujoch is recognized as a key station within many national and international networks as listed in Table 1.

In the following I would like to highlight the wealth of research by presenting two examples, (i) a new technique for the chemical characterization of aerosols and (ii) the effect of high altitude exposure on patients with mild congenital heart disease.



Figure 6: Sketch of ToF-ACSM.

The first project entitled “Aerosol Chemical Speciation Monitor (ACSM) measurements on the Jungfraujoch within the frame of the EU project ACTRIS (Aerosols, Clouds, and Trace gases Research Infrastructure Network)” of Dr. André Prévôt and his team from the Laboratory of Atmospheric Chemistry at the Paul Scherrer Institute has two goals: (i) gaining knowledge about the chemical composition at the high altitude site Jungfraujoch over at least a one year period and (ii) testing and validation of the new time of flight mass spectrometer shown in Figure 6.

Work on the project was started in late June 2012.

The second project entitled “Effect of high altitude exposure on hemodynamic response to exercise in patients with mild congenital heart disease” was led by Prof. Dr. Jean-Paul Schmid from the Cardiovascular Prevention & Rehabilitation, Swiss Cardiovascular Centre Bern, University Hospital (Inselspital), Bern.

Orientation about health issues related to the exposure to high altitudes is important for visitors or workers at Jungfraujoch. Therefore, medical investigations of this nature are highly relevant and very welcome. The project conducted by Prof. Schmid dealt with testing the hemodynamic response (cardiac output) of a steady state exercise at high altitude (3454 m) in adolescents with congenital heart disease and with measurements of the influence

of high altitude on single components of cardio-pulmonary response during a maximal exercise stress test. Results are summarized in the activity report to this medical campaign.



Figure 7: Non-invasive measurement of cardiac output using an inert gas rebreathing method during a constant work load exercise test in an adolescent with minor congenital heart disease (a recent study of Prof. Jean-Paul Schmid from the Swiss Cardiovascular Center Bern at the research station Jungfrauoch)

Additional scientific highlights were published in several peer-reviewed journals:

- Amitrano et al., Earth and Planetary Science Letters, 2012 presents a method of acoustic emission monitoring used to investigate rock.
- Brunner et al., Atmos. Chem. Phys., 2012 discusses an extended Kalman-filter for regional scale inverse emission estimation.
- Conen et al., Atmos. Meas. Tech., 2012 registers atmospheric ice nucleators active at ≥ -12 °C on PM10 filters.
- Deolal et al., Atmos. Chem. Phys., 2012 presents long-term in situ measurements of NO_x and NO_y at Jungfrauoch.
- Hendrick et al., Atmospheric Chemistry and Physics, 2012 discusses the analysis of stratospheric NO₂ trends above Jungfrauoch.
- Ruckstuhl et al., Atmospheric Measurement Techniques, 2012 presents a robust extraction of baseline signal of atmospheric trace species using local regression.
- Logan et al., J.A., Journal of Geophysical Research-Atmospheres, 2012 presents changes in ozone over Europe from sondes, regular aircraft (MOZAIC) and alpine surface sites.
- Parrish et al., Atmospheric Chemistry and Physics, 2012 presents long-term changes in lower tropospheric baseline ozone concentrations at northern mid-latitudes.
- Popp et al., Atmos. Meas. Tech., 2012 discusses high resolution NO₂ values obtained from remote sensing from the Airborne Prism EXperiment (APEX) imaging spectrometer.
- Risi et al., J. Geophys. Res., 2012 presents process-evaluation of tropospheric humidity simulated by general circulation models using water vapor isotopologues.
- Saikawa et al., Atmos. Chem. Phys., presents global and regional emissions estimates for HCFC-22.
- Schneider et al., Atmos. Meas. Tech., 2012 discusses ground-based remote sensing of tropospheric water vapor isotopologues within the project MUSICA.
- Spiegel et al., Atmospheric Measurement Techniques, 2012 discusses the evaluation of capabilities and uncertainties of droplet measurements for the fog droplet spectrometer (FM-100).
- van der Laan-Luijkx et al., Atmos. Meas. Tech. Discuss., 2012 presents a detailed multiple year flask sampling intercomparison.
- Wilson et al., Atmospheric Chemistry and Physics, 2012, Have primary emission reduction measures reduced ozone across Europe? An analysis of European rural background ozone trends 1996–2005.

