

Report of the Director

Everyone who has already had the opportunity to visit the Jungfrauoch Research Station and in particular the Sphinx observatory has surely noticed that space is extremely limited. Therefore, we looked into different possibilities of extending – for now, at least temporarily – our facilities to the East Ridge. Related to this topic, the HFSJG has prepared a White Paper about the Jungfrauoch Research Station which summarizes the past achievements, the present position and documents the vision.

The year 2013 was a rather quiet year after the previous year of celebration. However, many activities were going on at both locations Jungfrauoch and Gornergrat – summarized in our annual activity report. For instance, we hosted the largest CLACE campaign ever at Jungfrauoch! You may imagine that this required an additional effort and a flexible behaviour of our two custodian couples.

Stellarium Gornergrat is advancing after the installation of the telescopes took place in summer 2013. The first pictures taken are promising and document the potential of this new facility in educating young students of secondary and high school level in basic astronomy.

The Foundation HFSJG

According to the by-laws of the Foundation HFSJG, the Board has its regular meetings only every other year. This year's meeting of the Board took place on October 25 and 26, 2013, in Interlaken. Prof. M. Heimann was welcomed as the new delegate of the German Max-Planck-Gesellschaft as Prof. J. Trümper had retired. The statement of accounts for the year 2012 was approved and the HFSJG administration was given discharge. The budget for 2014 and 2015 was approved by the Board, who took note of the extraordinary expenses allowed for the East Ridge exploration and the renewal of the protection roof of the research station. The CORE Treuhand Cotting AG (Mr. Lüdi) was elected for an additional two years term as auditor. Prof. Joachim Trümper was awarded the title "corresponding member of the HFSJG" for his long-term engagement for our foundation. It had to be noticed that the White Paper has been thoroughly updated during the course of 2013 but was not ready to be presented in its final form for approval by the delegates of the HFSJG Foundation on October 25. We can expect that the final strategic document will be available for approval in summer 2014 after another consultation by the authors, the delegates and by SCNAT. Prof. em. Heinz W. Gäggeler, Department of Chemistry and Biochemistry, University of Bern and Paul Scherrer Institut gave a scientific talk entitled "Impact of Prof. H. Oeschgers ALPENPROJEKT on (paleo)atmospheric research at Jungfrauoch during the last 40 years".



Figure 1. Meeting of the Board on October 25, 2013 at Interlaken (left) and excursion to Jungfrauoch with the delegates of the Foundation HFSJG, Saturday October 26, 2013 (right).

The Jungfrauoch Commission SCNAT held its annual meeting on June 21, 2013, at the House of Sciences, Bern. A second workshop "Spawning the Atmosphere Measurements of Jungfrauoch, Schneefernerhaus and Sonnblick" has been initiated by Prof. Huber, president

of the commission, and took place from January 22 – 24, 2014 in Bern. Prof. Dr. Martin Huber announced to step back as president of the Jungfrauoch Commission at the end of 2013 and to resign as a member of the Commission at the end of 2014. He proposed Prof. Dr. Heinz Gägeler as new designated president.

The Astronomic Commission meeting was held on May 3, 2013, in Bern. The director informed the attendees that the renovation of the roof was postponed to 2014 as the Jungfrau Railways renovated their restaurant “Gletscher” in 2013. The temperature problem at the Sphinx 2nd level laboratory has still not been solved, the director initiated an inspection of the regulation system by an experienced electronics engineer. Funding of the Swiss Integrated Carbon Observation System (ICOS-CH) was granted by the SNF to the Swiss ICOS partners from ETHZ, Empa, WSL and UBern as well as to the Foundation HFSJG for updating its facilities and additional staff for the planned extension to the Jungfrau East Ridge. An update of the “Stellarium Gornergrat” project was given by Prof. Balsiger. The attendees were informed about the progress of the White paper. Prof. Dr. med. Schmid from the Inselspital Bern gave a presentation on the topic ‘Heart disease at high altitude: looking for trouble?’.

The meeting of the Board and the General Assembly of the Sphinx AG took place in Interlaken on June 5, 2013. The HFSJG president attended.

The IT services to the HFSJG facility users as well as the webpage of the Foundation were 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 over the last couple of years, the High Altitude Research Station Jungfrauoch remained a very active site for high level science in the reporting year. In 2013, 44 (2012: 34) institutions were active at Jungfrauoch. More than a third of the total 57 (2012: 47) 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. These involvements in international programmes as listed in Table 1 help to organize research campaigns focussing on specific interdisciplinary questions such as the aerosol-cloud interaction.

In 2013 projects with principal investigators from seven countries were registered (Figure 2). Significantly more countries appear when looking at the active collaborations that the projects mention (Figure 3). All this information can also be retrieved from the HFSJG Webpage (<http://www.hfsjg.ch/jungfrauoch/researchprojects/overview.php>).

The number of projects registered are led by Switzerland but a strong increase was noticed from German groups which is mainly due to the CLACE campaign 2013 (Figure 2). Similarly, the number of working days spent at Jungfrauoch is led by Swiss groups, however nearly as many days were spent by German persons followed by Belgian and Finnish people. (Figure 5).

