



GAW/GCOS Switzerland National Coordination Meeting Minutes

Date, Time: Thursday 1st February 2024, 10:00-16:45

Location: Eidgenössisches Personalamt EPA, Bern and virtual

Participants: Martin Ackermann (EAWAG), Silke Adler (Geosphere), Sara Basart (WMO-GAW), Cécilia Barouillet (University of Geneva), Alistair Bell (University of Bern), Antonio Bombelli (WMO / GCOS), Stefan Brönnimann (UNIBE), Simone Brunamonti (Empa), Dominik Brunner (Empa), Nina Buchmann (ETH), Tobias Bühlmann (METAS), Nicolas Bukowiecki (Universität Basel), Bertrand Calpini (MeteoSwiss), Greg Carmichael (University of Iowa), Martine Collaud Coen (MeteoSwiss), Mischa Croci-Maspoli (MeteoSwiss), Ruzica Dadic (WSL- SLF), Sonia Dupuis (University of Bern), Lukas Emmenegger (Empa), Christian Felix (MeteoSwiss), Vivien Yannis Athanassios Sainte Fare Garnot (UNIZH), Nina Genné (MeteoSwiss), Julian Gröbner (PMOD/WRC), Martin Gysel-Beer (PSI), Alexander Haefele (MeteoSwiss), Louise Harra (PMOD/WRC), Martin Hoelzle (University of Fribourg), Matthias Huss (ETH Zürich / WSL), Stelios Kazadzis (PMOD/WRC), Jörg Klausen (MeteoSwiss), Thomas Konzelmann (MeteoSwiss), Filippo Lechthaler (SCNAT), Jelle Lever (WSL), Markus Leuenberger (UNIBE /HFSJG), Emmanuel Mahieu (University of Liège), Christoph Marty (SLF), Andrea Mini (SUPSI, Institute of Earth Science), Robin Modini (PSI), Axel Murk (UNIBE), Jeannette Nötzli (WSL/SLF), Daniel Odermatt (EAWAG), Samuel Nussbaumer (WGMS), Cécile Pellet (University of Fribourg), Yann Poltera (ETH Zurich), Christian Rohr (University of Bern), Mario Rohrer (Meteodat GmbH), Stefan Rösner (Deutscher Wetterdienst), Andrea Rossa (MeteoSwiss), Yves-Alain Roulet (MeteoSwiss), Nadine Salzmann (WSL-SLF), Christoph Schär (ETH Zürich), Michael Schibig (BAFU), Petra Schmocker-Fackel (BAFU), Jan Seibert (University of Zurich), Pascale Smith (ETH Zurich), Lynsay Spafford (WSL), Stavros Stagakis (University of Basel), Michelle Stalder (MeteoSwiss), Martin Steinbacher (Empa), Thomas Stocker (University of Bern), Markus Stoffel (University of Geneva), André Streilein (swisstopo), James Thornton (Mountain Research Initiative), Isabelle Werner (MeteoSwiss), Daniel Vonder Mühl (ETH Zurich / PERMOS), Laurent Vuilleumier (MeteoSwiss), Felix Weibel (BFS), Ernest Weingartner (FHNW), Frank G. Wienhold (ETH Zurich), Martin Wild (ETH Zurich) and Christoph Zellweger (EMPA)

1 Welcome address: Bertrand Calpini, Deputy Director MeteoSwiss and Thomas Stocker GAW/GCOS Switzerland Scientific Steering Committee Chair

The meeting was opened by B. Calpini and T. Stocker.

2 Secretariat news

a) GCOS – Antonio Bombelli, WMO

- The new Chair of the GCOS Steering Committee (Thelma Krug) and the new Director of the GCOS Secretariat (Nir Stav) were nominated in October 2023.
- The main activities carried out in 2023 were:



- Addressing the GCOS Implementation Plan actions, collaborating with WGClimate (CEOS & CGMS) for satellite relevant actions.
- ECVs Rationalisation: to refine ECVs list, definitions and products, as well as the process to include new variables.
- ECV Requirement: to update WMO OSCAR database with the GCOS ECV 2022 requirements.
- Climate Indicators: to better define global climate indicators and propose new possible ones.
- Global Climate Data Centres: to define governance and requirements for open access data repositories, supporting their maintenance.
- Earth Cycles and Climate: workshop held to assess the current state of knowledge and propose a way forward.
- Air-Sea and Land-Air Fluxes / tiered networks: to develop a tiered network approach for monitoring flux-relevant ECVs, supporting the WMO proposal of the development of tiered networks.
- Adaptation: the final report of the GCOS Adaptation Task Team (GATT) was presented.
- GCOS Networks: GCOS Secretariat continued providing support to GRUAN (GCOS Reference Upper Air Network), GCOS Surface Reference Network (GSRN), GSN (GCOS Surface Network), GUAN (GCOS Upper-Air Network) and other networks.
- GCOS continued contributing to UNFCCC and SBSTA:
 - GCOS Statement presented at SBSTA-59 Plenary
 - GCOS actively involved in the organisation of the Earth Information Day
- Switzerland support to GCOS is very important and concerns:
 - Inventory of long-term climatological time series including 34 ECVs
 - Long-term atmospheric monitoring (temperature, precipitation, ozone, etc.)
 - Active participation in GRUAN, the GCOS Reference Upper-Air Network
 - GRUAN-ICM-15 meeting to be hosted by MeteoSwiss, Bern (March 2024)
 - Swiss station (Payerne) for the GSRN pilot (GCOS Surface Reference Network)
 - Leadership in cryosphere monitoring (Glaciers, Permafrost, Snow, etc.) and the related Global Terrestrial Networks, e.g. GTN-G, GTN-P
 - GCOS Switzerland Strategy 2017-2026 and related research projects.
- Further collaboration is envisaged, through direct contribution to the implementation of the 2022 GCOS Implementation Plan, GCOS Support to Swiss climate data centre (i.e. WGMS) and by exploring in kind support to GCOS Secretariat.

b) GAW – Sara Basart, WMO

- Recent appointments:
 - Prof. Celeste Saulo (Argentina), WMO Secretary-General, and Dr Al Mandous (UAE) were elected during the last WMO Congress (Cg-19)
 - Gregory Carmichael was re-elected as EPAC SSC Chair up to 2027.
 - Paolo Laj will start his appointment as Head of the GAW programme in May 2024.
- A new public WMO website was launched in mid-November 2023 (www.wmo.int)
- Overview of the WMO strategic priorities (including EW4ALL and the GGGW)
- Overview of the GAW programme and associated activities.
 - The current research infrastructure includes monitoring and modelling (i.e. forecasting intercomparisons) contributions from the GAW partners
 - The Science and Implementation Plan 2024-2027 was approved in the last WMO Congress (Cg-19). This new SIP includes a scientific goals connected to:
 - create a new organised strategy for capacity building within the GAW expert groups to promote the use of atmospheric composition;
 - promote science for services (to enhance and facilitate the downstream of research activities to be deployed as user-oriented services).
 - Dissemination activities include the yearly WMO bulletins and the GAW Newsletter.



c) GAW-CH/GCOS CH – Michelle Stalder, MeteoSwiss

M. Stalder presented general news from the Swiss GAW/GCOS office including information on the open call for proposal addressing the applicability of Swiss GCOS data and products. The call is open until 29 February and the decision on the award of contract will be taken in early April (all details can be found on [the GAW-CH/GCOS-CH website](#)). She also informed about the ongoing update of the GCOS-CH inventory report “National Climate Observing System”. This update includes the update of 40 different chapters, out of which two chapters are new (one new ECV, one new international center). More than 100 authors are involved and the publication is planned for the second quarter 2024.

Lastly, M. Stalder mentioned the various outreach channels (including [the new joint website](#), GAW-CH/GCOS-CH newsletter, ProClim Flash, MeteoSwiss Blog).

3 Joint GAW/GCOS projects. Status and update

a) SwissPhenocam: country-scale automated phenology tracking from imagery – Lynsay Spafford, WSL & Vivien Sainte Fare Garnot, University of Zurich

- Completion of a machine learning ready dataset for automated phenology tracking
- Dataset contains 1800 tree-years annotated, with ~14000 phenological observations
- Process-based modeling of phenology in Switzerland provides insight into driving mechanisms
- Implemented greenness-based phenology metrics, to be compared with human observations
- Start of development of machine learning-based phenology extraction
- Will integrate webcam-derived phenology observations in process models for refined predictions

b) Feedbacks between vegetation, carbon, energy, and water cycles in the urban environment (UrbaNature) – Stavros Stagakis, University of Basel & Nina Buchmann, ETH Zurich & Dominik Brunner, Empa

