COUNTRY HYDROMET DIAGNOSTICS

Informing policy and investment decisions for high-quality weather forecasts, early warning systems, and climate information in developing countries.

June 2025

Haiti Peer Review Report

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Federal Office of Meteorology and Climatology - MeteoSwiss

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WORLD METEOROLOGICAL ORGANIZATION

SOFF Systematic Observations Financing Facility — Weather and climate data for resilience

Alliance for Hydromet Development

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

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IDB Inter-American Development Bank

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08/25/2025

UNITE HYDRO METEOROLOGIQUE UHM HAITI

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Impressum

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Disclaimer

This report has been prepared by MeteoSwiss in close collaboration with the UHM and other relevant stakeholders between September 2024 and June 2025. While reasonable care and skill have been taken in preparing this report, no representation or warranty, expressed or implied, is made as to the accuracy, completeness, or suitability of the information and assumptions relied upon, and we do not accept any liability whatsoever for any direct or consequential loss arising from any use of this report or its contents.

The difficult security situation in Haiti at the time of assembly of this document prevented MeteoSwiss personnel from visiting the UHM in-person. The information provided in this document is thus entirely based on 1) discussions and interviews conducted online, and 2) reports from previous projects.

The political, economic, social, and security situation in Haiti is currently evolving rapidly, with a severe, ongoing, country-wide degradation of conditions, in particular in and around Port-au-Prince. This has a very direct impact on the UHM, both in terms of technical and human capacities. It is therefore important to note that this document only provides an instantaneous snapshot of the UHM at the time of writing.

Acknowledgements

We thank the personnel of the UHM, and in particular Marcelin Esterlin, Marie Carmelle Valcourt Chery, Wilner Polydor and Christ Avin Jean Pierre, for their input and explanations regarding the current state of the UHM, that lie at the heart of this document. We are also grateful to Silvia Pieretto, Jean-Noël Degrace, Jair Torres, Tristan Chopard, Graham Clarkson, and Stephanie Gallasch for sharing with us their respective knowledge of the UHM and Haiti.

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List of abbreviations

AWOS	Automated Weather Observing System
AWS	Automatic Weather Station
CariCOF	Caribbean Climate Outlook Forum
CHD	Country Hydromet Diagnostics
CREWS	Climate Risk and Early Warning Systems
DGCP	Directorate General of Civil Protection, in French "*Direction Générale de la Protection Civile*"
ECMWF	European Center for Medium-Range Weather Forecasts
EW4All	Early Warning for All
GBON	Global Basic Observing Network
GFS	Global Forecast System
GISC	Global Information Service Center
HDRFFGS	Haitian and Dominican Republic Flash Flood Guidance System
ICT	Information and Communications Technology
ITU	International Telecommunication Union
MCH	Meteorology, Climatology, and Hydrology
NHC	National Hurricane Center
NMHS	National Meteorological and Hydrological Services
OSCAR	Observing Systems Capability Analysis and Review tool
PSDRM	Permanent Secretariat for Disaster Risk Management, in French "*Secrétariat Permanent de la Gestion des Risques de Désastre*".
RFSF	Regional Forecast Support Facility
RSMC	Regional Specialized Meteorological Center
SOFF	Systematic Observations Financing Facility
SOP	Standard Operating Procedure
UHM	Haiti's NMHS, in French "*Unité Hydrométéorologique d'Haïti*"
UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
WFP	World Food Programme
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization

Résumé Exécutif en français

L'Unité Hydrométéorologique d'Haïti (UHM) a été créé en 2015, à la suite du séisme qui a frappé le pays en 2010 et qui a eu des conséquences dévastatrices. L'UHM a été mise en place avec le soutien actif de la communauté internationale, notamment grâce à deux projets complémentaires de la Banque Mondiale et de l'Organisation Météorologique Mondiale (OMM), avec la participation active d'Environnement and Climate Change Canada (ECCC) et de Météo France. Ces projets ont rencontré un succès raisonnable, avec notamment la construction d'un nouveau quartier général pour l'UHM, résistant aux ouragans et aux tremblements de terre, à proximité immédiate de l'aéroport international de Port-au-Prince. Ce succès se reflète dans le diagnostic hydrométéorologique d'Haïti résumé dans la Figure 1.

Les partenaires de ces projets ont rapidement constaté que la pérennité de ces résultats était incertaine, compte tenu du manque récurrent de budget de fonctionnement adéquat pour l'UHM. Des projets complémentaires tels que CREWS ont été conçus, en partie, pour aider à soutenir/renforcer les capacités clés de l'UHM jusqu'à ce qu'une transition vers un système opérationnel véritablement autonome puisse être réalisée. Malheureusement, cette période de transition a également coïncidé avec une baisse significative de la stabilité politique en Haïti (assassinat du président Moïse en 2021, démission forcée du Premier Ministre Henry en 2024, suivie de deux changements de Premier Ministre dans la même année) et une forte recrudescence de la violence des gangs, qui contrôlaient 90% de la capitale au début de l'année 2025.

