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| WEATHER CLIMATE WATER | **World Meteorological Organization****COMMISSION FOR OBSERVATION, INFRASTRUCTURE AND INFORMATION SYSTEMS****Second Session**24 to 28 October 2022, Geneva | **INFCOM-2/Doc. 5.1** |
| Submitted by:President of the Commission27.IX.2022**DRAFT 1** |

**AGENDA ITEM 5: CURRENT AND FUTURE WORK PROGRAMME OF THE COMMISSION**

**AGENDA ITEM 5.1: Work Programme for the next intersessional period**

# WORK PROGRAMME OF THE COMMISSION

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| **Summary** |
| **Document presented by:** the president of the Commission**Strategic objective 2020–2023:** 1.1, 1.2, 1.3, 2.1, 2.2, 2.3**Financial and administrative implications:** within the parameters of the Strategic and Operational Plans 2020–2023, will be reflected in the Strategic and Operational Plans 2024–2027.**Key implementers:** INFCOM, in coordination with SERCOM, RB, HCP, CDP and RAs**Time frame:** 2022–2024**Action expected:** review and adopt [Draft Resolution 5.1/1 (INFCOM-2)](#_Draft_Resolution_5.1/1) |

# DRAFT RESOLUTION

## Draft Resolution 5.1/1 (INFCOM-2)

## Work Programme of the Commission

THE COMMISSION FOR OBSERVATION, INFRASTRUCTURE AND INFORMATION SYSTEMS,

**Mindful** of the need to fully align the work of the World Meteorological Organization (WMO) technical and scientific bodies with the long-term goals and strategic objectives of the WMO Strategic Plan and Operating Plan, within defined limits of human and financial resources;

**Having considered**:

(1) The appropriateness of a deliverable-based approach in the definition of the workplan, its implementation and reporting to Congress and the Executive Council, including through the Technical Coordination Committee,

(2) The benefits of standardizing the working structures of the Commission and their functioning in accordance with the [*Rules of Procedure for Technical Commissions*](https://library.wmo.int/index.php?lvl=notice_display&id=21534) (WMO‑No. 1240),

(3) The opportunities offered by the biennial cycle of sessions of the Commission for a more flexible and adaptive approach to the implementation of tasks and the definition of working structures,

(4) The proposed update of the list of deliverables and responsibilities contained in the [annex](#_Annex_to_draft) to this draft Resolution,

**Recalling** [Resolution 6 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=85) – Review of the work programme of the Commission, which requested, the Management Group to maintain up to date, and to regularly review and reprioritize, the list of deliverables and responsibilities with the support of the Secretariat, facilitating and optimizing connection between Standing Committees and Study Groups, and to report on the status of implementation at the next session,

**Having examined** the status and actions taken to attain the deliverables of its Standing Committees for the Eighteenth Financial Period, contained in the [annex](#_Annex_to_draft) to this draft Resolution,

**Decides** that the work plan of the Commission for the second intersessional period (2022‑2024), with an outlook for the next financial period, will be adapted by the Management Group based on the list of deliverables and responsibilities contained in the [annex](#_Annex_to_draft) to this draft Resolution and reflected and resourced in the Operating Plan for 2022–2024;

**Requests** the Management Group to continue to maintain up to date, and to regularly review and reprioritize, the list of deliverables and responsibilities with the support of the Secretariat, facilitating and optimizing the connection between Standing Committees, Study Groups, Advisory Groups and Task Teams and to submit necessary deliverables to the next session.

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[Annex: 1](#_Annex_to_draft)

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Note: This resolution replaces [Resolution 6 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=85), which is no longer in force.

## Annex to draft Resolution 5.1/1 (INFCOM-2)

## Deliverables of the Standing Committees, Study Groups, Advisory Groups and the Task Team on Global Basic Observing Network (GBON) of the Infrastructure Commission second intersessional period (2023–2024) and outlook for the next period (2025–2026)

