Évaluation de la recherche

EVALUATION REPORT ON THE OBSERVATORY FOR THE SCIENCES OF THE UNIVERSE

UAR IPGP - Institut de physique du globe de Paris

UNDER THE SUPERVISION OF THE FOLLOWING ESTABLISHMENTS AND ORGANISMS:

Institut de Physique du Globe de Paris - IPGP,
CNRS - Centre national de la recherche scientifique,

UP Cité - Université Paris Cité

EVALUATION CAMPAIGN 2023-2024
GROUP D

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High Council for evaluation of research and hignter education

In the name of the expert committee :

Christian Sue, Chairman of the committee

For the Hcéres :

Stéphane Le Bouler, acting president

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To make the document easier to read, the names used in this report to designate functions, professions or responsibilities (expert, researcher, teacher-researcher, professor, lecturer, engineer, technician, director, doctoral student, etc.) are used in a generic sense and have a neutral value.

This report is the result of the unit's evaluation by the expert committee, the composition of which is specified below. The appreciations it contains are the expression of the independent and collegial deliberation of this committee. The numbers in this report are the certified exact data extracted from the deposited files by the supervising body on behalf of the unit.

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CHARACTERISATION OF THE OBSERVATORY FOR THE SCIENCES OF THE UNIVERSE

- Name of the observatory for the sciences of the universe: UAR IPGP - Institut de physique du globe de Paris
- Acronym of the observatory for the sciences of the universe: UAR IPGP
- Label and number: UAR 3454
- Composition of the executive team: Director of the UAR 3454: Mr. Marc Chaussidon; Administrative manager: Mr. Antoine Charlot; Deputy director of the UAR 3454: Ms. Anne le Friant

INTRODUCTION

HISTORY OF THE OBSERVATORY FOR THE SCIENCES OF THE UNIVERSE AND GEOGRAPHICAL LOCATION OF STAFF

The Institut de physique du globe de Paris (IPGP) was created in the Université de Paris by the decree of July 28, 1921, with the missions to develop magnetic observations, to create a teaching of the physics of the globe and to develop scientific research. The current magnetic observatory in Chambon la Forêt has been integrated in the IPGP in 1936. The responsibility of the observatory of Montagne Pelée (Martinique) was entrusted to the IPGP in 1946, that of the observatory of the Soufrière of Guadeloupe in 1950, and that of the observatory of the Piton de la Fournaise (La Réunion) in 1979. The IPGP became a 'Grand établissement de recherche et d'enseignement supérieur' by the decree of March 21, 1990, and was integrated as a 'grand établissement' in the new University of Paris Cité (UPCité) by the decree of March 20, 2019. The three decrees (1921, 1990 and 2019) define the three missions entrusted to the IPGP, research, observation, and teaching. The Geoscope network was created in 1982, Obsera (Observatoire de l'eau et de l'érosion aux Antilles) in 2005, the data centre in 2011, the Insight observatory in 2016 (Seismic observatory on Mars).
Today, the UAR is hosted on 6 different sites. The Cuvier campus (1 rue Jussieu, 75005 Paris) hosts the IPGP central services, Geoscope, the data centre, part of the volcanological and seismological observatories (OVS), part of the magnetic observatory, part of the Insight observatory and part of Obsera. The other part of Insight is located in the Paris Rive Gauche (PRG) campus (Lamark building, 35 rue Hélène Brion, 75013 Paris) belonging to UPCité. The national magnetic observatory is located in the campus of Chambon-la-Forêt (Loiret). The national volcanological and seismological observatories are located overseas: OVPF in Réunion (also hosting the Revosima, réseau de surveillance volcanologique et sismologique de Mayotte), OVSG in Guadeloupe (also hosting Obsera the observatory of water and erosion in the Antilles), and OVSM in Martinique.

RESEARCH ENVIRONMENT AND POSITION OF THE OBSERVATORY FOR THE SCIENCES OF THE UNIVERSE IN THE SCIENTIFIC ENVIRONMENT OF THE SUPERVISORY BODIES

The UAR groups today the national magnetic observatory of Chambon la Forêt and the stations of the magnetic network, the stations of the world seismological network Geoscope, the volcanological and seismological observatories (OVS) of the 3 French active volcanoes (in Reunion, Martinique and Guadeloupe), the water and erosion observatory in the Antilles, the Insight seismic observatory on planet Mars, and the IPGP data centre.
In addition, the IPGP also hosts three national infrastructure. These include the volcanological and seismological monitoring network of Mayotte (in partnership with the BRGM), the coordination and dissemination centre of the national ForM@Ter cluster (which aims to facilitate access to space data in the solid Earth domain and to contribute to the creation of products and services based on them), as well as the coordination of the Ozcar research infrastructure (which includes 60 instrumented sites for critical zone observation).
The UAR IPGP plays a key role in the national Revosima structure, responsible for monitoring volcanic and seismic activity in Mayotte, and in the related Marmor PIA project.
The IPGP is also one of the actors of the European research infrastructure EMSO (European Multidisciplinary Seafloor and water-column Observatory).
The IPGP observatory is the only one within the framework of UPCité and does not develop a relationship with other observatories in the Paris region. However, the IPGP observatory is at the cutting edge of its domains of observation.
The overall budget of the UAR IPGP is c.a. 2-3 M€/year.