Cette situation a empêché/limité considérablement l'UHM de bénéficier de manière significative des nouveaux programmes de renforcement des capacités et de coopération mis en place ces dernières années. Les relations existantes, par exemple la coopération technique avec le service météorologique cubain pour la maintenance des stations de surface, ont été interrompues ou suspendues. Il est évident que la détérioration de la situation sécuritaire affecte également directement le personnel de l'UHM et leurs familles, qui sont confrontés à des risques croissants au quotidien.

Sans une amélioration radicale de la situation politique et sécuritaire dans le pays, ainsi que du contexte économique général, la capacité de l'UHM à devenir opérationnellement viable sera de plus en plus compromise, avec une probabilité croissante de voir tous les efforts déployés à la suite du séisme de 2010 disparaître au fil du temps (comme c'est déjà le cas pour les stations automatiques, par exemple).

Compte tenu de ces perspectives sombres, il apparaît crucial que l'Organisation Météorologique Mondiale (OMM) et les autres entités concernées veillent à ce que l'UHM reste connectée à toutes les initiatives régionales et mondiales pertinentes, et ce malgré la capacité fortement réduite du personnel de l'UHM à communiquer avec le monde extérieur, ainsi que de voyager à l'étranger. Il est également primordial d'éviter l'isolement de l'UHM des initiatives régionales pertinentes uniquement en raison de la barrière linguistique (Haïti étant le seul territoire francophone indépendant des Caraïbes).

Tout futur projet de renforcement des capacités en Haïti se devra de rester flexible, en tenant compte de la situation instable sur le terrain, ainsi que des différences régionales pertinentes au sein du pays. Compte tenu du manque d'effectifs récurrent au sein de l'UHM, il semble également primordial que toutes les initiatives visant à soutenir l'UHM se coordonnent étroitement afin d'éviter de se disputer les mêmes compétences humaines sur le terrain, qui sont probablement vouées à rester limitées à court/moyen terme.

Executive Summary

The UHM, Haiti's National Meteorological and Hydrological Service (NMHS), was established in 2015, in the wake of the 2010 earthquake that hit the country with devastating consequences. The UHM has been assembled with strong support from the international community, and in particular via two complementary projects from the World Bank and the World Meteorological Organization (WMO), with strong involvement from Environment and Climate Change Canada (ECCC) and Météo France. These projects were met with a reasonable level of success, including the construction of new hurricane and earthquake proof headquarters for the UHM, in the immediate vicinity of the international airport of Port-au-Prince. This success is reflected in the Hydromet Diagnostics of Haiti summarized in Figure 1.

It was readily identified by project partners that the sustainability of these achievements was uncertain, in view of the recurrent lack of an adequate operating budget for the NMHS. Follow-up projects like CREWS were intended, in part, to help further support/strengthen key capabilities of the NMHS until a transition to a truly self-sustainable operational scheme could be achieved. Unfortunately, this transition period has also been coinciding with a significant decrease in political stability for Haiti (assassination of the President Moïse in 2021, forced resignation of the Prime Minister Henry in 2024, followed by two changes of Prime Minister in the same year) coupled with a severe up-tick in gang violence, with 90% of the capital controlled by them as of early 2025.

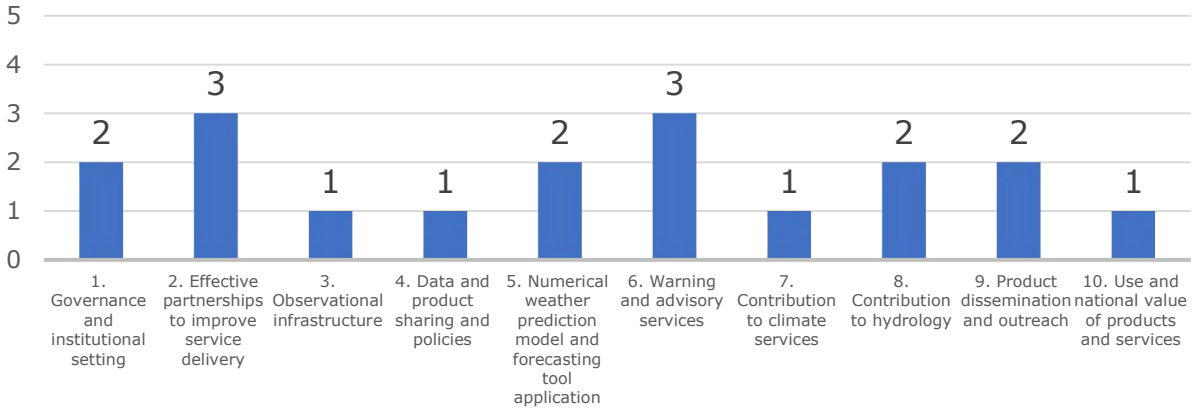
This situation has prevented/severely limited the UHM from significantly benefiting from new capacity development and cooperation programs in recent years. Existing relationships, for example a technical cooperation setup with the Cuban's NMHS towards the maintenance of surface stations, have either stopped or paused. Evidently, the degrading security situation is also directly affecting the staff of the UHM and their families, that face increasing risk levels on a daily basis.