Table 1. List of major nationally and internationally coordinated networks and/or research programs where Jungfrauoch is a key station

NDACC	Network for the Detection of Atmospheric Composition Change Primary Site (http://www.ndacc.org/)
GAW, GAW-CH	Global Atmosphere Watch, Global GAW Station (http://www.wmo.int/pages/prog/arep/gaw/gaw_home_en.html , and http://www.meteoschweiz.admin.ch/web/de/meteoschweiz/internationales/GAW.html)
GAW-PFR	GAW Aerosol Optical Depth (AOD) Network (http://www.pmodwrc.ch/worcc/pmod.php?topic=gawpfr_aod_network_menu)
GCOS	Global Climate Observing System (http://www.wmo.int/pages/prog/gcos/)
GCOS-CH	Swiss GCOS office (http://www.meteoschweiz.admin.ch/web/de/meteoschweiz/internationales/gcos/swiss_gcos_office.html)
SOGE	System for Observation of Halogenated Greenhouse Gases in Europe (http://www.nilu.no/soge/files/network/jungfrauoch.html)
GEOMON	Global Earth Observation and Monitoring of the Atmosphere (http://www.geomon.eu/)
AGAGE	Advanced Global Atmospheric Gases Experiment Collaborative Sampling Station (http://agage.eas.gatech.edu/)
NADIR/NILU	NILU's Atmospheric Database for Interactive Retrieval (http://www.nilu.no/nadir/)
IMECC	Infrastructure for Measurements of the European Carbon Cycle (http://imecc.ipsl.jussieu.fr/index.html)
EUMETNET	Network of European Meteorological Services (http://www.eumetnet.eu/)
SwissMetNet	Automatic Measuring Network of MeteoSwiss (http://www.meteoschweiz.admin.ch/web/de/klima/messsysteme/boden/swissmetnet.html)
RADAIR	Swiss Automatic Network for Air Radioactivity Monitoring (http://www.bag.admin.ch/themen/strahlung/00045/02372/02374/index.html?lang=de)
ICOS	Integrated Carbon Observation System (http://www.icos-infrastructure.eu/)
NADAM	Netz für automatische Dosis-Alarmierung und Meldung (http://www.naz.ch/de/aktuell/tagesmittelwerte.shtml)
NABEL	Nationales Beobachtungsnetz für Luftfremdstoffe - National Air Pollution Monitoring Network (http://www.empa.ch/plugin/template/empa/699/*---/l=1)
AGNES	Automated GPS Network for Switzerland (http://www.swisstopo.admin.ch/swisstopo/geodesy/pnac/html/en/statjujo.html)
PERMASENSE	Wireless Sensing in High Alpine Environments (http://www.permasense.ch/)
PERMOS	Permafrost Monitoring Switzerland (http://www.permos.ch/)
NMDB	Real-Time Database for High Resolution Neutron Monitor Measurements (http://www.nmdb.eu)
E-GVAP I + II	The EUMETNET GPS Water Vapour Programme (http://egvap.dmi.dk/)
ACTRIS	Aerosols, Clouds, and Trace gases Research Infrastructure Network (http://www.actris.net/Home/tabid/4276/Default.aspx)
EUSAAR	European Supersites for Atmospheric Aerosol Research (http://www.eusaar.net/files/activities/transnat_act.cfm)
EUCAARI	European Integrated project on Aerosol Cloud Climate and Air Quality Interactions (http://www.cas.manchester.ac.uk/resprojects/eucaari/)
COST 726	Long term changes and climatology of UV radiation over Europe (http://www.cost726.org/)
Swiss Glacier Monitoring Network	Federal Office for the Environment (BAFU) (http://glaciology.ethz.ch/messnetz/?locale=en)
InGOS	Integrated non-CO ₂ Greenhouse Gas Observing System (http://www.ingos-infrastructure.eu/)

Most of the measurements made at Jungfrauoch are publicly available via the respective databases, many of them in real or near real-time.