HCÉRES NOMENCLATURE AND THEMES OF THE OBSERVATORY FOR THE SCIENCES OF THE UNIVERSE

ST Science and Technology
ST3 - Earth and Universe Sciences

•*Volcanological and seismological observatories*
IPGP's Volcanological and Seismological Observatories (OVS) oversee active French volcanoes and the Lesser Antilles subduction zone, including La Soufrière in Guadeloupe, Montagne Pelée in Martinique, and Piton de la Fournaise in La Réunion, plus the Revosima observatory in Mayotte. Comprising the OVS Paris coordination group and three overseas observatories, they focus on volcano monitoring, research, and communication. The OVS, part of the INSU's 'Service national d'observation en volcanologie' (SNOV), collaborates with French institutions such as OPGC, ISTerre, and ISTO. Their main mission involves long-term data collection for geophysical, geological, and geochemical analysis, to help civil protection authorities in risk management. Strongly linked to IPGP's research teams, they provide essential multi-parameter time-series data on volcanic and seismic activity, contributing to IPGP's research themes: Natural Hazards, Earth System Science, and Earth and Planetary Interiors.
• *Magnetic Observatories*
The magnetic observatory service aims to provide high-quality and consistent ground-based geomagnetic observations to the scientific community, industry, and citizens worldwide. It collaborates with the EOST (Strasbourg) to form the 'Bureau Central de Magnétisme Terrestre (BCMT),' recognised as a CNRS-INSU Service National d'Observation (SNO) in 2008. Operating a network of eleven magnetic observatories across six continents, including the National Magnetic Observatory in Chambon-la-Forêt, the service ensures comprehensive coverage, especially in areas with sparse ground-based observations such as Western Africa. Five observatories are part of the global network Intermagnet (International Real-time Magnetic Observatory Network). Variometers and repeat station networks operate in metropolitan France. The service develops specialised magnetometers at Chambon-la-Forêt, leveraging unique testing and calibration facilities. It distributes various data products, including real-time, preliminary, quasi-definitive, and definitive observatory data, as well as variation and repeat station data, updated declination maps, and geomagnetic indices, through the BCMT portal, Intermagnet webpage, and World Data Centers. These data support scientific research, industrial orientation referencing, space weather monitoring, and global geomagnetic field modelling for navigation and positioning.
• *Geoscope Observatory*
The Geoscope observatory is a global seismological network created in 1982 to meet the challenge of instrumenting isolated sites all around the world. It currently runs 33 seismic stations, all equipped to provide real-time data. Geoscope stations are generally installed inside vaults or natural caves, in order to optimise the quality of the seismic signal, and are equipped with highly sensitive broadband sensors. Geoscope's missions are to publicly provide validated, high quality broadband seismic data to the French and international seismological communities. The Geoscope observatory is primarily dedicated to research and its data are used for studies of the Earth structure and dynamics, seismic sources, time-dependent seismology and environmental seismology. Geoscope also provides real-time data to earthquake detection and tsunami warning centres worldwide. Geoscope is an observatory jointly managed by IPGP in Paris and EOST in Strasbourg. 23 stations are directly maintained by IPGP and the data from all stations are distributed by the IPGP data centre. Data are also available through the Resif (Réseau sismologique et géodésique français) and IRIS (**Global Seismograph Network**) data centres. The Geoscope observatory provides raw data to the community using all standard interfaces, and offers data-derived products, such as the rapid estimation of earthquake source parameters.
• Obsera*: Observatory of water and erosion in the Antilles*
The Observatory of Water and Erosion in the Antilles is a National Observation Service (SNO) of the CNRS-INSU, and one of the components of the Ozcar Research Infrastructure (Critical Zone Observatories: Research and Application). Obsera involves teams from the IPGP, LGL (Lyon) and Geo-Ocean (Brest) laboratories. Obsera has the following objectives: (1) to monitor physical and chemical erosion and investigate how it influences biogeochemical cycles, in the specific context of a tropical volcanic island; (2) to understand how extreme events (flash floods, tropical storms, earthquakes…) influence biogeochemical cycles, denudation rates and landscape morphology; (3) to document the response of tropical watersheds to the ongoing climate change; (4) to promote the development of new tools and methods to survey the evolution of the critical zone. Obsera monitors the evolution of environmental variables (rainfall, river discharge, dissolved and solid transport in rivers, soil chemical composition, river and rainfall…) in four catchments of Basse-Terre Island, Guadeloupe archipelago (Lesser Antilles). Obsera also documents changes in sediment granulometry and the morphology of several rivers, based on aerial images acquired with a drone. Its data are made freely available to the scientific community through the webobsera platform: http://webobsera.ipgp.fr/.
• *IPGP data center*
The IPGP Data Center (IPGP-DC) is a crucial observational component of IPGP, tasked with managing and disseminating scientific data from IPGP observatories and research endeavours to support earth-science research worldwide. Created in January 2011, it has evolved from the Geoscope data centre to encompass a broader range of observatories and data types. In 2022, IPGP-DC expanded further with the launch of the IPGP Research Collection, an open repository hosting various research and observatory data products. Currently, IPGP-DC manages seismological, volcanological, and geodesy data from multiple observatories including OVSG, OVSM, OVPF, Mayotte's Revosima, Geoscope, and Insight. It facilitates access to this data through standard web services and interfaces while collaborating with national and international infrastructure for wider visibility. Additionally, IPGP-DC has created and manages the IPGP 'Research Collection', which hosts data products from the IPGP observatories, research projects and research articles. This institutional repository will be interconnected in the near future with the national (Recherche Data Gouv) and disciplinary (Data Terra) data repositories.