Without a drastic improvement to the political and security situation in the country, let alone to the overall economic context, the ability of the UHM to become operationally sustainable will become increasingly compromised, with a growing probability of seeing all the efforts deployed in the wake of the 2010 Earthquake vanish over time (as is already happening with the automatic stations, for example).

In view of this grim perspective, it would appear crucial for the World Meteorological Organization (WMO) and other relevant entities to ensure that Haiti's NMHS remains connected to any relevant regional and global initiatives, and this despite the strongly-reduced ability of UHM staff to communicate with the outside World, let alone travel abroad. It is also paramount to avoid an isolation of the NMHS of Haiti (the only French-speaking independent territory in the Caribbean) from relevant regional initiatives solely because of the language barrier.

Any future capacity development project in Haiti ought to remain agile and account for the volatile situation on the ground, as well as for relevant regional differences within the country. In view of the reduced staffing capacity of the UHM, it also appears paramount that all initiatives aiming at supporting the UHM coordinate themselves closely, in order to avoid competing for the same human expertise on the ground, which remains limited.

Peer Review Results



Element	Maturity level score
1. Governance and institutional setting	2
2. Effective partnerships to improve service delivery	3
3. Observational infrastructure	1
4. Data and product sharing and policies	1
5. Numerical weather prediction model and forecasting tool application	2
6. Warning and advisory services	3
7. Contribution to climate services	1
8. Contribution to hydrology	2
9. Product dissemination and outreach	2
10. Use and national value of products and services	1

Fig. 1: Review results for the 10 elements of the CHD.

Chapter 1: General information

Introduction

Haiti, officially the Republic of Haiti, occupies the Western third of the island of Hispaniola, the second largest island in the Caribbean Sea after the island of Cuba. With a surface of 27'750 km^2 and a population of ~11.4 million (2023 estimate), it is the most populated Caribbean country, and the only French-speaking independent territory of the region. Haiti, which ranks 177 (out of 187) on the Notre Dame Global Adaptation Initiative's (ND-GAIN) Country Index[1], is particularly vulnerable to climate disruptions.

Haiti is regularly and repeatedly affected by severe natural disasters[2], including earthquakes, hurricanes, and floods. The recent history of Haiti was marked by a catastrophic 7.0 M earthquake that struck the country within 25 km of the capital Port-au-Prince on January 12, 2010. This event prompted a large humanitarian response, also towards the meteorological and hydrological monitoring/forecasting capabilities of the country. It is these efforts that led to the creation in 2015 of the country's current National Meteorological and Hydrological Service (NMHS), known as the Hydrometeorological Unit of Haiti (in French, *Unité Hydrométéorologique d'Haïti*; UHM). This was achieved with strong support from the World Bank, the World Meteorological Organization, Environment and Climate Change Canada (ECCC) and Météo France, among other partners.

Haiti remains one of the poorest countries of the Americas, a situation related to a complex set of historical, societal, economic and environmental causes that are strongly inter-connected. For the country's NMHS, this translates (in very practical terms) into a recurring lack of operational budget and insufficient staffing. With the capacity development projects of Haiti's NMHS deployed in the wake of the 2010 earthquake having now ended, and those intended to follow them in hiatus for the most parts (due to the degrading security situation), the future of the institution hangs more-than-ever-before on its ability to find the means to become financially sustainable.

CHD methodology

The Federal Office of Meteorology and Climatology – MeteoSwiss carried out this Country Hydromet Diagnostic as part of the Systematic Observations Financing Facility (SOFF) Readiness Phase in Haiti, a project for which it acts as SOFF peer advisor. The information used to assemble this CHD was gathered by MeteoSwiss between September 2024 and June 2025. Documents from the World Bank and WMO development projects deployed in the wake of the 2010 earthquake represent an important source of information regarding the current state of the UHM. The data derived from these project documents were verified and complemented by a series of bilateral, online discussions between representatives of MeteoSwiss and UHM, as well as some of its partners/stakeholders. All supporting documents are accessible as supplementary material to this report.