The Research Station remained attractive in 2012 as in previous years. Several organizations initiated meetings of national and international scientific committees in the Jungfrau region and often combined these meetings with an excursion to Jungfrauoch. The research station was also visited by a large number of student and teachers groups as part of a lecture or training school. Examples of the 53 individual and group visitors in 2012 are:

- Paul Scherrer Institut, Hr. P. Zieger; 22.01.2012
- Gewinner von Nacht der Forschung Uni Bern, Fr. R. Murati; 30.01.2012
- Ice-co GmbH, Frau Camadini; 19.02.2012
- Delegation aus Korea, Fr. K. Antonietti; 23.02.2012
- ExtremCom12, Hr. J. Beutel, and Dr. F. Legendre; 13.03.2012
- Schindler Aufzüge, Hr. M. Karlen; 15.03.2012
- Onkologie-Zentrum Biel, Hr. D. Vetterli; 16.03.2012
- Chinesische Delegation, Hr. H-R Keusen; 22.03.2012
- Familie von Hr. v.d. Bergh, Hr. v.d. Bergh; 22.03.2012
- Studenten von Uni Frankfurt, Prof. J. Curtius; 27.03.2012
- VPT BLS, Pensionierte, Hr. H. Bärtschi; 12.04.2012
- Uni Basel / PSI, Hr. E. Hammer; 13.04.2012
- Deutsche Wissenschaftler und Journalisten, Prof. Dr. M. Wilhelm; 21.04.2012
- ETHZ LIDAR, Dr. U. Krieger; 30.04.2012
- Prof. S. Pratsinis; 02.04.2012
- ETH Zürich / PSI, Hr. E. Hammer; 10.05.2012
- Paul Scherrer Institut, Hr. P. Zieger; 14.05.2012
- Primarschule Bönigen, Hr. S. Weisskopf; 15.05.2012
- Astronom, Herr G. Bourban; 25.05.2012
- Fr. K. Aplin; 10.06.2012
- Paul Scherrer Institut, Hr. Weingartner, Besuch Prof. Thomas Leisner; 12.06.2012
- Herr S. Geissbühler; 12.06.2012
- Migeotte, IRWG/TCCON Meeting, Hr. Ch. Servais; 15.06.2012
- Herr Brand; 23.06.2012
- WCRP SPARC Workshop, Dr. M. Hegglin; 27.06.2012
- Uni Bern, Prof. Harald Krug; 28.06.2012
- Geographie Uni Bern, Prof. S. Brönimann; 29.06.2012
- GABA International AG, Fr. B. Egger; 07.07.2012
- Wengen Tourismus, Hr. P. Brunner; 10.07.2012
- UCLA, Prof. L. Estrada; 14.07.2012
- Fr. I. Zbinden, Bundespersonal; 19.07.2012
- Uni Basel, Zahnmedizin, Fr. S. Kaiser, JB; 17.08.2012
- Deutscher Wetterdienst, Hr. Fröhlich; 18.08.2012
- Familie von Hr. v.d. Bergh, Hr. H. van den Bergh; 20.08.2012
- Ehepaar P. und A. Naef, MeteoSwiss, Hr. P. Naef; 23.08.2012
- EMPA, Fr. B. Buchmann; 25.08.2012
- Meteo Schweiz, Hr. Chr. Félix; 04.09.2012
- Hokkaido University, Hr. Shin Sugiyama; 05.09.2012
- Swisscom Station, Hr. Goldie; 08.09.2012
- Wengen Tourismus; 28.09.2012
- Uni Stuttgart, Hr. Prof. G. Baumbach; 03.10.2012
- Das FIRST Lab, Hr. B. Tuzson (EMPA); 04.10.2012
- Siemens, Hr. E. Würzler; 13.10.2012
- CEDB, Club der ehemaligen Dozierenden Burgdorf, Prof. H. Häberlin; 30.10.2012
- Glaziologie Studenten, ETHZ Prof. M. Funk; 07.11.2012
- Delegation von Hr. v. d. Bergh; 08.11.2012
- Naturforschende Gesellschaft in Bern, Prof. E. Flückiger; 10.11.2012
- Gewinner Wettbewerb des Eidg. Finanzdepartementes, Hr. S. Rüfenacht; 09.12.2012

The management HFSJG was particularly honoured to welcome the following official delegations:

- Media event, «Top Science at the Top of Europe», Scientific exhibition at Jungfraujoch; May 3, 2012
- Reception and tour with experts from Roshydromet (Moskau and St. Petersburg); May 2-3, 2012
- Reception and tour with the board of directors of the University of Bern; June 2, 2012
- Reception and tour with NASA STS-134 astronauts and accompanying persons CERN/AMS at Jungfraujoch; July 26, 2012
- Reception and tour with guests of the 192th Jahreskongresses 2012 der Akademie der Naturwissenschaften Schweiz SCNAT, „Höher und kälter – Forschung am geographischen Limit“; October 27, 2012



Figure 8: Delegation of the directorate of the University of Bern at Jungfraujoch on June 2, 2012 (on the left); NASA and ESA astronauts of the STS-134 mission at the research station Jungfraujoch, July 26, 2012 (on the right). This was the penultimate mission of NASA's Space Shuttle program and marked the final flight of Space Shuttle Endeavour.