• *Insight observatory*
The Insight Service National d'Observation, recognised as CNAP AA Observatory since 2016 as ANO-2 (space instrumentation), has been in charge of delivering the SEIS instrument to the NASA's Insight mission and of its operation on Mars until the end of 2022. It is also in charge of the data delivery and archiving to the science community. Insight SNO will be maintained until the end of 2024 and the team will transition to the Farside Seismic Suite SNO, which recognition is proposed starting January 2024. The future FSS SNO is in charge of the delivery to NASA Farside mission of the Lunar French VBB and will be responsible for its operation until the end of 2026. This will also include the operation of the FSS Lunar Quake Service. With both Insight and Farside SNOs, IPGP is therefore extending its Observatory responsibility to two terrestrial bodies of the solar system, Mars and the Moon.

WORKFORCE OF THE IPGP OBSERVATORY

The UAR comprises the IPGP's central services on the one hand, and all the observatories based on the five different campus (Cuvier, Chambon-la-Forêt, OVPF, OVSM, OVSG) on the other. The IPGP's central services administer the IPGP, the seventeen research teams of the UMR, all the observatories and the department of training and doctoral studies (DFED) for teaching activities. All central services are under the hierarchical authority of the Director General of Services.
By definition of the UAR, only BIATSS and ITA are formerly members of the UAR, the 30 CNAP scientists carrying out their observation duties in the UAR, being staff of the IPGP (Grand Etablissement de Recherche et d'Enseignement Supérieur) and affiliated to the UMR 7154. A total of 88 members are affiliated to the UAR with 66 permanent staff (40 IPGP including 5 IR, 22 CNRS including 8 IR, 4 UPCité), and 22 non-permanent (20 CDD including 16 IPGP, 3 Cnes, 1 UPCité; 2CDI IPGP). These 88 members of the UAR distribute nearly equally between the IPGP's central services (42 staff including 34 IPGP, 5 UPCité and 3 CNRS) and the observatories, platforms and ForM@Ter (46 staff including 24 IPGP and 22 CNRS). These 46 staff are shared between the volcanological observatories (29.5), the magnetic observatories (6), Geoscope (3), the data centre (3), ForM@Ter (2), Obsera (1.5), and the Scapad computing centre (1). Note that the staff in the Insight observatory is affiliated to the team Planetary and space sciences and not to the UAR. It is worth noting that the feeling of belonging to the Unit felt by the UAR personnel is quite good, and actually even better than the one of the UMR.

GLOBAL ASSESSMENT ON THE OBSERVATORY FOR THE SCIENCES OF THE UNIVERSE

The three SNO Geoscope, Volcano and Magnetisme are IPGP's historic observatories, producing data that meet the highest quality standards and are made available to the scientific community. They are maintained and developed by high-performance teams and are supported by IPGP research. IPGP's excellent scientific framework has enabled the emergence of SNO Obsera, which is part of the Ozcar infrastructure, and whose data acquisition is now a long-term project. SNO Insight is in charge of an emblematic and unique project for instrumental development in extraterrestrial seismology within the framework of international projects. The Data Center plays a major role in the UAR IPGP, enabling the dissemination and scientific exploitation of seismological, geodetic and volcanological data. Its procedures comply with FAIR standards. The committee underlines the overall excellence of the activities of the observatories included in the UAR IPGP, which fully meet the role of INSU observatory in terms of data production, management, and dissemination. The OVS provides a remarkable multidisciplinary and comprehensive approach to the study of volcanoes, from several aspects concerning their understanding, to more delicate and operational aspects, devoted at maintaining monitoring networks, at interpreting the monitoring data to forecast eruptions and, eventually collaborating with authorities in issuing warnings or alerts and managing crises.

EVALUATION OF THE OBSERVATORY FOR THE SCIENCES OF THE UNIVERSE

CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

The UAR (formerly UMS) has not been evaluated as a specific unit in the last evaluation period but was mixed with the 'Grand établissement' evaluation. Hence, this paragraph is not really relevant.
However, one recommendation was '*Le comité recommande à la direction une vigilance pour éviter que la diminution des moyens humains consacrés à la diffusion des données d'observation ne pénalise la qualité des services rendus par l'IPGP*'. This point is still crucial in the present-day scheme of the IPGP (UAR), although the Unit has developed noticeable efforts to strengthen the data availability and the related human resources.