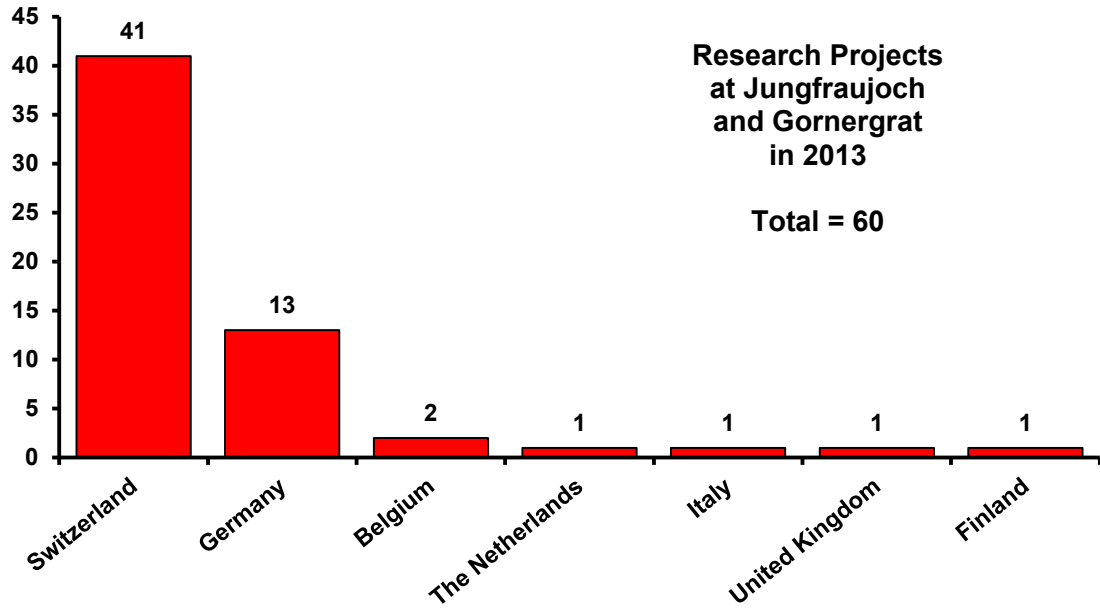


Figure 2. Number of research projects at the High Altitude Research Station Jungfrauoch and Gornergrat in 2013 by country

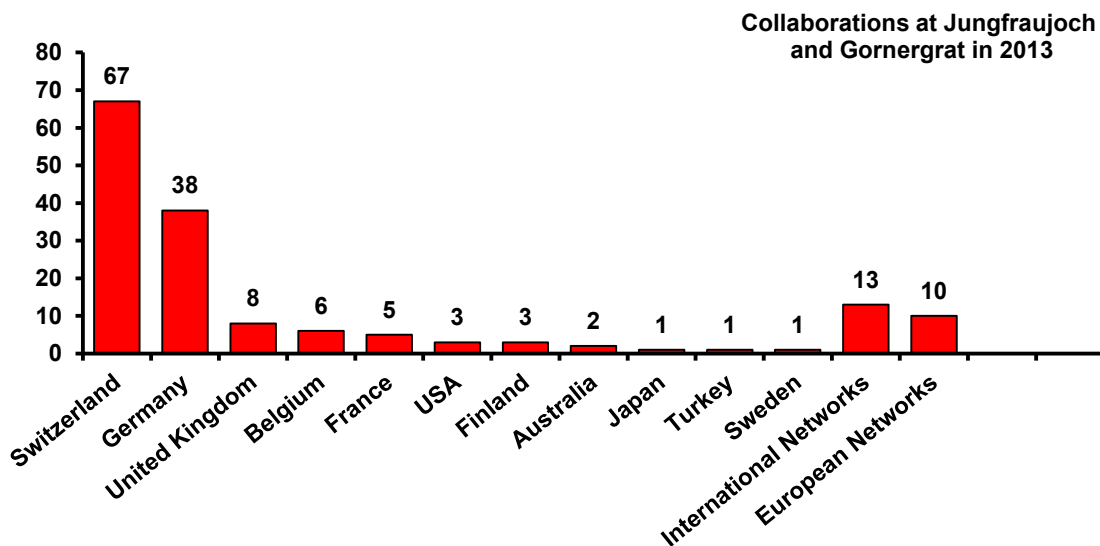


Figure 3. Number of collaborations at the High Altitude Research Station Jungfrauoch and Gornergrat in 2013

A further significant increase of overnight stays was recorded (1235 in 2013, 815 in 2012). This is mainly due to largest CLACE campaign ever performed since its initiation in year 2000 as well as to two medical campaigns that were hosted by our custodians at Jungfrauoch. Scientists spent a total of 1399 person-working days at Jungfrauoch. As shown in Figure 4, this is again a major increase in comparison to the previous year (2012: 1004). However, the trend to remote operation of experiments is progressing further and therefore campaigns are very welcome from any research field.