This report was assembled in parallel and independently from a series of national consultations for the EW4All initiative, conducted between 2023 and 2025 by the Directorate General for Civil Protection (DGCP) under the auspices of the Permanent Secretariat for Disaster Risk Management (PSDRM) in Haiti, with strong inputs from relevant national entities (including Haiti's NMHS), civil society organizations, and several UN agencies (in particular: UNDRR, WMO, ITU, WFP). The resulting EW4All gap analysis and implementation plan represent an important source of information on the current state and needs of the Multi-Hazard Early Warning System in Haiti, that complements this CHD.

[1] https://gain.nd.edu/our-work/country-index/rankings/
[2] https://en.wikipedia.org/wiki/List_of_natural_disasters_in_Haiti

Chapter 2: Country Hydromet Diagnostics

Element 1: Governance and institutional setting

1.1 Existence of Act or Policy describing the NMHS legal mandate and its scope

The creation of Haiti's current NMHS (the UHM), is detailed in a circular from the Agriculture, Natural Resources and Rural Development Ministry (MARNDR) from 2015-08-27. There is no law/act/policy regulating meteorology as a whole in Haiti.

1.2 Existence of Strategic, Operational and Risk Management plans and their reporting as part of oversight and management.

The first strategic plan of the UHM was assembled in 2020 (with a revision in 2022) for the period 2020-2024. The need to create a new plan for the next period has been identified, but the lack of resources is currently preventing its development.

1.3 Government budget allocation consistently covers the needs of the NMHS in terms of its national, regional, and global responsibilities and based, among others, on cost-benefit analysis of the service. Evidence of sufficient staffing to cover core functions

As a "unit" within the Agriculture, Natural Resources and Rural Development Ministry, the UHM does not possess its own budget. Beside staff salaries, the UHM currently does not receive any funds to support its operations. The UHM also faces strong difficulties to retain skilled personnel: for example, only 3 forecasters relay themselves to maintain daytime operations 7/7 (with round-the-clock operations only in case of imminent cyclonic risk), and the technical department is currently comprised of a single technician.

1.4 Proportion of staff (availability of in-house, seconded, contracted- out) with adequate training in relevant disciplines, including scientific, technical, and information and communication technologies (ICT). Institutional and policy arrangements in-country to support training needs of NMHS.

The existing personnel (see Table 1) have varying degrees of formation. If many of the senior staff have been trained in their discipline in Haiti and abroad, the more recent hires typically lack dedicated, in-depth training. This is for example the case for the (only) UHM technician that has not received the necessary training to maintain the network's stations.

1.5 Experience and track record in implementing internationally funded hydromet projects as well as research and development projects in general.

The UHM is the result of the important support deployed by the international community in the wake of the 2010 earthquake. Overall, these efforts have had very positive outcomes (incl. the construction of new UHM headquarters), although the rapidly degrading security situation in recent years is clearly putting this more and more in jeopardy.

Summary score and recommendations for Element 1:

2 – *Effort ongoing to formalize mandate, introduce improved governance, management processes and address resource challenges.*

The birth of the UHM in the wake of the 2010 earthquake, and the strong international support, has seen the visibility and strategic relevance of this entity rise over the years. However, the UHM still lacks an adequate budget to sustain its operations, which may change if it were to evolve from a "unit" to a "service" as advocated in its 2020-2024 Strategic Plan. The UHM is also being increasingly impacted by the degrading security situation in the country (both in terms of infrastructure and staffing).

Table 1: Number of existing UHM staff as of January 2025.

Staff category	Staff Amount (Male/Female)
Management	2/1
Meteorologist	3/0
Meteorological Technician	1/0
Hydrologist	1/1
Hydrological Technician	6/0
Climate Services	1/2
Researcher	0/0
Other	Aeronautical observers: 9/13 Support staff: 9/4 Legal office: 1/1
Total	33/22 (60%/40%)

Element 2: Effective partnerships to improve service delivery

2.1. Effective partnerships for service delivery in place with other government institutions.

The UHM has good operational ties with the Directorate General for Civil Protection (DGCP), that relies on UHM forecasts to plan and anticipate its preparatory actions, and warn local communities accordingly. The UHM also has interactions with other governmental institutions (Civil Aviation Office – OFNAC; National Center for Geospatial Information – CNIGS; Maritime and Navigation Service – SEMANAH; Ministry of the Environment – MdE; National Food Security Coordination - CNSA). However, a formal collaboration protocol has so far been signed only with the DPC and the CNSA. The redistribution of aeronautical taxes between OFNAC and the UHM remains an open issue.

2.2. Effective partnerships in place at the national and international level with the private sector, research centres and academia, including joint research and innovation projects.

The UHM does not presently have any partnership in place with the private sector. There is no research being undertaken at UHM, be it independently or in collaboration with research centers/universities. However, the UHM is providing access to its archival data to students and research that ask for it.

2.3. Effective partnerships in place with international climate and development finance partners.

The UHM has ongoing partnerships/interactions with the World Food Programme (WFP) and the United Nations Development Programme (UNDP). The UHM was born out of the merging of the former national meteorological and hydrological services with the support from the World Bank and the World Meteorological Organization, with the active involvement of several additional actors on the ground (including ECCC; Météo France).