ASSESSMENT OF SCIENTIFIC ACTIVITY RESULTING FROM FEDERATIVE SYNERGY

As the UAR IPGP is viewed as an observatory and administrative unit leaned to the UMR IPGP, not as a federative unit *sensus stricto*, this assessment is not relevant. The role of the IPGP as observatory is to produce and disseminate scientific dataset fitting the national and international standards.
However, the committee underlines the outstanding scientific quality of the UMR IPGP, which is intricately linked with the UAR IPGP, and whose scientific production is largely based on the observations managed by the UAR.

THE REALITY AND QUALITY OF SCIENTIFIC LEADERSHIP

The scientific leadership of the IPGP ecosystem is clearly held by the UMR. The UAR (Unité d'Appui à la Recherche) role is to support the UMR beside the national responsibilities of the SNO.
Hence, this paragraph is also not relevant for the IPGP UAR.

REPORT ON THE ACTIVITIES OF ACCREDITED OBSERVATION SERVICES

•*Volcanological and seismological observatories*
The Volcanological and Seismological Observatories (OVS) oversee a wide range of activities (including monitoring, research, communication, dissemination, teaching) focusing on the three French active volcanoes of Reunion, Martinique and Guadeloupe. These scientific and operational duties are addressed by OVS through diversified, appropriate, and comprehensive efforts, fully exploiting the potential of its staff and providing excellence and reference at the international level. Therefore, the various activities of the OVS are considered as definitely adequate and effective, and certainly adding relevant prestige to IPGP.
Given the delicate mission of observing/monitoring active volcanoes in inhabited areas, the current distribution of resources at the three observatories, mainly in terms of permanent staff, appears quite unbalanced; in particular, this distribution leaves minimal support to the newly built observatory in Martinique.

• *Magnetic Observatories*
The Magnetic Observatories are highly regarded internationally for their high substantial quality contribution to the international network of ground magnetic observations, used for scientific research, to support exploration and extraction of mineral and hydrocarbon resources, provision of space weather services, and for navigation. As well as the 'flagship' observatory at Chambon la Forêt (CLF), with its long, high-quality time series (unfortunately now impacted by electrical noise from the Paris-Orléans railway line), new observatories have been established in strategic locations, including close to the magnetic equator where unique phenomena occur, and at Réunion where the magnetic field is forecast to change exceptionally rapidly. Six of the eleven magnetic observatories operate to Intermagnet standards. The Magnetic Observatories had an ambitious strategic plan for 2019-23 that was unfortunately seriously derailed by the Covid-19 pandemic, as it included significant amounts of overseas travel and training associated with the new observatories; however, most of the plan is achievable with a delay, and it is expected that some of the remaining observatories will reach Intermagnet standards in the coming years. The observatories use in-house instrumentation, which is being continually developed; this is an important activity anyway, but also means that the observatories are not dependent on instrumentation which is widely used in observatories operated by other nations. The magnetically clean testing facilities at CLF are used for this and other applications (e.g. testing spaceborne instruments). In an innovative move, the network of repeat stations in metropolitan France is being upgraded from biennial manual observations to being equipped with continuously operating, observatory quality, instrumentation, though without the regular manual calibration measurements that would provide absolute measurements. These data will likely be used in space weather applications. The observatories depend on a dedicated workforce of scientists and technicians, as well as administrative support; the size of this team is just sufficient to support the required activities. The scientists are well aligned with research activity at IPGP: for example, a paper co-authored by one of them was chosen for the portfolio of the Geomagnetism team of IPGP in the UMR evaluation.

• *Geoscope Observatory*
Geoscope is one of the members of the FDSN (Federation of Digital Seismograph Networks) and work in close collaboration with the other members. These broadband networks were originally set up to improve imaging of the deep Earth and study the source of major earthquakes. With its 33 very broadband stations and global coverage, Geoscope has been successfully carrying out this task since 1982, producing data for the scientific community. The data are available with standard protocols of dissemination at the IPGP, Resif-EPOS and IRIS-DMC (IRIS Data Management Center) data centres.
They are widely used by the international community. The Geoscope team pays great attention to data quality analysis and the study of seismic noise.
Geoscope publishes near-real time information on the source characteristics of earthquakes with a magnitude larger than 5.5-6.
Geoscope has been successful in providing high quality broadband seismic data for more than 40 years and more recently in real time allowing for earthquake detection and tsunami warning. It would not be possible without the well-developed collaborations with French and international partners. A recent example is the installation of new stations in Africa.
The network is facing up to the ageing of the excellent instruments originally installed. These sensors remain at the highest level, but new equivalent types are now available, and Geoscope has launched a necessary renovation program. This transition is being carried out with care and prudence, to guarantee the continuity of observations that is part of Geoscope's appeal. Opportunities arise with the new broadband seismometers easier to deploy in the field which might ease the replacement of failing stations. Although the committee noticed that Geoscope is actively collaborating with other IPGP observatories to mutualise the field interventions, experts stress that Geoscope network is critical for numerous studies and that the team is at its lowest size possible to maintain the network and should not lose any other team member without jeopardising the good operation of the network.
The scientific results obtained from Geoscope data, particularly at the IPGP with the discovery of elasto-gravity signals, the characterisation of hum or studies of very large earthquakes, demonstrate the real scientific interest of a global broadband deployment. The Geoscope observatory is successfully meeting its objectives, for the benefit of the national and international scientific community.