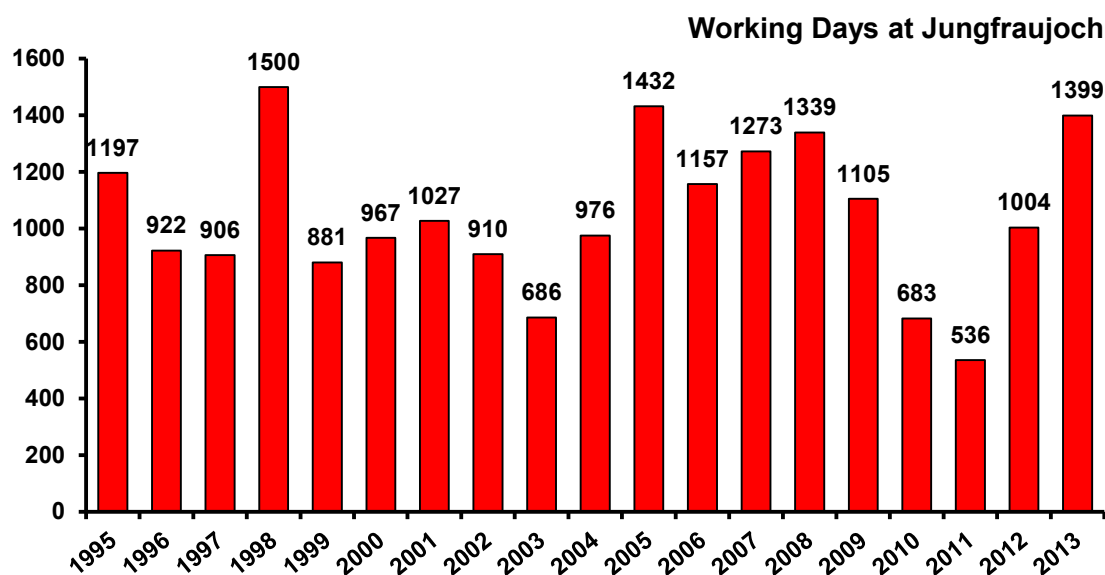


Figure 4. Number of working days spent by scientists at the High Altitude Research Station Jungfrauoch during the past years

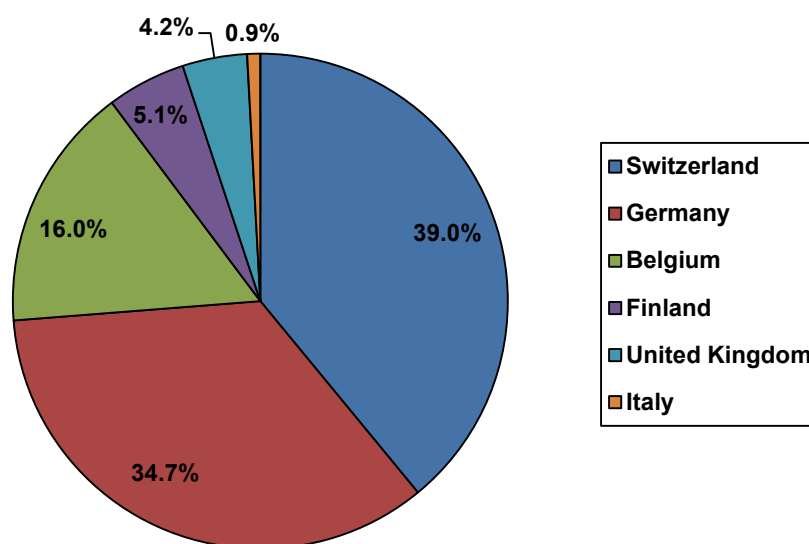


Figure 5. Percentage of person-working days in 2013 at the High Altitude Research Station Jungfrauoch per country

The research conducted at Jungfrauoch resulted in the following output in 2013:

- 39 refereed publications
- 61 conference presentations / posters
- 8 popular publications and presentations
- 8 data publications and reports
- 4 bachelor- (1), master- (1), PhD (2) thesis and
- 1 book / edited books

Scientific results obtained at Jungfrauoch were presented by the various research groups at a number of international conferences in 2013, e.g. at the European Geophysical Union, General Assembly, Vienna, Austria, April 07-12, 2013 (A), Goldschmidt conference, Florence, August 25-30, 2013 (I), International Conference on THz and Mid Infrared

Radiation and Applications to Cancer Detection Using Laser Imaging, Sheffield, October 10-11, 2013 (UK), Mid-Infrared Coherent Sources (MICS), Paris, October 27-November 02, 2013 (F), 9th International Carbon Dioxide Conference, Beijing, June 03-07, 2013 (CN), 17th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2013), Beijing, June 10-14, 2013 (CN), GAW 2013 Symposium, Geneva, March 18-20, 2013 (CH), AGAGE meeting, Seogwipo, Jeju, May 13, 2013 (KR), DACA-13 conference, Davos, July 8-12, 2013 (CH), URSI Microwave Signatures Conference, Helsinki, October 30, 2013 (FIN), DAS Annual Meeting, Ascot, November, 2013 (UK), 33rd International Cosmic Ray Conference, Rio de Janeiro, 2013 (BR), European Aerosol Conference, Prague, September 1-6, 2013 (CZ), 19th International Conference on Nucleation and Atmospheric Aerosols, Fort Collins, Colorado, June 23-28, 2013 (USA), 14th EMEP Task Force on Measurements and Modelling (TFMM), Zagreb, May 5-8, 2013 (HR), 5th World Congress on Sleep Medicine, Valencia, 28 Sept – 2 Oct, 2013 (E), AGU Fall Meeting 2013, San Francisco, December 09-13, 2013 (USA), 8th Extremwetterkongress, Hamburg, September 23-27, 2013 (D), International Conference on AstroParticle Physics, Rome, May 22-24, 2013 (I).

Year by year, it is amazing how many refereed publications and conference contributions that are explicitly linked to our research facility can be placed. 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 detecting aerosol particles that act as ice nuclei in our atmosphere and (ii) quantification of carbon tetrafluoride (CF₄).