| **INFCOM group** | **EC or Cg Resolution** | **Alignment with Operational Plan** | **Coordination with other bodies** | **2023** | **2024** | **2025–2026 outlook** | **Status as of October 2022 and comments** |
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| **Output 1.1.5**  | **Early warning and advisory services provided to UN and humanitarian agencies** |
| SC-ESMP | [Res. 12 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=64) | New/1.1.5 | SERCOM | Support SERCOM (SC-DRR) to demonstrate the proposed improvement of the Global Data-processing and Forecasting System (GDPFS) | Support SERCOM (SC-DRR) to evaluate the results of demonstration | Integration of WMO-CHE into the GDPFS Manual | SERCOM-1(II) invited INFCOM to collaborate on developing regulatory material and guidance for operational implementation ([Doc 5.1.4(1)](https://meetings.wmo.int/INFCOM-2/English/Forms/AllItems.aspx?RootFolder=%2FINFCOM%2D2%2FEnglish%2F1%2E%20DRAFTS%20FOR%20DISCUSSION&FolderCTID=0x012000DFD47F9206CDD640A4FDFBAA2EB0EF6E&View=%7BDBBC48FA%2DBEE2%2D4A94%2D8905%2DFBE98B87E342%7D))SERCOM is ready to table the detailed implementation plan including the proposed improvement of GDPFS to SERCOM-2. |
| **Output 1.2.1**  | **NMHS basic systems operational, with data rescued and incorporated in a climate data management system (CDMS) with ongoing integration of new observations; access to and provision of basic monitoring products and seasonal forecasts; deployment of Climate Services Toolkit (CST)** |
| SC-ON | [Res. 54 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=185) | 1.2.1 | SERCOM | Enhanced capacity of RCCs and NMHSs to use satellite-based data in line with the Action plan for phased Space-based Weather and Climate Extremes Monitoring (SWCEM) implementation with strengthened end-user engagement |  |  | Based on the successful East Asia/Western Pacific project, a similar proposal has now been developed for RA III. The Enhancing Adaptive Capacity of Andean Communities through Climate Services (ENANDES) Project was introduced as a pilot project for Region III in Feb 2021, and it is preliminary planned for four years.Further considerations are being done with RA I.The kick-off meeting with the beneficiaries of the Climate Risk and Early Warning Systems (CREWS) project focused on the Southwest Indian Ocean region (CREWS-SWIO) took place in February 2022. Many users in the region expressed their interest in utilizing satellite-based rainfall data. In addition, the potential interest in disseminating the GSMaP data for the users in the region via the EUMET Cast system was expressed.In addition, from August 2022, SWCEM products are currently used for operational drought risk assessment and Early Warning System for drought by the Papua New Guinea (PNG) National Weather Service and the PNG Disaster Management Team.SWCEM achievements will be presented at the Asia-Pacific Ministerial Conference on Disaster Risk Reduction (APMCDRR) in Brisbane, Australia, 19–23 September 2022. |
| **Output 1.2.3**  | **Objective regional sub-seasonal and seasonal forecasting systems operational; regional coordination of downscaling of annual to decadal prediction and climate change projection products** |
| SC-MINT | [Res. 20 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=90) | 1.2.3 | SC-CLI | Contribution to the evaluation of World Records of Weather and Climate Extremes | Contribution to the evaluation of World Records of Weather and Climate Extremes  | Contribution to the evaluation of World Records of Weather and Climate Extremes | Guidelines were drafted and feedback was provided by SC-MINT. |
| [Res. 23 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=97)[Res. 20(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=90) | 1.2.3 | SC-CLI | Contribution to the WMO recognition mechanism for long-term observing stations | Contribution to the WMO recognition mechanism for long-term observing stations including its extension to include hydrological observation stations | Contribution to the WMO recognition mechanism for long-term observing stations | EC-73 endorsed new recognition mechanism for long-term observing stations and a roadmap to further develop it.WMO action plan for hydrology H 3.3 requires an activity on “Sharing of data from recognized centennial/reference (GBON-hydrology and Data centres) stations in hydrology”. |
| **Output 1.3** | **Further develop services in support of sustainable water management** |
| SC-MINT  | [Res. 25 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103) and [Res. 5 (EC-71), Annex 1](https://library.wmo.int/doc_num.php?explnum_id=10248#page=16) | 1.3/2.1/2.3 | SC-HYD, HCP | Workplan for QMF and Tech Reg update in the part related to INFCOM  |   |   | INFCOM-1 Part III adopted [Recommendation 14 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=363) to update Tech Reg vol III (Ch, 1, 2, 4 and 5). |