• *Observatory of water and erosion in the Antilles*
The Obsera SNO is a relatively new structure, created in 2005 and promoted to CNRS-INSU SNO in 2011. Although relatively small, with eleven permanent members but only 2.3 FTE, Obsera is at the heart of the third strand of the IPGP strategic plan ('bring a new look to the carbon and water cycles in the critical zone') which was implemented in 2021. In addition, this structure is part of the Ozcar national research infrastructure, which is itself involved in the creation of the European eLTER network. This positioning allows Obsera to benefit from a dynamic and stimulating environment focused on major environmental issues involving interdisciplinary approaches (meteorology, hydrology, sedimentology, geochemistry, and geomorphology) to the continental and coastal ecospheres. Based on a series of observation tasks, Obsera has enabled the structuring of activities related to the interaction between physical and chemical erosion and biogeochemical cycles, the response of tropical ecosystems to climate change, and the development of new tools for monitoring changes in the critical zone. Obsera produces an impressive amount of data (approximately 2.5 million measurements over the period 2017-2022), which is made freely available to the scientific community through a dedicated website (http://webobsera.ipgp.fr). These data are widely used to support research projects submitted in response to calls for proposals (e.g. ANR, FEDER) or for publications (12 publications, some of them in top-ranked journals), as well as for PhDs (5 during the period) or HDR (1). The committee notes the willingness of SNO Obsera members to develop and strengthen their collaboration with public organisations (Guadeloupe National Park) or with national (Inrae) or international research organisations (Luquillo Critical Zone Observatory of Puerto Rico). The momentum generated means that the Obsera network could be extended to other tropical environments. However, a lack of human resources, particularly in terms of research support staff, severely restricts this capacity and hinders this momentum. There is therefore a great need for technical staffs to expand and develop this SNO, which otherwise successfully fulfills its observatory tasks.

• *IPGP data center*
The data centre is a fundamental component of IPGP's observation strategy. It also represents an important contribution to the international scientific community. The IPGP Data Center efficiently archives and makes available data from the volcanological and seismological observatories (including data from Mars and the Moon). The Data Center is part of the French seismological and geodetic network (Resif which is now EPOS-France), the European research infrastructure on solid Earth (EPOS), the Federation of Digital Seismograph Networks (FDSN) and the Planetary Data System (PDS/NASA). The incorporation of magnetic observatory data is in preparation, but poses staffing problems. Indeed, the number of staff is stable, while the quantity of data and services has increased significantly and will continue to increase with the new sensors (nodes and DAS: Distributed Acoustic Sensing) and the IPGP Research Collection. Recruiting experts in the required specialities is very difficult.
A project for the coming years is to apply for the CoreTrustSeal certification and to set up an external backup of the data logging and system configuration. This will ensure that the Data Center will be ready to assume its responsibilities towards the rest of the IPGP and the scientific community.

• *Insight observatory*

The Insight SNO created in 2016 was in charge of designing and delivering to the NASA the seismometer that would be deployed on Mars. The mission was a success, and the seismometer was deployed in 2018. Since then, Insight as a SNO, has maintained the data delivery and archiving. The data are accessible through the IPGP datacenter. This instrument allowed tremendous discoveries on Mars structure and volcano-tectonic activity. This is evidenced by the number of publications using the data, some of them being in high impact journals. The SNO will end as planned in 2024 but the gained experience by the team will be used to develop instruments that will be deployed on the far side of the Moon.

The Insight observatory encompasses a broad spectrum of scientific expertise's and being able to hire in 'Astronomy' sections of the CNAP or the CNRS would definitely be a plus for the Insight observatory and the subsequent Far Side Seismic Suite project on the Moon.

The future for the SNO Insight group lies in the creation of a SNO FSS to support the ambitious plan to develop and exploit extraterrestrial seismological sensors, starting with deployment on the far side of the Moon. The move to Cuvier is intended to strengthen collaboration with Team Seismology.

RELEVANCE AND QUALITY OF SHARED TECHNICAL SERVICES

The UAR comprises the administrative services of IPGP, the observatories, and the data centre.

The administrative services manage the full activity of IPGP and are well shared in between the different teams. The financial services still face important difficulties, which impact the research activity of IPGP in general. This problem has been the subject of recent recruitment and should be solved in a while.

The IPGP data centre is part of the UAR, primary shared between the observatories OVS Geoscope, Insight, and Revosima. IPGP Data Center also manages the IPGP 'Research Collection', hosting data products from the IPGP observatories, together with research projects and research articles. Indeed, the sharing of scientific items through the Data Center is not only limited to the observatories but concerns all the community. The shared technical services hosted by the IPGP UAR with its Data Center are very efficient and relevant both for the IPGP, and for a larger national and international scientific community, through the dissemination of data.

DEGREE OF POOLING OF UNIT RESOURCES

As the IPGP UAR is viewed as an observatory, not as a federative unit *sensus stricto*, this assessment is not relevant, the single research unit in the UAR IPGP being the UMR IPGP.