2.4. New or enhanced products, services or dissemination techniques or new uses or applications of existing products and services that culminated from these relationships.

Flash flood risks are monitored using the software "Haiti and Dominican Republic Flash Flood Guidance System" (HDRFFGS). Climate bulletins rely heavily on CariCOF (Caribbean Climate Outlook Forum) material. Forecasts issued by the UHM strongly benefit from the Sever Weather Forecast Programme (SWFP) via the Eastern Caribbean Regional Forecast Support Facility (RFSF) in Martinique.

Summary score, recommendations, and comments for Element 2

3 – *Moderately effective partnerships but generally regarded as the weaker partner in such relationships, having little say in relevant financing initiatives.*

The UHM is engaged in a few partnerships, a very small number of which are associated with formal agreements and protocols. Perhaps the most notable one is the partnership with the DGPC, which appears moderately effective, but with the UHM generally regarded as the weaker partner. Given its history, the UHM has experienced a significant number of partnerships with international climate and development partners, through projects that were met with a reasonable level of success. As it celebrates its 10th anniversary in 2025, the UHM faces the challenge of confirming its ability to act as a strong national and international partner, that can deliver products and services that meet the needs of its stakeholders: a task becoming increasingly challenging in view of the degrading security situation in the country and lack of relevant budget.

Element 3: Observational infrastructure

3.1. Average horizontal resolution in km of both synoptic surface and upper-air observations, including compliance with the Global Basic Observing Network (GBON) regulations.

The primary surface stations of the UHM are located at the (five) main airports in Haiti, and have an average distance of 90 km between them. They are however no longer transmitting data, and are no longer maintained either. There is also one AWOS station at the airport of Port-au-Prince, no longer actively maintained either, but that for now still transmits some data to the UHM headquarters. None of these stations are registered as GBON stations, and their data are not shared on the GTS/WIS 2.0. There is currently no upper-air station in Haiti.

There are a number of other historical surface stations (meteorological or hydrological) in Haiti. We refer the readers to the Systematic Observations Financing Facility (SOFF) National Gap Analysis (included as an Annex to this document) and to Delphin Léveillé et al. (2020) for more details about these stations.

3.2. Additional observations used for nowcasting and specialized purposes.

The UHM does not do nowcasting, and it doesn't use additional observations for any specialized purpose.

3.3. Standard Operating Practices in place for the deployment, maintenance, calibrations and quality assurance of the observational network.

The loss of trained technicians, the degrading security situation in recent years, together with the lack of a dedicated budget, all have prevented the implementation of formal SOPs for the observational network.

3.4 Implementation of sustainable newer approaches to observations.

No approach was identified. A national WIGOS plan could not be identified either.

3.5. Percentage of the surface observations that depend on automatic techniques.

30%. The main network (5 AWS at the airports, 1 AWOS in Port-au-Prince, 1 AWS in Fort Liberté) is automated, and so were about 30 hydrological stations (that are now essentially all out of order). Another 70 pluviometers rely on manual observations, while 15 secondary AWS stations (all out of order) relied on manual data download (on-site).

Summary score, recommendations, and comments for Element 3:

1 – *No or limited, basic surface observations and no upper-air observations.*

The UHM has an extensive network of stations, including hydrological ones, very few of which are still operational. In the wake of the 2010 earthquake, a core set of AWSs were deployed at the main airports in the country, with the technical support of the Cuban NMHS and the financial support of the WMO. However, the degrading security situation, the loss of trained staff, and the lack of a dedicated budget has seen the stations fall-off the grid in recent years. This should come as no surprise: in its final project report (Sjaavik, 2022), the WMO had already clearly identified that *"the main concerns [for the sustainability of the project's outcomes] are the upkeep and maintenance of the technical equipment, and particularly the stations […]*".

Element 4: Data and product sharing and policies

4.1. Percentage of GBON compliance – for how many prescribed surface and upper-air stations are observations exchanged internationally. Usage of regional WIGOS centres.

0%. The 5 AWSs at the main airports in Haiti no longer transmit data to the UHM headquarters (only the AWOS in Port-au-Prince still does). These data were never shared internationally, and no station is registered as "GBON" on OSCAR/Surface. The RAIV Regional WIGOS Center (RWC) operational procedures foresee that Incident Management for Haiti will be handled by the Canadian Leading Node. Still, it must be noted that Haiti, being the only independent French-speaking territory of the Caribbean, is at risk of being excluded from potentially highly-beneficial regional WIGOS initiatives because of the language barrier. One practical example is the deployment of a regional WIS 2.0 Box by members of the Caribbean Meteorological Organization (CMO), with "*CMO Headquarters and Trinidad and Tobago Meteorological Service […] responsible for the data quality management system for the English-speaking Caribbean as components of virtual Regional WIGOS Centre in Regional Association IV*" (see Caribbean Meteorological Council, 2023).