| [Res. 4 (Cg-Ext. (2021)](https://library.wmo.int/doc_num.php?explnum_id=11113#page=36)) | 1.3/2.1 | JET-HYDMON |  | Draft normative material and training on Sediment Transport Measurements and assessment (suspended and bedload) in cooperation with UNESCO and ISO | Normative material and training on Sediment Transport Measurements and assessment (suspended and bedload) adopted by INFCOM | Experts from JET-HYDMON identified and preliminary discussion with UNESCO-IHP started, likely delay due to other priorities |
| SC-ON | [Res. 4 (Cg Ext. (2021)](https://library.wmo.int/doc_num.php?explnum_id=11113#page=36)) | 1.3/2.1 | SC-MINT |  | Draft normative material and training on water quality monitoring in cooperation with UNEP, UNESCO, WHO, FAO, UNDP, WB | Normative material and training on water quality monitoring adopted by INFCOM | Water quality monitoring is requested by the WMO action plan for hydrology, activities I.1.2, I.1.3, I.2.3, I.4.1, I.4.2, I.5.1, I.5.2, I.5.3. Scoping workshops done in 2022 and a detail planning would be requested. |
| **Output 1.3.4** | **High-quality data supports science: NHSs supported in all aspects of hydrometry, from data collection to data management to data sharing** |
| SC-ON | [Res. 18 (EC-70)](https://library.wmo.int/doc_num.php?explnum_id=4981#page=71) | 1.3, 2.1 | C-DATA |  | Review and endorse the World Water Data Initiative (WWDI) Implementation Plan |  | Draft implementation plan approved by WWDI steering committee; activity postponed due to lack of resources. |
| SC-ESMP | [Res. 5 (CHy-15)](https://library.wmo.int/doc_num.php?explnum_id=3404#page=43) | 1.3/2.1/2.2 | SC-HYD | Report on the evolving role of the GRDC, IGRAC and HYDROLARE, and their relationship with WMO, with respect to the monitoring and measurement of the achievement of the SDGs, their contributions to the Global Framework for Climate Services (GFCS) and support to the WHOS, GHSF and other hydrological initiatives |  | Needs for regional hydrological centres | INFCOM-1 Part III adopted [Resolution 12 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=157) on the concept of the GDPFS centres for hydrological services. Assessment of global data centres will take into account this decision. |
| SC-IMT  | [Res. 25 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103)[Res. 17 (EC-70)](https://library.wmo.int/doc_num.php?explnum_id=4981#page=70) | 1.3/2.2 | SC-ON, JET-HYDMON | WHOS Phase II implementation in the La Plata Basin, and the Arctic Region, and development of the WIS 2.0 pilot for WHOS integration. | Launch of additional WHOS Phase II implementations at subregional and national scaleLaunch of the WHOS PortalRegional Training on interoperable hydrological data exchangeWHOS integration with WIS and WIGOS | Continue WHOS Phase II implementation including water quality parametersRegional Training Interoperable hydrological data exchange and supported toolsWHOS integration with WIS and WIGOSOperationalization of Interoperable Hydrological data exchange Communities | Web portal Arctic Region open in March 2021. La Plata Basin on open; Additional implementation in Dominica Republic in final stage.-Distance Learning course on Operational data exchange conducted. Online training material on track.In progress.Draft WHOS Phase II Operational plan submitted to INFCOM-2 as draft Recommendation 6.3(1)/2. |
| SC-ON | [Res. 25(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103) and [Res. 5 (EC-71), Annex 1](https://library.wmo.int/doc_num.php?explnum_id=10248#page=16) | 1.3/2.1 |  | HydroHub-WHYCOS Operating Plan and priority project funded and launched |  |   | Indian Ocean Hydrological Cycle Observing System (HYCOS) approved as a part of the Green Climate Fund (GCF) funded project; SADC HYCOS submitted to GCF in 2020; Lake Chad HYCOS concept note submitted to Adaptation Fund in June 2022. |
| SC-MINT  | [Res. 25(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103) and [Res. 5 (EC-71), Annex 1](https://library.wmo.int/doc_num.php?explnum_id=10248#page=16) | 1.3/2.1 |  |  | Innovation Camp for hydrometry launched |  | There is a new strategy for Innovation Hub, based on innovation calls instead of camps. A new innovation calls for Pacific Island on going in 2022, and an innovation project submitted to the Adaptation Find. work ongoing Hydrometry training including innovation organized for October 2021 in Benin.In addition, SC-MINT should consider the WMO action plan for Hydrology E.1.1. “Guidelines on/development of practical methods for assessment (flagging) of hydrological data” for 2025; A.8.2 “Support of local production of monitoring equipment to enhance maintenance availability and reduce cost” and A.9.2: “HydroHub Innovation hub will stimulate the development and deployment of low-cost technologies for hydrometric monitoring” |
| **Output 1.3.5**  | **Science provides a sound basis for operational hydrology: a user-friendly tool for estimating uncertainties in discharge measurements is available to NHSs** |