ASSESSMENT OF THE INITIAL AND CONTINUING TRAINING POLICY, EITHER IN-HOUSE OR IN SUPPORT OF OTHER TRAINING STRUCTURES

In addition to its head of the Human Resources service hold by an IE, the service is now composed of an assistant, an HR manager in charge of the proximity management of CNRS agents, and three HR managers in charge of training and daily HR management. Because of the specificity of life in remote OVS observatories (isolation, distance…), the head of the service accompanies the IPGP management team every year during the 'liaison committees', in order to meet the agents and discuss with them all their HR issues (promotions, training, career files, etc.). The promotion of the technical personnel of the UAR is rather efficient, partly thanks to the help provided by their supervising staff (repetitions, help in file managing, etc.).

RELEVANCE OF THE STRATEGY FOR DEVELOPING OBSERVATION SERVICES, COMPLEMENTARITY/INTEGRATION WITH OTHER FEDERATIVE STRUCTURES PRESENT ON THIS SITE

The UAR IPGP is the single observatory on the site and does not develop relations with other federative structures from the site. Indeed, due to the situation of IPGP, this part is not relevant. It is worth noting that the UAR IPGP provided datasets used worldwide: in that sense, it develops interactions with many laboratories and research structures in France and at the international level.

The UAR IPGP maintains a strong long-term policy of instrumental development and update of the material, specifically concerning the Geoscope seismometers. All the SNO present efficient strategy of development, although depending of their own history. Specifically concerning the OVS SNO, an effort is made to develop a better recognition of the OVS by the official institutions (the 3 ministries concerned, ministère de l'Enseignement Supérieure et de la Recherche, ministère de la transition écologique, ministère de l'Intérieur et des Outre-Mer), which may represent both an opportunity (funding) and a risk (duty).

The UAR IPGP presents a clear strategy of recruitments of CNAP personnel to develop their SNO, considering the six retirements planned in the next five years. The unit plans three physicians (PHY) positions for directors of the volcanic observatories (OVS), attached to the function of director of the observatory, and four assistant physicians (PHY-AD) positions for the OVS (2), magnetism observatory (1), and data centre (1).

RECOMMENDATIONS TO THE STRUCTURE

The committee recognises the high quality of services offered by the UAR for the IPGP UMR and at national and international level, specifically concerning data production, management, and dissemination. Hence, the committee recommend continuing the overall policy of the UAR IPGP.
At the global level of the UAR, specific recommendations concern the financial services, which is a weak point in the present-day situation, and must be strengthened in a near future. The direction of the unit is fully aware of this issue and develop noticeable efforts to remedy this situation.

The Geoscope SNO works very well with a high experience of seismic network managing and highly implicated peoples, both from the scientific staff and technical staff. They are developing a careful strategy to update the seismometers. The committee fully support their strategy.

The OVS SNO face specific difficulties due to the remote location of the staff overseas. The IPGP UAR handles this situation with an efficient managing of the team (annual visits, remote weekly meetings) and it seems that the colleagues in the remote observatories feel integrated in the UAR. However, the committee recommends keeping aware of the difficulties that may arise from remoteness. This OVS SNO primary task is to provide observations on volcanic systems and to reference level of activity for active volcanoes, based on long multi-parameter time series. A corollary task is to determine activity levels and analyse the evolution of phenomena in terms of system criticality, and then evaluate the probability of occurrence of surface phenomena. In addition, OVS SNO plays a role of warning structure in charge of transmitting scientific alerts and possible scenarii to the authorities in charge of civil security. Indeed, the committee recommends keeping a careful look on this duty that represents an opportunity of funding, but also a risk from a legal point of view. It is important to better define the framework in which the OVS should play an alert role (permanence, 24/7), comprising legal responsibilities. In that sense, the committee recommends recruiting new and functional permanent staff, to meet the concern and interest of the institutions and authorities, towards a precious investment to safely face future volcanic crises within the French territories. While not considering advisable to transfer permanent staff from the currently most active and demanding volcano (La Réunion) or from the already very limited staff at Guadeloupe, the increase of permanent staff at the severely understaffed Martinique observatory should be achieved recruiting new and dedicated personnel. This need is motivated by the unique and crucial monitoring role of the volcano observatories, which brings undeniable societal impact, involving volcanic hazard assessment and risk mitigation. As the active volcanoes at Martinique and Guadeloupe are currently experiencing unrest, and their eruptive histories and, in particular, their pre-eruptive activities are poorly known, any effort should be made to support the observatories to adequately know their volcanoes and estimate any hazard. In this frame, the possibility to have also functional positions for directors at the observatories, as requested by IPGP, should be considered.

The committee encourages the UAR IPGP to maintain its strong implication in the Revosima national infrastructure.

The Obsera SNO is a young observatory, connected to the Ozcar infrastructure. Opportunities of development of Obsera are important and the observatory could consider opening new sites of observation in another framework (for instance La Reunion Island), which would imply the recruitment of CNAP staff dedicated to this SNO. Further development of the Obsera should be though in a broader national framework within the framework of Ozcar to structure and rank the priorities on erosion observations. Another recommendation is to integrate the data produced by Obsera in the IPGP Data Center, to improve their dissemination, and offer a better visibility.