Within the first project entitled “The CLACE 2013 campaign: first tests with the new ice selective inlet (ISI)”, a subproject of “The Global Atmosphere Watch Aerosol Program at the Jungfraujoch” of Prof. Dr. Urs Baltensperger and his team from the Laboratory of Atmospheric Chemistry at the Paul Scherrer Institute, a new aerosol inlet system was designed. It deals with the following two burning questions:

- Which aerosol particles act as IN in our atmosphere?
- By which detailed mechanisms do atmospheric aerosols contribute to the formation of ice?

In order to verify the operation of the new ice selective inlet (ISI), the first step is to ensure that the droplet evaporation unit of the ISI was operating correctly, removing water droplets and transmitting ice crystals. A comparison of number size distributions from the “Total” OPC (above the droplet evaporation tube) and the “Ice” OPC (below the droplet evaporation tube) can be used to assess the transmission efficiency of particles at different sizes and should therefore provide a first approximation of the extent to which droplets are removed and ice crystals transmitted. For illustration, Figure 6 shows the number size distributions measured by the two OPCs during a cloud on the 12th-13th February and the processes at work within the inlet explaining the observed modes.

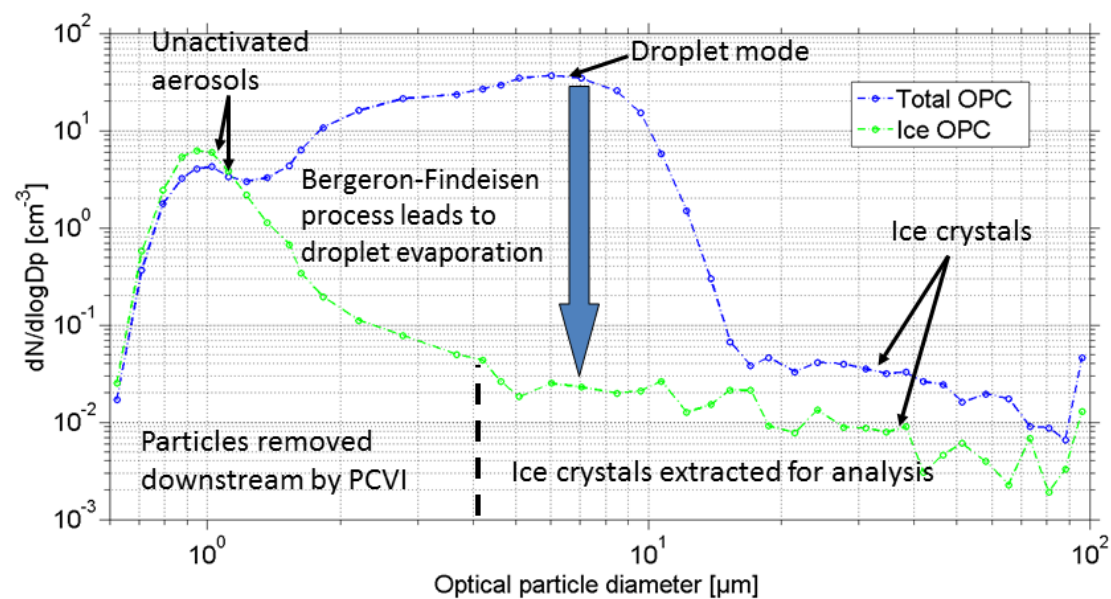


Figure 6. Number size distributions measured by OPCs upstream (blue) and downstream (green) of the droplet evaporation unit in a mixed-phase cloud. The dashed line marks the D50 cutoff of the PCVI (i.e. the diameter at which 50% of particles are transmitted through the instrument).

As becomes immediately obvious, the droplet mode is greatly decreased in number in the Ice OPC, while ice crystals are transmitted to a much greater extent. Analysis of images from the Particle Phase Discriminator, which unambiguously differentiates between ice crystals and liquid droplets, confirms that the droplet evaporation unit consistently removed all droplets in the sample flow. The question arises however, why there are still particles visible in the droplet mode size range as measured by the Ice OPC. The most likely answer to this is that ice crystals are gradually sublimating within the droplet evaporation unit, with transfer of water vapor from the crystals to the ice-covered walls. In view of these results, the current design of the ISI allows for the characterization of the ice crystal residual particles, but does not allow for in-depth characterization of ice crystal microphysical properties, such as habit and surface roughness. The ISI will be modified for the upcoming CLACE 2014 campaign to address these shortcomings.

Weingartner, E., P. Kupiszewski, A. Bigi, U. Baltensperger, P. Vochezer, M. Schnaiter, Design of an ice selective inlet for the characterization of ice in mixed-phase clouds, Daka-13, Davos, Switzerland, 2013.

The second project, entitled "High resolution, solar infrared Fourier Transform spectrometry. Application to the study of the Earth atmosphere", was led by Dr. Christian Servais and his team from the Institut d'Astrophysique et de Géophysique, Université de Liège. They investigate many gases relevant for the Montreal protocol as well as greenhouse gases as listed in the Kyoto protocol, among them Carbon tetrafluoride (CF₄).

CF₄ is a very strong greenhouse gas targeted by the Kyoto Protocol. It is by far the longest-lived perfluorocarbon, with a lifetime of more than 50000 years. The data set reveals a continuous increase of CF₄ characterized by two regimes. Their results have been compared with *in situ* and remote-sensing measurements. Figure 7 shows the various data sets, including CF₄ surface measurements performed by Empa at the Jungfrauoch. A very good agreement is observed, when accounting for the uncertainties affecting the retrieved quantities and time needed for a thorough mixing of CF₄ in the atmosphere. Figure 7 also shows that the anthropogenic contribution to the atmospheric CF₄ loading has overtaken in the late 90s the natural background level, estimated at ~35 ppt. See Mahieu et al. (2013a) for more details.