4.2. A formal policy and practice for the free and open sharing of observational data.

The UHM is sharing its archival data freely with students and researchers that ask for it. However, no formal data sharing policy could be identified as part of this analysis.

4.3. Main data and products received from external sources in a national, regional and global context, such as model and satellite data.

The UHM relies on global and regional models (from Météo France, Instituto de Meteorología de Cuba, GFS, ECMWF) to assemble their forecasts. Climate bulletins of the UHM are based on Caribbean Climate Outlook Forum (CariCOF) material. The UHM forecasters also exploit forecasts from the RSMC Miami National Hurricane Center (NHC).

Summary score, recommendations, and comments for Element 4:

1 – *No observational data is shared internationally, either because not available to be shared or due to the lack of data sharing policies or practices, or the existing infrastructure does not allow data sharing.*

No observational data from Haiti are currently being shared internationally. In particular, the degrading security situation on the ground is severely hindering basic maintenance activities (let alone the troubleshooting and/or repairs) of the surface stations of Haiti's NMHS. If the data flow to the UHM could be restored, the sharing of data internationally would then still require the update of relevant metadata on OSCAR/Surface, together with a suitable WIS 2.0 connexion.

Element 5: Numerical model and forecasting tool application

5.1. Model and remote sensed products form the primary source for products across the different forecasting timescales.

UHM forecasters have access to several global models (AROME/ARPEGE, SisPI, GFS, ECMWF), and rely primarily on AROME (from Météo France) and SisPI (from the Instituto de Meteorología de Cuba). Access happens via the software SYNERGIE-WEB and the Severe Weather Forecasting Programme (SWFP)-Eastern Caribbean Regional Forecast Support Facility (RFSF) located in Martinique. For hurricanes, the UHM forecasters also exploit forecasts from the RSMC Miami National Hurricane Center (NHC). Hydrological forecasts, for flash floods, rely on the Haitian and Dominican Republic Flash Flood Guidance System (HDRFFGS; Sierra-Lorenzo, 2022). Recent examples of forecasts, hydrological bulletins and climate bulletins are included as supplementary material to this document.

5.2. a) Models run internally (and sustainably), b) Data assimilation and verification performed, c) appropriateness of horizontal and vertical resolution.

The UHM does not run models internally.

5.3. Probabilistic forecasts produced and, if so, based on ensemble predictions.

The UHM does not generate probabilistic forecasts.

Summary score, recommendations, and comments for Element 5

2 – *Basic use of external model output and remote sensed products in the form of maps and figures, covering only a limited forecast time range.*

UHM rely on global and regional models and other external material to issue their meteorological forecasts. No models are being run internally.

Element 6: Warning and advisory services

6.1. Warning and alert service cover 24/7.

UHM forecasters are working 24/7 only in case of an immediate cyclonic risk for Haiti. The rest of the time, staff shortage prevents the UHM from having a warning and alert service operational 24/7. Currently, the three UHM forecasters strive at covering at least the daytime shifts, 7-days per week.

6.2. Hydrometeorological hazards for which forecasting and warning capacity is available and whether feedback and lessons learned are included to improve warnings.

The UHM is issuing warnings for wind (incl. hurricane) and precipitation (incl. flash floods, riverine floods). Warnings are based on global & regional models and material from RSMC Miami for the former category, and on the HDRFFGS software for the latter. All warnings are assembled by hand. This limits the ability of the UHM to exploit feedback and lessons learned, which is infrequently provided to the UHM by staff members of the Directorate General of Civil Protection (DGCP) staff on the ground. Two examples of special bulletins issued in 2016 (red alert) and 2024 (orange alert) are included as supplementary material to this document. These documents are used by the UHM to circulate alerts to relevant partners within the scope of the National Plan for Disaster Risk Management.

6.3. Common alerting procedures in place based on impact-based services and scenarios taking hazard, exposure and vulnerability information into account and with registered alerting authorities.

The UHM has an established mechanism to communicate its warnings with the DGCP, which is then able to act upon and disseminate them through the local communities as warranted. There is no formal impact-based assessment made when assembling the warnings at the UHM, that are not issued in CAP format.

Summary score, recommendations, and comments for Element 6

3 – *Weather-related warning service with modest public reach and informal engagement with relevant institutions, including disaster management agencies.*

The UHM issues warnings that have a good public reach thanks to their dissemination by the DGCP. However, the ability of the UHM to issue warnings in the first place is strongly affected by the lack of trained personnel. The existing interactions with the DGCP appear functional, but lack formalism. In particular, the Registry of Alerting Authorities for Haiti is incomplete, and alerts are not issued in CAP format.