The magnetic observatories SNO provide a wide range of data used by various scientific, industrial, and institutional actors. The committee recommends strengthening the staff of the observatory by the recruitment of CNAP personnel (scientific and/or technician). It also recommends further capacity building and training of the personnel at the new observatories with the objective to obtain Intermagnet status; if possible, a member of staff from each would attend the next IAGA Observatory Workshop in 2024. The dataset of this SNO should also be integrated in within the IPGP Data Center.

The Insight SNO, is a very specific observatory in the framework of IPGP recognised as CNAP AA Observatory. It provides a unique service, with a very strong added value and visibility for IPGP. The committee encourages fully the Insight SNO to continue its scientific and methodology strategies of development and high-level projects. However, the personnel experienced an important reduction in the last six years and, the present administration staff seems below critical size for flight management. These are really critical conditions for the FSS mission, to be launched in 2026. Therefore, the committee recommends dedicating appropriate workforce, to guarantee the insight's planned activities.

The Data Center play a key-role in the UAR IPGP, and should continue to develop, by the integration of new products arising from the SNO hosted in the UAR. An important limit of the DC concerns the human power, and the UAR should consider new dedicated recruitments at midterms. Another issue to be handled by the Data

Center concerns the service continuity, so far, only the data benefits from a mirror server but not the servers to monitor the data acquisition and archiving. This could be mitigated by the creation of a new external mirror server of the data acquisition and monitoring codes and scripts.

CONDUCT OF THE INTERVIEWS

Dates

10 January 2024 2 p.m. - 2:45 p.m. (meeting 'behind closed doors' with supervisors of Establishments and Organisms)

11 January 2024 8 a.m. - 6:30 p.m.

Interview conducted: on-site

INTERVIEW SCHEDULE

Lundi 08 janvier 2024	Lieux					
Dîner de travail du comité en huis clos avec les representants du Hcéres M Sosson/H Wozniak		20h00				
Mercredi 10 janvier 2024		**Début**	**Durée**	**Fin**	Intervenants	Participants
Rencontre Huis clos (Comités UMR-UAR) avec les tutelles	310	14:00	0:45	14:45		Comité + tutelles
Jeudi 11 janvier 2024	Lieux	**Début**	**Durée**	**Fin**	Intervenants	Participants
UAR						
Comité UAR		**Début**	**Durée**	**Fin**	Intervenants	Participants
Introduction de la visite M Sosson et président du	Amphithéatre	8h	01:00	9:00	Direction de l'UAR	Tous
Magnetic Observatories bilan/trajectoire + questions	Amphithéatre	9:00	0:40	9:40	Vincent Lesur (20'+20')	Tous
Geoscope observatory bilan/trajectoire + questions	Amphithéatre	9:40	0:40	10:20	Martin Vallé (20'+20')	Tous
Geoscope observatory bilan/trajectoire + questions	Amphithéatre	9:40	0:40	10:20	Martin Vallé (20'+20')	Tous
Observatories of water and erosion in the Antilles bilan/trajectoire + questions	Amphithéatre	10:20	0:30	10:50	Eric Lajeunesse (15'+15')	Tous
Pause café		10:50	0:15	11:05		
IPGP Data center bilan/trajectoire + questions	Amphithéatre	11:05	0:30	11:35	Claudio Satriano (15'+15')	Tous
InSight observatory bilan/trajectoire + questions	Amphithéatre	11:35	0:30	12:05	Philippe Lognonné (15'+15')	Tous
Repas comité en huis clos (plateaux repas)		12:05	1:00	13:05		Comité
Volcanological and seismological observatories bilan/trajectoire + questions	Amphithéatre	13:05	1:30	14:35	Jean Christophe Komorowski & Jean Marie Saurel + en visio Aline Peltier, Jordane Corbeau, Ivan Vlastelic (70'+20')	Tous
Pause café		14:35	0:10	14:45		
Rencontre huis clos avec les personnels d'appui à la recherche, administratifs et techniques et CDD administratifs et techniques des observatoires	Amphithéatre	14:45	1:00	15:45		Comité + personnels d'appui à la recherche, administratifs et techniques et CDD administratifs et techniques (sans la direction)
Rencontre huis clos avec les responsables des observatoires	310	15:45	0:45	16:30		Comité + responsables des obsservatoires actuels et futurs (sans la direction)
Rencontre huis clos avec la direction de l'UAR	310	16:25	0:45	17:10		Comité + Direction
Rencontre huis clos du comité d'experts	Curie	17:10	0:30	17:40		Comité
conclusion du Représentant Hceres et Président	Amphithéatre	17:40	0:05	17:45		Tous

PARTICULAR POINT TO BE MENTIONED

N.A.

GENERAL OBSERVATIONS OF THE SUPERVISORS

Paris, le 16 juillet 2024

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Directeur
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Je tiens avant tout à remercier le comité de visite pour son investissement dans l'évaluation de l'IPGP (UMR et UAR). Je souhaite aussi apporter les précisions suivantes quant à certains commentaires faits dans le rapport HCERES sur l'UMR 7154 IPGP.