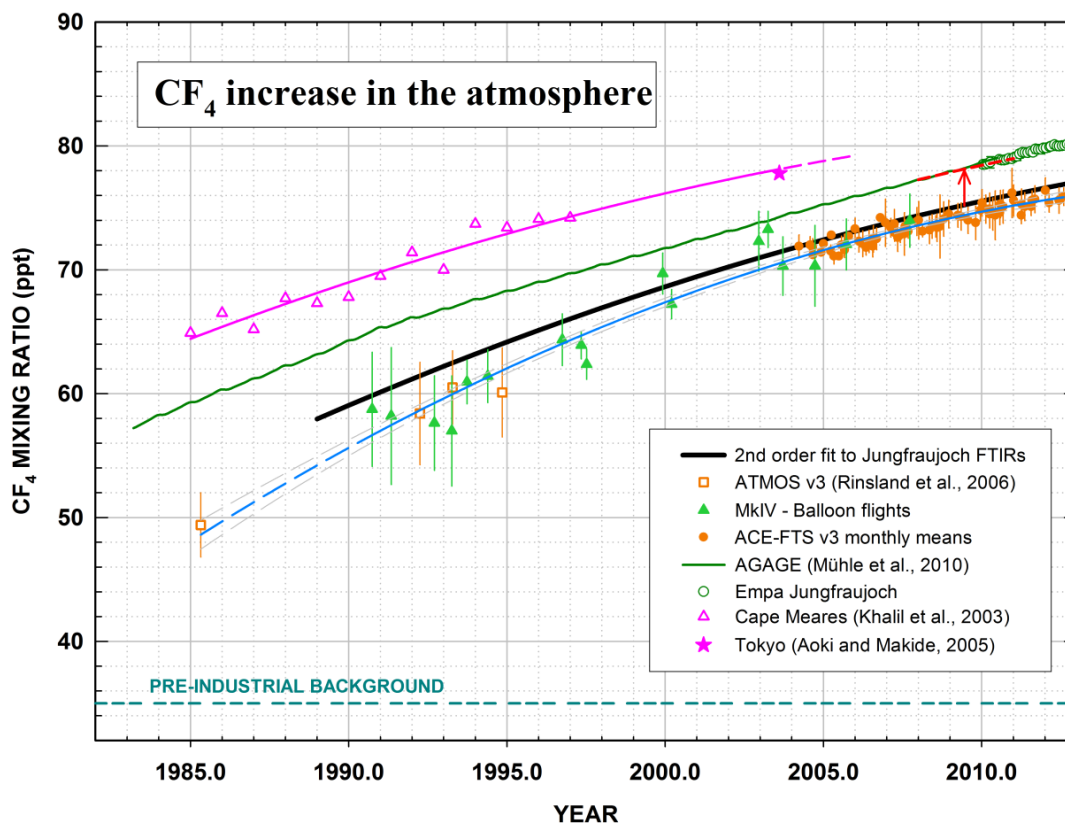


Figure 7. Long-term evolution of the CF_4 atmospheric mixing ratio as inferred from various techniques and locations (see inserted legend for their identification).

Mahieu, E., R. Zander, G.C. Toon, M.K. Vollmer, S. Reimann, J. Mühle, W. Bader, B. Bovy, B. Lejeune, C. Servais, P. Demoulin, G. Roland, P.F. Bernath, C.D. Boone, K.A. Walker, and P. Duchatelet, Spectrometric monitoring of atmospheric carbon tetrafluoride (CF_4) above the Jungfraujoch station since 1989: evidence of continued increase but at a slowing rate, accepted for publication in *Atmos. Meas. Tech.*, 2013a.

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

- Asmi et al., *Atmos. Chem. Phys.*, 2013 present aerosol decadal trends part II.
- Beddows et al., *Atmos. Chem. Phys. Discuss.*, 2013 investigated variations in tropospheric submicron particle size distributions across the European continent.
- Berchet et al., *Atmos. Chem. Phys.*, 2013 worked towards better error statistics for atmospheric inversions of methane surface fluxes.
- Bianchi et al., in *Nucleation and Atmospheric Aerosols*, edited by P.J. DeMott, and C.D. Odowd, 2013 document particle nucleation events at the high alpine station Jungfraujoch.
- Cao et al., *Radiocarbon*, 2013 present radiocarbon measurements on microgram-level samples from firn and ice.
- Collaud Coen et al., *Atmos. Chem. Phys.*, 2013 present aerosol decadal trends part I.
- Deolal et al., *Atmospheric Environment*, 64, 2013 discuss transport of PAN and NO_y from different source regions to the Swiss high alpine site Jungfraujoch.
- Dufлот et al., *Atmos. Meas. Tech.* 2013 discuss measurements of hydrogen cyanide (HCN) and acetylene (C_2H_2).
- Fang et al., *Atmos. Chem. Phys. Discuss.*, 2013 present in-situ measurement of atmospheric CO_2 at the four WMO/GAW stations in China.
- Frohlich et al., *Atmospheric Measurement Techniques*, 2013 introduce a ToF-ACSM: a portable aerosol chemical speciation monitor with TOFMS detection.
- Girard et al., *Geophys. Res. Lett.*, 2013 investigated environmental controls of frost cracking revealed through in-situ acoustic emission measurements in steep bedrock.