| SC-MINT | [Res. 25(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103) and [Res. 5 (EC-71), Annex 1](https://library.wmo.int/doc_num.php?explnum_id=10248#page=16) | 1.3/2.1 |  | Project X implementation according to new TORs and approved workplan  | Progress on implementation of workplan of Project X and better connections to Innovation hub. |   | New workplan approved in 2022. |
| **Output 1.3.6**  | **We have thorough knowledge of the water resources of our world: first phase of HydroSOS operational and WRA tools available** |
| SC-IMT  | [Res. 25(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103) | 1.3/2.1/2.2/2.3 | SC-HYD. SC-ON, SC-ESMP |   | Report on the findings of the pilot phase of the Global Hydrological Status and Outlook System (HydroSOS) | HydroSOS implementation started | HydroSOS pilot report approved by Cg-Ext. (2021). Demonstration webpage ready; two pilot projects in preparation for funding.A SC-ON, SC-ESMP, SC-IMT cross-cutting activity is requested for HydroSOS further development and implementation, according the WMO action plan for hydrology.In addition, the WMO action plan for hydrology H.3.1 “a Concept note for WMO hydrology cloud developed (for storage of essential data of Members (based on a review of the role of data centres role))”, H.3.4 “a Software (possibly a cloud solution) for computation of parameter defined under H.2.3”, and H.3.5 “Presentation of data sets for evaluation – web presentation of data sets for SDGs”. |
| SC-ESMP | [Res. 25(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103) and [Res. 5 (EC-71), Annex 2](https://library.wmo.int/doc_num.php?explnum_id=10248#page=20) | 1.3/2.1/2.2/2.3 | SC-HYD/SC-ON |   | Support SC-HYD in the preparation of Guidelines for Water Resource Assessment (website), especially modelling components (DWAT) and roles of hydrological centres (part of GDPFS) |   | Most of activities done by SC-HYD (SERCOM), website under preparation, delay due to COVID-19.A new activity is requested from the WMO action plan for hydrology C.2.3 “Operational guidance and tools for verification of available products”. |
| SC-ON | [Res. 25(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=103) and [Res. 5 (EC-71)](https://library.wmo.int/doc_num.php?explnum_id=10248#page=16) | 1.3/2.1 | SC-HYD | Hydrological network design concept and guidelines. |  |   | Postponed due to WMO Reform process. Research component incorporated into Research document of HCP, activities to start in 2022 under SC-ON, likely with task team that includes JET-HYDMON experts. This activity should contribute as well to the WMO action plan for hydrology A.11.4 “Statement on network design with respect to flood forecasting and management”. |
| **Output 2.1.1**  | **WIGOS Operational Plan 2020–2023 implemented:** **◦ Enhanced WMO Integrated Global Observing System delivering observations to support all WMO priorities, Programmes and application areas;****◦ Increased visibility and strengthened role of NMHSs at the national level;****◦ Increased integration and open sharing of observations from WMO and non-WMO sources across national and regional boundaries;** |
| SC-ON, TT-GBON, GCW-AG | [Res. 37 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=127) | 2.1.1 | RAs, HCP, RBGlobal Ocean Observing System (GOOS), Global Climate Observing System (GCOS) | **Plan for WIGOS Initial Operational Phase (2020–2023)**:1. Implementation of the plan completed with decisions on next steps for 2024–2027
2. Maintain relevant technical regulatory material and Guides related to WIGOS.
3. Integration of Earth System domain observations in WIGOS:
* Interact with HCP via JET-HYDMON for further integration of hydrological observations in WIGOS
* Interact with the Research Board for the further integration of the Global Atmosphere Watch (GAW) observations in WIGOS
* Promote understanding of the value chain and provide support in evaluating priority investment areas through the GOOS ObsCoDe Ocean Decade programme; expand GBON in global oceans for GNWP; use the power of WMO’s regulatory environment to help improve exchange of ocean data in EEZs
* GCW pre-operational plan 2020–2023; support in articulating the need/value for investment in the ocean observing system – advocacy
* Further integration of GCOS network observations into WIGOS
* Development of an integrated extensible Tiered Networks approach
* Contribute to harmonization of terminology
* Promote the defining the station sets by utilizing the guidance document