The large number of requests for visits of the research station at Jungfraujoch was paralleled by an unbroken intense interest by print media and TV, with more than 49 contributions in 2012. The winner of the “Nacht der Forschung” of the University of Bern, Mrs. Remina Murati from Bern was invited for a Jungfraujoch excursion with a guided tour of the Research Station.

In order to provide the researchers good working conditions, continuous efforts are made to update the infrastructure. In 2012 several infrastructural changes were made at the Jungfraujoch Research Station: (i) a protective door was built in at Sphinx laboratory level 2 to minimize instrument noise and contamination exposure; (ii) the HFJSG entrances were refurbished for better visibility and corporate identity; (iii) preparations were made for the protection roof renovation coming up in 2013 and 2014.

(i) Noise emission at the Sphinx laboratory on level 2 was unacceptable for research work or during tours with visitors. Therefore, a protective door was installed for noise reduction as well as contamination minimization from contaminated air masses uplifted through the elevator channel. After installation a significant improvement was noticed.

(ii) In addition to the science exhibition, the refurbishing of the HFSJG infrastructure entrances to a modern appearance has led to improved visibility and recognition of the research facilities at Jungfraujoch.



Figure 9: Installation of the protective door (left) and additional access points for outside air measurements at the Sphinx cupola (right).

(iii) As already announced in the last activity report, there is an urgent need to renew the protection roof of the research station. Preparations by our architect have been done and quotes are available. The renovation is planned for the summer/autumn months of 2013 and 2014.

Due to the tremendous demand of research groups to participate in the 2013 CLACE campaign that commenced in January and will last until mid-March 2013, additional access points requested for outdoor sampling were installed. The only available space for such access points without significant interference to on-going research projects was the Sphinx cupola.

A significant reduction of emissions at Jungfraujoch was observed after the construction work and completion of the new tunnel system for tourists ended in mid-March 2012. This has been documented by NO_x values, for instance. Yet, there is a growing demand to carefully document and investigate the grade of contamination in order to maintain the highest quality of the measurements. A continued open discussion about challenging issues at Jungfraujoch between the Jungfrau Railways and our Foundation is important.

As in previous years, several coordination discussions took place with the management of the Jungfrau Railways. The main annual coordination meeting at Jungfraujoch, a platform for the discussion of items of common concern, took place on October 23, 2012, and was attended by the director of the research stations and Mr. Urs Otz. Prime topics related to the HFSJG were (i) the emissions related to the construction of the new passageway; (ii) the announcement of the director that the protection roof of the research station is going to be renewed in 2013/2014 (iii) the exchange of rooms between HFSJG and Jungfrau Railways (JB) has been formalized (the workshop of JB is moving into the old exhibition hall of HFSJG infrastructures with corresponding space available for HFSJG in the new JB cavern for storage).

The High Altitude Research Station Gornergrat

After two years of silence at the observatory Gornergrat South, a moderate renovation of the infrastructure is one of the precursors for the new equipment being installed in the coming months within the framework of the “*Stellarium Gornergrat*” project. The financial funding comes from the two host universities, i.e. University of Bern (Physics Institute) and the Université de Genève (Observatoire de Genève), from the Burgergemeinde Zermatt, and from an SNF grant under the SNF program AGORA.

“*Stellarium Gornergrat*” is an astronomical facility to be installed at Gornergrat for educational purposes with the goal to provide access to astronomical observation to the public in general and to young people. The clean and dry air at this site as well as its location on the southern side of the Alps maintains, on the average, favourable meteorological conditions. It has been recognized by professional astronomers as one of the best sites in Switzerland for astronomical observations. This astronomical facility is designed to deliver professional performance and to be remotely controlled from any location with the help of an easy-to-use web-interface. It is conceived to become an ideal platform for the education of students, for visitors at the Gornergrat as well as for the general public, and thus to evolve into a prime site in Switzerland for astronomy and science education.

Stellarium Gornergrat is organized around three different elements: (1) The observation infrastructure at Gornergrat, namely a large telescope and other specialized observing tools. (2) A web portal to control the facility and provide access to the observations and educational tools and packages. (3) Educational materials and programs.

The educational programs are targeted to make this facility a major tool for education. They will be planned and organized in close collaboration with teachers and with existing Swiss infrastructure for science outreach and communication at UniGe and UniBe.