- Hall et al., *Atmos. Meas. Tech.*, 2013 present results from the International Halocarbon in Air Comparison Experiment (IHALACE).
- Hammer et al., *Atmos. Chem. Phys. Discuss.*, 2013 investigated the effective peak supersaturation for liquid-phase clouds at the high-alpine site Jungfraujoch.
- Henneberger et al., *Atmos. Meas. Tech.*, 2013 worked on HOLIMO II: a digital holographic instrument for ground-based in situ observations of microphysical properties of mixed-phase clouds.
- Hess et al., *Atmospheric Chemistry and Physics*, 2013 investigated stratospheric impact on tropospheric ozone variability and trends: 1990-2009.
- Levin et al., *Tellus Series B-Chemical and Physical Meteorology*, 2013 present Atmospheric Delta (CO₂)-C-14 trend in Western European background air from 2000 to 2012.
- Pieterse et al., *Geophys. Res.*, 2013, reassessed the variability in atmospheric H₂ using a two-way nested TM5 mode.
- Rose et al., *Atmos. Chem. Phys. Discuss.*, 2013, present size-resolved and integral measurements of cloud condensation nuclei (CCN) at the high-alpine site Jungfraujoch.
- Santachiara et al., *Atmospheric Research*, 2013 worked on atmospheric aerosol scavenging processes and the role of thermo- and diffusio-phoretic forces.
- Sturm et al., *Atmospheric Measurement Techniques*, 2013 tracked isotopic signatures of CO₂ at the high altitude site Jungfraujoch with laser spectroscopy: analytical improvements and representative results.
- Tuzson et al., *Atmospheric Measurement Techniques*, 2013 present selective measurements of NO, NO₂ and NO_y in the free troposphere using quantum cascade laser spectroscopy.
- van der Laan-Luijkx et al., *Atmospheric Measurement Techniques*, 2013 compared atmospheric flask CO₂, delta(O-2/N-2) and delta(CO₂)-C-13 measurements at Jungfraujoch.
- Wacker et al., *Theoretical and Applied Climatology*, 2013 present a method to calculate cloud-free long-wave irradiance at the surface based on radiative transfer modeling and temperature lapse rate estimates.
- Xia et al., *Aerobiologia*, 2013 investigated the total bacterial number concentration in free tropospheric air above the Alps.
- Zieger et al., *Atmospheric Chemistry and Physics*, 2013 investigated effects of relative humidity on aerosol light scattering: results from different European sites.

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 (https://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/*/--/1=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)
EUSAAR	European Supersites for Atmospheric Aerosol Research (http://www.eusaar.net)
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. Further information can be found at www.hfsjg.ch

The Research Station remained attractive in 2013 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 teacher groups as part of a lecture or training school. Examples of the 65 individual and group visitors in 2013 are:

- Tele Bärn / Trix Hammer, 17.01.2013
- Stephan Gruber / Universität Zürich, 21.01.2013
- Joint Swiss-Taiwan-German SNSF Workshop / Universität Bern / WP, 23.01.2013
- Korean TV, 27.01.2013
- Gymnasium Thun Seefeld / Fachschaft Physik, 01.02.2013
- Intervideo Filmproduktion GmbH / Imagefilm Firma Siemens, 13.02.2013
- Paul Scherrer Institut / Roman Fröhlich and students of the ETHZ, 20.02.2013
- KUP/Universität Bern/Glaciology-students/ Prof. Hubertus Fischer, 23.04.2013
- Rotary Club Bern and Essen/ Prof. Christian Schlüchter, 10.05.2013
- International Space Science Institute, 29.05.2013
- Empa, Abteilung Finanzen/Controlling/Einkauf, 04.06.2013
- Universität Bern / Prof. Harald Krug and students, 12.06.2013
- Université de Liège / Prof. Havenith and students, 16.06.2013
- ETH Alumni Engineering + Management, 22.06.2013
- Kantonsschule Seetal / Sylvia Schibli and students, 24.06.2013
- EPFL / Dr. Valentin Simeonov and researchers from Sibiria, 25.06.2013
- Nicolaus-Kistner-Gymnasium, Mosbach, DE, Thomas Vierling and students, 11.07.2013
- Summer School on Glaziology / Students, 16.08.2013
- MyClimate / Eva Schaub, 18.08.2013
- Gesellschaft für Schnee, Eis und Permafrost der SCNAT / M. Schwikowski, 24.08.2013
- Schweizer Alpen-Club SAC / René Furter, 02.09.2013
- ABB Forschungszentrum / Dr. Robin Gremaud, 03.09.2013
- Hokkaido University, Sapporo, Japan / Shin Sugiyama and students, 04.09.2013
- Empa, Laboratory for Advanced Materials Processing, 16.09.2013
- Kantonsschule Hottingen, Zürich / Kathrin Trüb, 26.09.2013
- Meteorologisches Institut, Universität Bonn/Prof. Andreas Bott and students, 03.10.2013
- ETH Zürich, TIK / Samuel Weber, 08.10.2013
- High Alpine Research Center (HARC), Taif University, Saudi Arabia, 09.10.2013
- Royal Grammar School, UK, 21.10.2013
- ETH Zürich, VAW-Glaziologie / Andreas Bauder and students, 13.11.2013
- Lehrerschaft Schule Grindelwald / Urs Graf, 25.11.2013
- Prof. Willy Tinner / Institut für Pflanzenwissenschaften / Universität Bern, 14.12.2013
- Gymnasium Thun-Schadau / M. Stähli, 16.12.2013