Element 7: Contribution to Climate Services

7.1. Where relevant, contribution to climate services according to the established capacity for the provision of climate services.

The climate department of the UHM assembles 3-monthly climate bulletins using Caribbean Climate Outlook Forum (CariCOF) material. As with the other services, the ability of the UHM to provide climate services is strongly impacted by a lack of trained staff. The digitalization of archival records is incomplete. The current security situation is preventing that process (that relied on students and interns to make the initial physical scans, with subsequent data validation by UHM experts before ingestion inside an MCH database management system) to continue. Archival records that have been digitized are shared freely upon request by students and researchers.

Summary score, recommendations, and comments for Element 7

1 – *Less than basic Capacity to provide Climate Services.*

The ability of the UHM to provide climate services is strongly affected by the lack of trained personnel. The UHM does act as a provider of archival meteorological measurements in Haiti for the research community, but it is not involved in the subsequent data exploitation. The lack of resources prevents the development of dedicated climate services. The committee intended to act as a national governance mechanism for climate services (in French, "Comité National sur les Changements Climatiques"; CNCC), of which the UHM is in principle a member, is not operational.

Element 8: Contribution to hydrology

8.1. Where relevant, standard products such as quantitative precipitation estimation and forecasts are produced on a routine basis according to the requirements of the hydrological community.

The state of the hydrological network does not allow for the creation of standard products based on in-situ measurements. Forecasts for flash-floods are performed using models via the HDRFFGS software (Sierra-Lorenzo 2022).

8.2. SOPs in place to formalize the relation between Met Service and Hydrology Agency, showing evidence that the whole value chain is addressed.

In the wake of the 2010 earthquake, the National Meteorological Service and the Hydrology Agency were merged to form the UHM, in which hydrology became a division alongside those of (aeronautical) observations, forecasting, and climatology. The UHM is now responsible for hydrological forecasting and flood warnings. Interactions with the Ministry of the Environment, including the National Institute for Hydrological Resources occurs on an irregular, ad hoc, on-demand basis.

8.3. Data sharing agreements (between local and national agencies, and across international borders as required) on hydrological data in place or under development.

No formal data sharing partnerships/agreements could be identified as part of this analysis. However, the UHM does share its archival data freely (upon direct request).

8.4 Joint projects/initiatives with hydrological community designed to build hydrometeorological cooperation.

No projects could be identified as part of this analysis.

Summary score, recommendations, and comments for Element 8

2 – *Meteorological input in hydrology and water resource management happens on an ad hoc basis and or during times of disaster.*

There is a good relationship between the meteorological and hydrological services in Haiti, on the basis that both live within the country's current NHMS. There is however a need for a formalization of the relevant Standard Operating Procedures (SOPs). The links between the UHM and other relevant national hydrological entities, including the Ministry of the Environment, is not formalized. The network of hydrological stations is for the most part no longer operational, either because of technical malfunctions, communication issues, lack of suitable calibration, or station destruction/theft.

Element 9: Product dissemination and outreach

9.1. Channels used for user-centred communication and ability to support those channels (for example, does the NMHS operate its own television, video or audio production facilities? Does it effectively use cutting-edge techniques?).

The UHM uses its website[3] to disseminate its daily and maritime bulletins, currently comprised only of a textual description. Maps with pictograms are no longer available because of software issues. Longer-term forecasts (5-days, monthly) are also no longer available because of resource constraints. The 3-monthly climate bulletins are also not available online. Generally, the UHM faces challenges (lack of budget, lack of technical expertise) to alter the website structure, or to have it evolve in terms of advanced/interactive contents and new features.

9.2. Education and awareness initiatives in place.

There are no initiatives by the UHM itself. But there are several initiatives by other institutions/partners, for example in terms of Disaster Risk Reduction (see e.g. GFDRR, 2022) and climate resilience in agriculture (Staub & Clarkson, 2021).

9.3. Special measures in place to reach marginalized communities and indigenous people.

There are no special measures implemented by the UHM to reach marginalized communities. The UHM essentially relies and benefits from the DGCP network to reach remote communities with warnings and relevant information.

Summary score, recommendations, and comments for Element 9

2 – *Traditional communication channels and a basic dedicated website is used to disseminate forecasts and basic information.*

The UHM does possess a functioning website, where information is easily accessible. The partnership with the DGCP is a clear asset for the UHM in terms of product dissemination, in particular when it comes to warnings targeting remote communities. Key communication material (e.g. maps with pictograms, alerts) are however not/no longer available online. The lack of human and financial resources within the UHM is affecting its ability to correct these issues and further strengthen its product dissemination mechanisms, that, if not cared for, will be increasingly at risk of degradation.

[3] https://www.meteo-haiti.gouv.ht/, last accessed on 2025-03-21

Element 10: Use and national value of products and services

10.1. Formalized platform to engage with users in order to co-design improved services.

No formalized platform to engage with users was identified as of March 2025.