The first minor step of the hardware installation was achieved in 2011 with the mounting of the all-sky camera that delivers pictures from Gornergrat to track the movement of the moon and sun. The telescopes and their mount were ordered during the reporting period and will undergo an in-depth testing procedure prior to the definitive installation at Gornergrat in spring 2013.

Teams and projects at the High Altitude Research Station Gornergrat are less numerous than at Jungfrauoch as documented by its statistics. In 2012, 3 (2011: 3) teams were active at Gornergrat. Among a total of 3 (2011: 3) research projects, 2 (2011: 2) were primarily based on automatic measurements around the clock.

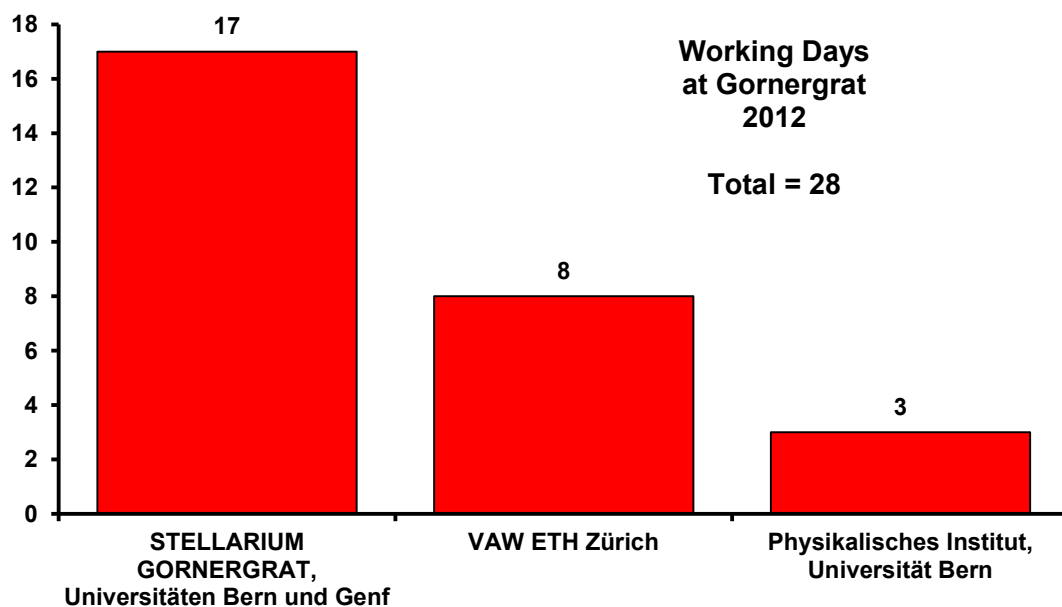


Figure 10: Number of working days at the High Altitude Research Station Gornergrat in 2012 by research groups



Figure 11: Telescopes and mount for Gornergrat for testing at the University of Bern (left), Matterhorn during sunset (right)

Summary and Acknowledgements

The year 2012 – the 75th anniversary of the Sphinx observatory, Jungfrauoch’s landmark – has brought many memorable times. The new science exhibition will serve as an interface between the research community and tourists. We hope that many of the large number of tourists will be attracted by the science displays and will interact with our community and the Foundation. So far, we have had many positive responses.

At Gornergrat the project “Stellarium Gornergrat” is well on track. The first educational training at Gornergrat is planned soon.

Again, I am deeply impressed with the research output from the many projects being conducted in either peer-reviewed publications, conference presentations or in the individual activity reports. It is exactly the principle aim of the HFSJG to promote science, and it is an excellent testimony for our continued support regarding infrastructure, maintenance and administration.

HFSJG is well aware that the success of our Research Stations is based on the support of multiple partners. The international structure of our foundation with its members, their annual contributions and their representatives are as central as the Swiss National Science Foundation for the most significant funding. The research organizations using the HFSJG infrastructure, the scientists devoted to research, and the administrative personnel of HFSJG are crucial for our success. Particularly, I would like to thank the two custodian couples who were in charge at Jungfrauoch over the course of 2012, Mrs. and Mr. Fischer as well as Mrs. and Mr. Otz for their continuously excellent and competent work and for providing researchers with a friendly and motivating atmosphere.