 | Streamline the WIGOS Manual (WMO-No. 1160), to be better applicable for users;Further integration of Earth System domain observations in WIGOS to increase data use.Assess and promote the national WIGOS implementation, and improve the guidance material for Members. | 1) National WIGOS implementation, including necessary capacity development, partnership agreements and integration of observing systems for all application areas;2) Fostering a culture of compliance with the WIGOS technical regulations;3) Maintenance of the GBON and the Regional Basic Observing Networks (see deliverable in specific row below);4) Improvement in the areas of WIGOS Data Quality Monitoring System (WDQMS), RWCs, OSCAR (see specific deliverables in specific rows below). | [Resolution 9 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=35) – Plan for the WMO Integrated Global Observing System Initial Operational Phase (2020–2023) per [Recommendation 1 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=262).[Decision 7 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=526) on WIGOS Indicators per [Recommendation 12 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=356).The drafts for updating the technical regulatory and guidance material were prepared for INFCOM-2.A guidance document for station sets was developed for INFCOM-2. |
| SC-ON, TT-GBON, GCW-AG | [Res. 1 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=9) |  | HCP, RBGOOS, GCOS | **Implementation of Unified Data Policy (SC-ON part):**Update of Technical Regulations reflecting core data in other domains.Develop technical regulations in relation to the data policy for the domains not covered by GBON, i.e., Hydrology, AC, Space weather, cryosphere, and marine observations and historical observations. | Implementation of new core data.GCW-AG: identify and document core cryosphere (all components) data – 2024. | GCW-AG: evaluate compliance with Data Policy and recommend adjustments. | Cg-Ext.(2021) adopted [Resolution 1 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=9) on the WMO Unified Data Policy for the International Exchange of Earth System Data, requesting INFCOM inter alia to provide draft technical regulations to support the implementation of the resolution, to be submitted to the World Meteorological Congress in 2023.Consequently, INFCOM president established a Coordinator on the implementation of the Unified Data Policy, who, in consultation with the Standing Committee Chairs, developed an implementation roadmap.Concerning hydrological data: the work of the Work Water Data Initiative should be included here. |
| SC-ON, TT-GBON, GCW-AG | [Res. 35(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=123) and [Res. 36 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=125) | 2.1.1 |  | **WIGOS Station Identifiers (WSI)**: Amendments to the *Manual on the WMO Integrated Global Observing System* (WMO-No. 1160) and *Guide to the WIGOS* (WMO-No. 1165) | Promote development of national scheme for WSI assignment by the Members. | Promote development of national scheme for WSI assignment by the Members. | INFCOM-1 Part II adopted [Recommendation 3 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=295) amendments to the Manual on WIGOS, section 2.4.1INFCOM-1 Part III adopted: (i) [Recommendation 11 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=353) on amendments to the Manual on WIGOS, [WMO-No. 1160](https://library.wmo.int/doc_num.php?explnum_id=11157), and (ii) Recommendation 10 on the update of the Guide to WIGOS, [WMO-No. 1165](https://library.wmo.int/doc_num.php?explnum_id=11137), concerning implementation of WSI. These were then adopted by the Executive Council through [Resolutions 10](https://library.wmo.int/doc_num.php?explnum_id=11008#page=61), [11](https://library.wmo.int/doc_num.php?explnum_id=11008#page=63) and [13](https://library.wmo.int/doc_num.php?explnum_id=11008#page=209) (EC-73).Trainings and workshops organized including WSI principles and assignments.Examples for national WSI schema shared in WIGOS web page.Documents and tutorials available in WIGOS learning portal. |
| SC-ON, TT-GBON, GCW-AG | [Res. 2 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=29)[Res 3 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=34) | 2.1.1 |  | **Implementation of the GBON**; Monitor compliance and maintenance of GBON by SC-ON; GBON Financing Mechanism and capacity development activities, including technical support to SOFF for LDCs and SIDS per ad hoc requests of SOFF. | Maintenance and evolution of GBON and its compliance monitoring. | Maintenance and evolution of GBON and its compliance monitoring. | INFCOM-1 Part II adopted [Recommendation 2 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=290) on the update of regulatory material for GBON, and [Resolution 2 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=41) on GBON.INFCOM-1 Part III adopted (i) Recommendation 11 on further amendments to the Manual on WIGOS, [WMO-No. 1160](https://library.wmo.int/doc_num.php?explnum_id=11157).Accordingly, Executive Council then adopted [Resolution 11 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=63) on WIGOS Manual update, and Congress adopted [Resolution 2 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=29) on Technical Regulations for GBON. Congress requested INFCOM inter alia to develop the technical guidelines, processes and procedures needed to ensure the expedient and efficient implementation of GBON, and to prepare for the effective performance and compliance monitoring of GBON.Consequently, INFCOM president established a Task Team on GBON implementation to work during 2022 on the Congress request. |