10.2. Independent user satisfaction surveys are conducted, and the results used to inform service improvement.

No user satisfaction surveys are being conducted by the UHM as of March 2025.

10.3. Quality management processes that satisfy key user needs and support continuous improvement.

No established quality management processes were identified as of March 2025. Six Internal Auditors (ISO 19011:2018) were trained and certified in early 2025 (with support from the CREWS project)[4].

Summary score, recommendations, and comments for Element 10

1 - *Service development lacks any routine stakeholder feedback practice.*

The UHM does not currently engage proactively with its users and stakeholders. This is, in part, a consequence of the lack of resources available for service improvement and development. Limited studies of the socio-economic benefits associated to the strengthening of Haiti's NMHS were conducted by the World Bank (2015).

[4] https://wmo.int/media/project-update/improving-hydrometeorological-services-haiti-quality-management-system-training-uhm

Annex 1 Consultations (including experts and stakeholder consultations)

2024-08-13: bilateral discussion with Stephanie Gallasch, Project Officer & CREWS Haiti Project Manager, Development Partnership Office, World Meteorological Organization.

2025-01-21: bilateral discussion with Silvia Pieretto, Climate Action & Risk Financing Officer, Haiti Country office, World Food Program.

2025-01-30: formal presentation by Wilner Polydor (UHM) on the Forecasting activities at the UHM.

2025-02-04: formal presentation by Marie Carmelle Valcourt Chery (UHM) on the Hydrology activities at the UHM.

2025-02-05: formal presentation by Christ Avin Jean Pierre (UHM) on the Climate activities at the UHM.

2025-02-27: bilateral discussion with Graham Clarkson, Senior Research Fellow and PICSA (Participatory Integrated Climate Services for Agriculture) Manager, University of Reading

2025-02-28: bilateral discussion with Tristan Chopard (Security Advisor, Swiss Federal Department of Foreign Affairs), based in Haiti.

2025-04-02: trilateral discussion with Jean-Noël Degrace (EW4All consultant, formerly at Météo France) and Jair Torres (Programme Management Officer, Regional office for the Americas & the Caribbean, United Nations Office for Disaster Risk Reduction – UNDRR).

Annex 2 Urgent needs reported

The current situation in Haiti remains highly unstable. This makes it hard to predict with high accuracy how the needs of the UHM may evolve over the coming months or years. Nonetheless, at this point in time, the following elements do stand out:

- Budget: the UHM needs to be given the financial means to perform its assigned tasks and fulfil its official mandates (operational costs incl. communication, human resources incl. formation/training); the question of the redistribution of aeronautical taxes needs to be settled.
- Human resources: the UHM needs additional staff to perform its assigned tasks (in particular with regards to the maintenance and operation of its surface network, and the issuance of forecasts and alerts); staff must be trained in accordance with their assigned tasks; the UHM needs to become an employer that attracts and retains highly-qualified staff.
- Management: the UHM should assemble a new/updated strategy for the next 5/10-year period; the discussions regarding the transition of the UHM legal status from a "unit" to a "service" need to continue; Standard Operating Procedures need to be formalized.
- Observational infrastructure: the UHM needs to perform an in-depth review of its network (meteorological & hydrological), also to update relevant OSCAR/Surface metadata; the data flow between stations and the headquarters needs to be re-established; standard station maintenance and repair procedures must be assembled and implemented; a WIS 2.0 box is needed to initiate international data sharing, and the necessary skillset to maintain it needs to be acquired by the UHM (unless the UHM can enter into an agreement with CMO to benefit from their regional WIS 2.0 Box initiative).
- Forecasts and Alerts: the ability to issue forecast maps with pictograms needs to be re-established; alerts need to be issued in CAP format;

We recall here that these recommendations were assembled in parallel and independently to those identified as part of a series of national consultations for the EW4All initiative, conducted between 2023 and 2025 by the DGPC under the auspices of the SPGRD, with strong inputs from relevant national entities (including the UHM), civil society organizations, and several UN agencies (in particular: UNDRR, WMO, ITU, WFP). We refer the readers to the EW4All implementation plan for a detailed action list necessary to establish a Multi-Hazard Early Warning System in Haiti, and in particular its Pillar 2 for elements directly related to the UHM, Haiti's NMHS.

Annex 3 Information supplied through WMO

N/A

Annex 4 List of materials used

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World Bank (2021). *Implementation completion and results report on a grant in the amount of SDR 3.5 million (US$5 million equivalent) to the Republic of Haiti for the HT Strengthening Hydro-Met Services project*. Report no. ICR00005439, project P148259. http://documents.worldbank.org/curated/en/893491622035426172

Annex 5 Copy of the SOFF National Gap Analysis for Haiti