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

- Welcome and guided tour of the 21st ESA Symposium on European Rocket and Balloon Programmes and Related Research, Thun; June 14, 2013.
- Meeting and guided tour of the steering committee of the Swiss Physical Society SPG/SPS, June 15, 2013.
- Welcome and guided tour of the directorate of the Bern University of Applied Sciences: Dr. Rudolf Gerber, assigned rector BFH, Dr. Herbert Binggeli, designated rector BFH, with wives; July 23, 2013.
- International Foundation for Science (IFS) and SCNAT, Jürg Pfister, 12.10.2013
- Board of the HFSJG and guests, 26.10.2013
- Welcome and guided tour for a group of the “Naturforschende Gesellschaft in Bern NGB”, November 9, 2013.



Figure 8. Visit of the High Altitude Research Center (HARC) from Taif University, Kingdom of Saudi Arabia, at Gornergrat on October 8, 2013 (on the left); Meeting of the Swiss Physical Society at Jungfraujoch (right) on June 15, 2013.

The large number of requests for visits of the research station at Jungfraujoch was paralleled by an unbroken intense interest by the print media and TV, with more than 30 contributions in 2013. Nevertheless, there was a significant reduction compared to the year 2012.

Facility updating is an essential prerequisite for performing good science; therefore it is a key task of our Foundation. However, in 2013 it was rather quiet because we postponed the major task of the renewal of the protection roof of the Research Station to 2014 due to construction work of the Jungfrau Railway on the restaurant “Gletscher”. However, preparations were ongoing in 2013 in order to have a smooth renewal phase in 2014. The floor on the Sphinx terrace was renewed since the surface coating was gone, which resulted in slippery conditions especially for the persons removing the snow. Furthermore, the pyramid roof on the Sphinx terrace will be replaced by a flat roof to facilitate snow removal and allow instrument placements during campaigns.

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 22, 2013, and was attended by the director of the research stations and Mr. Martin Fischer. Prime topics related to the HFSJG were (i) updating the list of contaminants with the extension in which construction materials they appear (written in German); (ii) the announcement of the director that the protection roof of the research station has been postponed to 2014 (iii) the still existing problem of temperature fluctuation at the Sphinx laboratory on the second level.

The High Altitude Research Station Gornergrat

The year 2013 will be remembered as the year when the “*Stellarium Gornergrat*” telescopes were mounted. The mounting took place over several months from February to June since many adaptations were required at the Gornergrat South observatory. To shortly recall for those who are not familiar with this project: “*Stellarium Gornergrat*” is an astronomical facility at Gornergrat for educational purposes with the goal to provide access to astronomical observation to the public in general and to young people. 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. The first workshop is already in preparation and will take place in March 2014.

As it was always the case, teams and projects at the High Altitude Research Station Gornergrat remained less numerous than at Jungfraujoch as documented by its statistics. In 2013, 3 (2012: 3) teams were active at Gornergrat.

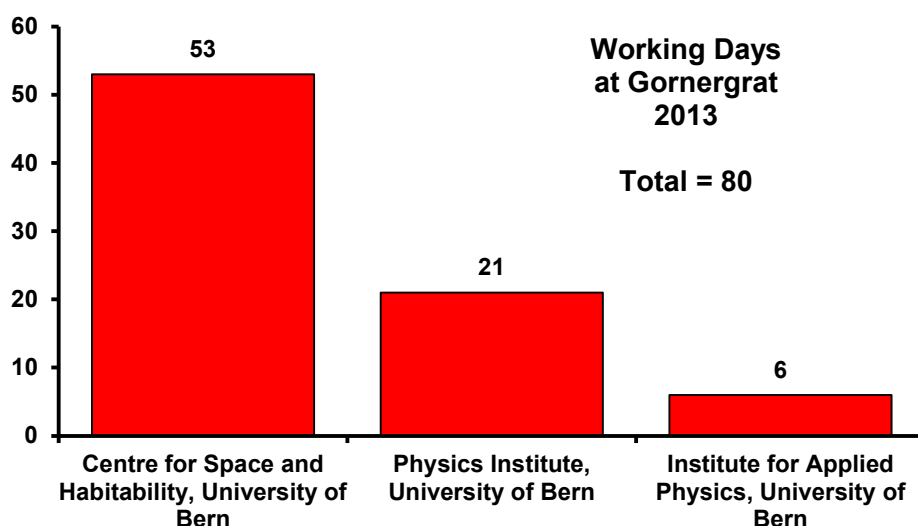


Figure 9. Number of working days at the High Altitude Research Station Gornergrat in 2013 by research groups



Figure 10. Installation of the base for the telescope mount on February 26, 2013 (left) and installation of the telescopes on June 6, 2013 (right) by the crew of the University of Bern at Gornergrat South observatory.