- In-situ observations so far include a new street-level meteorological station in Basel, park tree sap flow sensors in Zurich, soil respiration and leaf area index measurement campaigns in Zurich and a stable isotope analysis campaign in Zurich to identify tree water uptake depths. Outcomes so far indicate a significant variation in soil respiration and sap flow across park locations and trends are detected connecting tree stem diameter to water uptake depth.
- The remote sensing activities include so far, a detailed survey of the available datasets and products for both cities, as well as the application of methods to downscale Landsat 8 land surface temperature and to estimate leaf area index in very high resolution using airborne LiDAR data in cities.
- The shortwave radiation module of the high-resolution 3D ecophysiology model has been developed and tested in an urban canyon with in-situ roof-level and street-level radiation observations, revealing very good accuracy in the simulation of street-level diffuse radiation and medium accuracy for the direct radiation due to model resolution restrictions.
- First urban simulations using ICON TERRA_URB with ART and VPRM extensions have been implemented over Basel and Zurich. Comparisons of simulated air temperature at 2 m and wind speed at 10 m height with urban station observations in Zurich reveal that there is better agreement with the observations when TERRA_URB is activated but the comparisons are challenging due to the local influence of buildings, especially for the wind speed.
- A workshop was organised by UrbaNature with 30 participants from academia, the city of Zurich and the private sector on the topic: Urban biosphere-atmosphere interactions in a changing climate. The main outcomes are to repeat the event annually, closer collaborations between the participants and the organisation of a new session at the Swiss Geoscience Meeting in Basel next November.

c) The Swiss H2O Hub: High-quality water vapor measurements from ground to space– Simone Brunamonti, Empa

- Swiss H2O-Hub Balloon campaign 2023 successfully conducted in Payerne (15 Aug – 6 Sept)



Swiss Confederation

- Total 7 balloon flights (6 with PCFH, 1 with ALBATROSS)
- 4 flights with CFH alternative low-GWP coolant (ethanol/dry ice mixture)
- Simultaneous retrievals by RALMO and MIAWARA
- 100 % payload recovery rate
- ALBATROSS: good agreement with reference instruments in troposphere (until 250 mbar), contamination in the stratosphere (source under investigation), to be addressed by mechanical engineering
- PCFH: good performance with PID control scheme (especially flight 007), wet bias removed, cooling capability and controller tuning to be improved
- MIAWARA: operational during campaign period, next generation MIAWARA-C2 under development, Hunga-Tonga H₂O transport analysis in progress
- Planning for balloon campaign 2024 ongoing

d) Tapping the potential of one decade of annual repeat altimetry to study glacial and periglacial processes (TapRep): Matthias Huss, ETH Zurich

- Annual orthophotos and digital elevation models (2012-2023) at very high resolution of glaciers and proglacial areas allow an analysis of spatio-temporal changes in these environments at unprecedented detail.
- Built-up of a comprehensive and operational processing chain to infer geodetic glacier mass balance for arbitrary periods from the data set, including extrapolation to all Swiss glaciers.
- Detailed analysis of glacier collapse features based on annual ice surface elevation changes and quantification of subglacial melt volumes.
- Assessment of sediment dynamics in proglacial areas indicate that erosion and deposition occur at the same time, but catchments are at different stages of stabilisation after glacier retreat.
- Lake sediment cores were acquired to close the sediment budget of Alpine catchments, showing sedimentation rates of 1-3 cm per year.

4 Programme achievements through the years: Bertrand Calpini's professional expedition

Since this was the last event with B. Calpini, Deputy Director of MeteoSwiss, the afternoon session was dedicated to a wide range of presentations by various GAW-CH/GCOS-CH members in his honour.

- a) GAW/GCOS as a catalyst for cooperation between weather services and university research – Christoph Schär, ETH Zurich
- b) Bertrand Calpini at Jungfrauoch – from a great scientist and to an excellent science manager – Markus Leuenberger, University of Bern
- c) The PMOD/WRC: from Davos to the Sun – Louise Harra, PMOD/WRC
- d) As infrared photons travel through the atmosphere – Lukas Emmenegger, Empa (*this contribution unfortunately had to be cancelled due to sickness*)
- e) GAW GCOS Kenya: 30 years of success, challenges and opportunities – Christian Félix & Jörg Klausen, MeteoSwiss
- f) Bertrand Calpini's Heritage in Science and Technology – Alexander Haeferle, MeteoSwiss
- g) Bertrand Calpini's farewell and vision for the programmes – Bertrand Calpini, MeteoSwiss

5 Closing of the meeting

The meeting was closed by M. Stalder and A. Rossa.