| SC-ON, TT-GBON, GCW-AG | [Res. 2 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=29) | 2.1.1 | HCP, RB,GOOS, GCOS | **Expansion of GBON in other domains**:1. Define principles for expansion of GBON in other domains
2. Study on the potential integration of additional hydrological and cryosphere variables into the GBON in collaboration with the respective communities. This implies (i) working with GOOS and Intergovernmental Oceanographic Commission (IOC) and SERCOM for the oceans/cryosphere; (ii) Working with the RB on Carbon monitoring/tracking/budgeting/modelling; (iii) climatology, (iv) hydrology and GBON concept note targeting Cg-19 for related technical regulations.
 | Roadmaps for integration of GBON in additional domains. | Implementation of roadmaps for the integration of GBON in additional domains. | As part of [Resolution 2 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=29), Congress requested INFCOM to continue exploring potential paths for the future evolution of GBON into broader Earth system domains and disciplines beyond its current scope of support for global numerical weather prediction (NWP) and climate analysis. Congress also adopted [Resolution 4 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=36) – WMO Vision and Strategy for Hydrology and its associated Plan of ActionThe president of INFCOM with support of SC-ON, and in consultation with the Hydrological Coordination Panel (HCP), prepared a concept note for study on the potential integration of additional hydrological and cryosphere variables into GBON, which then adopted [Decision 6 (EC-75)](https://meetings.wmo.int/EC-75/SiteAssets/SitePages/Session%20Information/EC-75-LIST-OF-RESOLUTIONS-AND-DECISIONS_en.docx).This activity should take into account the WMO action plan for hydrology, A.11.1 requiring a “network of reference”. |
| SC-ON, TT-GBON, GCW-AG | [Res. 34 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=121)[Res. 37 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=127) | 2.1.1 | RAs | **Transition to the Regional Basic Observing Networks (RBONs)**: Guidance to Members with regard to implementation of RBONsRBONs established in all regions by the regional associations (INFCOM assisting). | Maintenance and evolution of RBON and its compliance monitoring (INFCOM assisting the regional associations). | Maintenance and evolution of RBON and its compliance monitoring (INFCOM assisting the regional associations). | Draft Recommendation on the update of the Guide to WIGOS is submitted to INFCOM-2, with a new chapter on the RBON design process. If adopted, the regional associations will be invited to apply the process during 2023.On 7 June 2022, according to regional association decisions, all former RBSN and RBCN stations have been affiliated to RBON instead. |
| SC-ON, TT-GBON, GCW-AG | [Res. 37 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=127) | 2.1.1 |  | **WIGOS Data Quality Monitoring System (WDQMS)**:Improvement of functions of WDQMS web tool for GBON compliance monitoring. | Evaluation and improvement of WDQMS functions. | Evaluation and improvement of WDQMS functions. | (i) Questionnaires on the status and evolution of the WDQMS webtool have been developed circulated among various communities and expert teams and will be assessed next.(ii) GCOS upper-air network and GCOS surface network integrated into the operational version of the WDQMS webtool.(iii) Incident management system tool as part of the WDQMS concept is available in test mode for Regional WIGOS Centres.Executive Council adopted [Decision 7 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=526) on WIGOS Indicators per [Recommendation 12 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=356).WDQMS web tool display modes for GBON compliance monitoring defined. |
| SC-ON, TT-GBON, GCW-AG | [Res. 37 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=127)[Res. 41(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=146) | 2.1.1 | OSCAR Project Team | **Strategy for evolution of WIGOS Tools across Earth System domains:**1. OSCAR Platform Strategy, including the Surface, Space and Requirements components;
2. WDQMS Strategy;
3. IMS Strategy.
 | Collecting, assessing and addressing the user feedback for WIGOS tools.Integration of WIGOS components into WIGOS tools. | Collecting, assessing and addressing the user feedback for WIGOS tools.Integration of WIGOS components into WIGOS tools. | OSCAR/Surface:(i) Questionnaires on the status and evolution of OSCAR/Surface have been developed, circulated among various communities and expert teams and assessed.(ii) New releases of OSCAR/Surface have been published twice/year with improved functionalities for users to update metadata, including for users of the API.(iii) New additional tools have been developed and are ready for release, that will facilitate users’ interaction with OSCAR/Surface: The Station templates for facilitating/streamlining manual entries of most common station types and the Web client tool for batch upload of station records.OSCAR/Requirements being reviewed as part of second deliverable under output 2.1.4.OSCAR Space maintenance contract has been successfully established, evolutions are ongoing and interface to Space Agency landing pages are coordinated via the Coordination Group for Meteorological Satellites (CGMS) Working Group II.Integration of WIGOS components (GCW, marine, radars, wind profilers, radars) in WIGOS tools under discussion with relevant communities. |