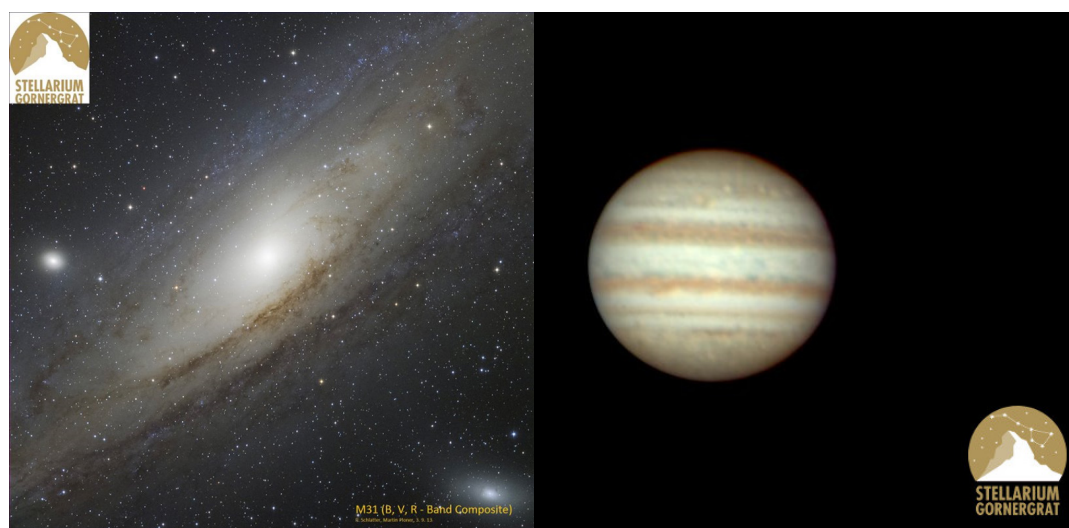


Figure 11. At the beginning of September 2013, astronomers of the University of Bern took the first pictures with the recently installed telescope at Gornergrat. The instrument still needs to be precisely aligned, but the picture of M31, better known as the Andromeda Galaxy, gives a hint on the potential of the telescope (Photo by P. Schlatter & M. Ploner, Copyright by University of Bern) (left). Picture of Jupiter (right).

Summary and Acknowledgements

The year 2013 is a normal – efficient and productive – year, yet it will be remembered as the year when the “Stellarium Gornergrat” telescopes were mounted at the Gornergrat South observatory. It is also the year in which the HFSJG has progressed in evaluating potential extension opportunities.

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 is 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 Jungfraujoch over the course of 2013 – during the largest CLACE campaign ever – 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 delegates from the High Altitude Research Center (HARC) from Taif city were impressed by the excellent accessibility of both our research locations. I would like to give these flowers to those who they belong to, namely, the Jungfrau Railways and the Gornergrat Bahn. 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 his representative in the HFSJG Board, Mr. René Bayard) and the Gornergrat Railway for the good collaboration. Both research stations benefit year by year from their goodwill and their substantial support.

A sincere thank you goes to the staff members of the Jungfrau Railways who are experienced in handling busy times as the success of the Jungfrau Region, being a prime touristic destination, remained unbroken. In these times, a continuous exchange of information is required in order 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.

Stellarium Gornergrat progressed well during the reporting period this is also due to the continuous support of the Burgergemeinde Zermatt. I would like to thank Mr. Andreas Biner, president and Mr. Fernando Clemenz for their involvement and hope that they will find some time to marvel at the pictures taken by the telescope which tell us stories from very, very far away. A cordial 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 HFJSG staff and researchers. Without their goodwill and support it would not be possible to operate an astrophysical observatory at such a splendid site.

Research sites are attractive and lively when scientists can do what they do best, namely being curious, inquisitive, and maybe sometimes even nosy. Only the active use of the HFSJG infrastructures by many research partnerships, organizations and institutions will lead to higher visibility and recognition. Therefore, I sincerely thank all scientists for their interest and innovative power in suggesting and conducting research at both stations with greatest care and dedication. Remote monitoring has its advantages but cannot account for companionship that can be experienced during campaigns or long-term experiments.

Remote activities are progressing rapidly not only at Jungfrauoch but also at Gornergrat. This requires high-band width internet connections. In this respect I would like to thank SWITCH for the excellent and fast internet connection with hardly any interruption, as well as Christian Heim and Fritz Bütikofer with their teams 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 or during power failures.

I sincerely thank the administrative staff at Bern. They did a marvellous job again. Claudine Frieden (secretary) and Dr. Rolf Bütikofer (IT responsible person) have besides their work to also deal with the requests I approach them with. Mr. Karl Martin Wyss for his competent services as our treasurer, Mrs. Theres Trachsel for the bookkeeping, and the CORE Treuhand Cotting AG, Bern (Mr. Harro Lüdi) for the professional auditing, deserve my sincere credit.

I am particularly grateful to the University of Bern, its Rector Prof. Dr. Martin Täuber, the Administrative Director, Dr. Daniel Odermatt, and the director of the Physikalisches Institut, Prof. Willy Benz, for being a member of our organization, for its hospitality and support of our administration. Finally, I would like to thank Prof. Erwin Flückiger and Prof. Hans Balsiger for their continuous and enthusiastic involvement in the “Stellarium Gornergrat” project.

As you may have heard, Prof. Dr. Martin Huber, president of the Jungfrauoch Commission, stepped back from his duties as president at the end of 2013. Prof. Dr. Heinz Gäggeler has started his work as per January 1, 2014 – welcome. I would like to thank Martin Huber for his enthusiastic engagement and his intense involvement in writing a concise White Paper.

I conclude with the hope that all of you have had a rememberable year either with stays at Jungfrauoch or Gornergrat, or if you missed it during the reporting period, you are welcome to do so in the current year 2014 – maybe even at the Jungfrau East Ridge! On behalf of the HFSJG, I warmly welcome you.



Bern, February 7, 2014

Markus Leuenberger