The year 2012 must have been an incredible year for the Jungfrau Railways with its centennial celebration. I certainly can say that the HFSJG is lucky to have such a competent and cooperative partner and is proud to share a significant portion of the time frame of these 100 years of success. Similarly, with the Gornergrat Bahn we have an excellent partner for our observatory on Gornergrat. Therefore, I would like to thank the Jungfrau Railway Holding AG (Prof. Thomas Bieger, president of the Board and Mr. Urs Kessler, Chief Executive Officer), the Matterhorn Gotthard Railway (Jean-Pierre Schmid, president and Fernando Lehner, Chief Executive Officer and its representative in the HFSJG Board, Mr. René Bayard) and the Gornergrat Railway for the good collaboration. With their goodwill and their substantial support both research stations have benefited year by year. Thank you.

A sincere thank you goes to staff members of the Jungfrau Railways who experienced busy times during the preparation phases of the centennial as well as beyond. These times required continuous exchange of information in order for us to benefit from each other. In this respect we express our special thanks to Mr. Jürg Lauper, head of infrastructure and his deputy, Mr. Heinz Schindler, to Mr. Gabriel Roth, head of Zugförderung und Werkstätte (ZfW/JB) und Leiter Jungfraubahnen AG, to Mr. Andreas Wyss, chief of technical services and maintenance division, and his team. HFSJG is very grateful to Mrs. Brigitte Soche and Mr. Martin Soche and the personnel of the restaurants at the Top of Europe for the excellent hosting of our staff, scientists, and visitors.

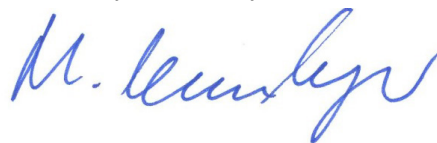
For Gornergrat our thanks go to Burgergemeinde Zermatt (Mr. Andreas Biner, president and Mr. Fernando Clemenz) for the continuous support of the scientific projects at Gornergrat particularly for their involvement in the new Stellarium Gornergrat project. The financial contribution was important to make this project fly. A big thank you goes to Mrs. Nicole Marbach and Mr. Thomas Marbach, the directors of the Kulmhotel Gornergrat and their team, for their warm hosting of HFSJG staff and researchers. Without their goodwill and support it would not be possible to operate an astrophysical observatory at such a magnificent site.

I do not only act as director, but I am also an active researcher at Jungfraujoch, and therefore I know what it means for somebody coming from far away to have an excellently working observatory. Only the active use of the HFSJG infrastructures by many research partnerships, organizations and institutions will lead to higher visibility and recognition. In other words, we are on a give and take basis, preferentially in a win-win situation. Having this in mind, I sincerely thank all scientists for their interest and innovative power in suggesting and conducting research at both stations with greatest care and dedication and with a high degree of esprit de corps. Campaigns or long-term experiments allow extending and strengthening this cooperation and collaboration further.

As already mentioned above, a good and well maintained infrastructure is mandatory to hold our standards. This requires excellent expert knowledge, time and financial investments. In this respect I would like to thank SWITCH for maintaining the fast internet connection with hardly any interruption, as well as Christian Heim and Fritz Bütikofer with his team from the “Informatikdienste der Universität Bern” for their excellent support regarding all kinds of requests in IT matters. Their help is especially valuable during rather hectic times of large campaigns.

The administrative staff at Bern has again done a good job. In particular the work by Claudine Frieden, our new secretary, is very much appreciated. She adapted very efficiently to the new setting within a short time. Many thanks to Dr. Rolf Bütikofer for carefully supervising and extending the IT processes for and within the HFSJG. Thanks go to Mr. Karl Martin Wyss for his competent services as our treasurer, and Mrs. Theres Trachsel for the bookkeeping, and the professional auditing by Treuhand Cotting AG, Bern (Mr. Harro Lüdi). I am particularly grateful to the University of Bern, its Rector Prof. Dr. Martin Täuber and the Administrative Director, Dr. Daniel Odermatt, and the director of the Physikalisches Institut, Prof. Willy Benz, for the hospitality and support of our administration. Finally, I would like to thank Prof. Erwin Flückiger and Prof. Hans Balsiger for their enthusiastic involvement in the “Stellarium Gornergrat” project.

I conclude by reminding all our readers not to miss the opportunity to visit either Gornergrat or Jungfraujoch or even both and to enjoy the exceptional surroundings in the splendid locations in the Swiss Alps. On behalf of the HFSJG, I warmly welcome you.



Bern, February 8, 2013

Markus Leuenberger