| SC-ON, TT-GBON, GCW-AG | [Res. 37 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=127) | 2.1.1 | RAs | **Regional WIGOS Centres (RWCs):**1. Organize training and support to Members activities (data management, metadata, quality monitoring, network design, measurement techniques, instrumentation and instrument exposure, traceability,...);
2. Engage with the regional associations and further develop and consolidate the network of RWCs, including capacity development and training e.g. on OSCAR, WDQMS, IMS;
3. Expansion of the functions and scope of the RWCs (e.g. additional functions; expansion in other domains);
4. Contribution to standardization of RWC auditing process;
5. Establishment of RWCs in RA IV and RA VI;
6. Implementing the RWCs audit program;
7. Contribute to process for transition from pilot to operational mode for the RWCs.
 | Evaluation of the RWCs operations, and expansion of the scope and functions. | Evaluation of the RWCs operations, and expansion of the scope and functions. | RWCs in RA II (Beijing and Tokyo) had been audited and designated as full operational centres since September 2021.RWCs in RA I/East Africa (Kenya and Tanzania) (July 2020), RA I/Southern Africa (South Africa) (March 2021), RA I/West/Central Africa (Casablanca, Morocco) (2022) RA III/Argentina (May 2020), RA III/Brazil (May 2020), RA V/ Fiji (June, 2021), RA V/Indonesia (June, 2020), RA V/Singapore (June, 2020) and RA VI/EUMETNET (2019, only automatic component of the monitoring function) have been established in pilot mode since the dates indicated.Discussions are progressing well in RA IV (a draft concept document was developed for RWCs in RA IV with discussion of various Members and this document was endorsed by RA IV MG).The initiatives are under progress for establishment of RWCs in RA VI.RWC Global Workshop was organized on 25–27 July 2022.Audit program including audit criteria for RWCs developed.Executive Council adopted [Resolution 12 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=205) - Regional WMO Integrated Global Observing System Centres audit process, per [Recommendation 13 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=359) |
| **Output 2.1.2**  | **◦ Enhanced capabilities to identify gaps in global, regional, subregional and national observing systems in the context of user needs, issues, etc.;****◦ Enhanced cooperation with partners at the national and regional levels;****◦ Enhanced compliance with WMO Technical Regulations;****◦ Improved human and technical capacity of all WMO Members for planning, implementation and operation of WIGOS;****◦ Improved availability and quality of WIGOS observational data and metadata** |
| SC-ON |  |  |  | **Engagement of experts in SC-ON:**1. Promote and ensure gender and regional balance in the experts contributing to SC-ON;
2. Promote and ensure engagement of young experts and succession planning activities in SC-ON;
3. Capacity Development:
* Identify the capacity development needs.
* Contribute to preparation and delivery of capacity development activities.
* Interact with relevant entities including public and private agencies, and academia for capacity development.
 | Continued activities from 2023. | Continued activities from 2023, 2024. | A survey on capacity development was developed and circulated in 2022 among SC-ON Members, and assessed.In application of the WMO work plan for hydrology E.1.2, section of Tech Reg III on Hydrological observations Hydrological data availability would be required, together with SC-MINT (2.1.5). |
| SC-ON | [Res. 39 (Cg-17)](https://library.wmo.int/doc_num.php?explnum_id=3138#page=501) | 2.1.2 | GCOS | **Establishment of a GCOS Surface Reference Network (GSRN)**:GSRN implementation of pilot stations and their reporting to and monitoring by the lead centre. |  | GSRN Pilot network operational. | TT-GSRN formed & started working. Lead Centre selected and started working.INFCOM-2 is invited to adopt draft Decision 6.1(6)/1 on operational implementation plan for a GSRN pilot station network. |
| SC-ON | [Res. 23 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=97) [Res. 20 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=90) [Res. 51 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=177) | 2.1.2 |  GCOS | **Climate observations**:1. Include ECV requirements in Rolling Review of Requirements (RRR)
2. Liaise with Members to advance the actions of the GCOS IP Observing stations recognized according to the WMO recognition mechanism for long-term observing stations (Resolution 23 (Cg-18);