(1) A plusieurs endroits (pages 6, 8, 9) le rapport revient sur le besoin d'améliorer la communication interne, la prise en compte des difficultés ressenties par les personnels, et l'efficacité ou la rapidité des procédures administratives, notamment celles liées au paiement des commandes engagées et au règlement des frais de mission.
Comme indiqué dans le rapport, depuis l'année 2020 et au-delà de la crise sanitaire exceptionnelle que nous avons alors traversée, l'établissement a connu de profonds changements au sein de ses services centraux. Cela n'a pas été sans incidences ni pour la construction, ni pour l'exécution de nos derniers exercices budgétaires. En effet, suite à un arrêt longue maladie en juillet 2020, l'établissement s'est retrouvé sans directeur des affaires financières. L'adjoint du service étant lui-même parti en mobilité l'année précédente, le service a travaillé en mode dégradé pendant de très longs mois et les retards se sont accumulés. Tant dans le traitement des factures (remboursements missions compris), que dans la perception des recettes.
Aujourd'hui, suite au recrutement d'une nouvelle DAF, le service financier est entièrement réorganisé et les retards en voie d'être tous traités et régularisés. Un point sur ces retards a encore été fait lors d'une dernière réunion de responsables d'équipes.
En revanche, nous ne comprenons pas la remarque du comité d'experts sur les « delays in implementing salary raises ». L'IPGP n'est pas aux compétences élargies et tous ses agents fonctionnaires sont payés par le ministère. Si ce sont des retards pour des agents hébergés à l'IPGP, cette situation incombe aux tutelles de l'unité auxquelles appartiennent ces agents et en aucun cas à l'IPGP.

(2) Le rapport s'inquiète du manque de DUER (Document unique d'évaluation des risques professionnels in french) et de manques en ce qui concerne l'hygiène, la sécurité et la prevention.
Aujourd'hui toutes les questions touchant à l'hygiène, la sécurité et la prévention sont systématiquement discutées lors des séances de notre comité social d'administration (CSA). De plus, un réseau des assistants de prévention a été monté et ce dernier se réunit régulièrement pour échanger sur les évolutions réglementaires, les bonnes pratiques, faire remonter les difficultés etc.
Pour rassurer le comité d'experts, notre DUER, commencé en 2023, sera terminé et disponible dès septembre 2024.

(3) le rapport s'inquiète de l'apparente absence de préparation du déménagement des deux équipes de Lamarck sur le site de Cuvier mi-2026.
Ce déménagement a été mis à plusieurs reprises à l'ordre du jour des réunions « Respeq », ce projet de déménagement a été placé au cœur des discussions lors de notre « dialogue performance » avec le rectorat et nous venons d'obtenir le financement pour lancer un pré-programme auprès d'un cabinet expert à l'automne 2024. Il est aussi abordé dans le cadre du COMP que nous sommes en train de négocier avec le ministère, et nous avons obtenu un financement significatif de la mairie de Paris pour la réalisation des travaux qui devront être faits.

(4) Le comité d'experts souligne à plusieurs reprises, notamment p14, « the need for renewed internal reflection on the psychological dimensions of work and associated suffering".
Je tiens ici à indiquer que nous avons passé une convention avec la médecine de prévention d'UP Cité en 2021. Depuis la signature de cette convention, la quasi-totalité des agents IPGP et UP Cité ont été reçus par un médecin de prévention. En cas de difficultés, les agents peuvent bénéficier d'une offre médicale et sociale importante : psychologues, psychologues du travail, entretiens avec des assistantes sociales etc.

Nous travaillons également en étroite collaboration avec nos autres tutelles et c'est ainsi que des points réguliers sont faits entre notre service RH et celui du CNRS par exemple. De plus les médecins de prévention d'UP Cité et du CNRS assistent à toutes les séances de notre comité social d'administration. D'autre part, des procédures existent (auprès des RH et de la direction) pour orienter un personnel en difficulté vers les bons interlocuteurs.

(5) Le rapport en p14 suggère « A laboratory council would be an internal structure enabling direct contact and discussion between representatives of all groups and management, more easily than in councils including external members. »
Comme expliqué dans notre rapport, ce conseil, nommé Respeq existe déjà, se réunit mensuellement et regroupe les responsables d'équipes, d'observatoires, des services administratifs et la direction, et ne comporte aucun membre extérieur. Les conseils qui comportent des membres extérieurs, des membres de l'IPGP élus et nommés, sont les 4 conseils statutaires : conseil d'administration, conseil scientifique, conseil pédagogique, comité social d'administration.

(6) Le rapport identifie comme une faiblesse une réussite qui serait trop faible aux appels ERC eu égard à l'expertise et la reconnaissance des équipes de l'IPGP (p9 et a d'autres endroits).
Bien qu'on puisse toujours augmenter notre taux de réussite à l'ERC, et que des actions sont d'ailleurs entreprises en interne pour aider l'émergence de ces demandes, la faiblesse de notre taux de réussite me semble toute relative avec 7 ERC en cours et 2 autres obtenues depuis le comité de visite.

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