3. Progress with regard to development of Volunteer Observing Networks;
 |  |  | 1. Review of ECV requirements finalized.
2. GCOS Implementation Plan to be published in fall 2022. It will include the ECV requirements that will be subsequently integrated in the RRR.
3. Centennials: 94 centennial stations recognized by EC 72; 71 nominations received in response to a following WMO call for nominations in Dec 20 (assessment ongoing and proposal to be tabled at EC-73); SERCOM endorsed a recommendation to EC-73 to endorse an updated WMO mechanism (mechanism developed further to address WMO Reform) and a roadmap (including test of recognition of marine and hydrological stations, guidelines for national recognition of 75+ years stations, proposal for very important remote stations incl. Polar stations that do not meet all criteria)
4. Voluntary Observing Networks (VON): The newly established SERCOM ET-CMA (Climate Monitoring and Assessment) accepted an activity to gather and provide to INFCOM requirements for VON ([Secretariat]note: VON were entirely led by the Commission for Climatology in the past but need to be taken over by INFCOM based on requirements from SERCOM).
 |
| SC-ON | [Res. 39 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=138) | 2.1.2 | RAs | **Implementation of Aircraft-based observations**:Continued development and implementation of the WMO-IATA Collaborative Aircraft Meteorological Data Relay (AMDAR) Programme (WICAP)1. Two regional workshops on WICAP.
2. Establishment of targeted WICAP projects for Africa, RA III and the Middle East.
3. Development of a resourcing strategy for WICAP.
4. Investigation into application of the International Civil Aviation Organization (ICAO) emissions trading scheme (CORSIA) for WICAP.
 | Continued implementation of the WICAP Implementation Plan.Implementation of the resourcing strategy for WICAP.Investigation into application of the ICAO emissions trading scheme and implementation if feasible.Two workshops on WICAP.Targeted development projects for Africa, RA III and the Middle East. | Continued implementation of the WICAP Implementation Plan.Strategic engagement with aviation service providers.2 regional workshops on WICAP per annum. | WICAP Data Policy developed and signed by WMO and IATA.All 6 WMO RAs now committed to develop a regional AMDAR programme under WICAP and regional teams/work groups have been established.Has been jointly agreed not to take organization level approach to exchanging Turbulence Aware turbulence data.Report of WICAP Target Airline Analysis published with initial cost estimates for implementation and operation.Two WICAP promotional videos published and more guidance material, including an Airline Manual, to be published in due course.Holding of two regional workshops on WICAP (RA III and RA I)Timeline for implementation has been greatly impacted and delayed by the pandemic on the aviation industry. A new WICAP Implementation Plan is submitted as information document 6.1(5) to the INFCOM-2 session. |
| SC-ON |  | 2.1.2 | SC-MINT | **Aircraft-based observations regulatory and guidance material**:1. Publication of WMO-No. 8, Volume III, Chapter 3.
2. Publication of WMO-No. 1200, Guide to Aircraft-based Observations (ABO).
3. Publication of two Newsletters on ABO and AMDAR.
4. Continued maintenance of the ABO Application Area on the WMO Community Platform.
 | Continued review of ABO guidance and technical materials.Continued publication of Newsletter on ABO and AMDARContinued maintenance of the ABO Application Area on the WMO Community Platform. | Continued review of ABO guidance and technical materials.Continued publication of Newsletter on ABO and AMDAR.Continued maintenance of the ABO Application Area on the WMO Community Platform. | Drafts of updates to [WMO No. 8](https://library.wmo.int/index.php?lvl=notice_display&id=12407), Volume III, Chapter 3 completed.Draft of update to [WMO No. 1200](https://library.wmo.int/index.php?lvl=notice_display&id=20116), Guide to ABO completed.Update and publication of WIGOS Technical Report 2021–1, Benefits of ABO and AMDAR to Meteorology and Aviation.2 ABO newsletter volumes published per year. |
| SC-ON | [Res. 6 (EC-69)](https://library.wmo.int/doc_num.php?explnum_id=3645#page=130) - GDC[Dec. 18 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=247) - Uncrewed Aircraft Systems (UAS)-DC | 2.1.2 | SC-MINT | **Aircraft-based observations data availability**:1. Continued implementation of the Aircraft-Based Observations Metadata Repository, including commencement of Member provision and maintenance of metadata.
2. Continued development of the plan for, and the holding of the UAS Demonstration Campaign.
3. Continued development of the functions of the Lead Centre for Aircraft-Based Observations and the ABO WDQMS.
4. Development and implementation of a proposed resourcing framework for ABO data sources.
5. Agreement with USA/NOAA for operation of the Global Data Centre for ABO.
 | Continued implementation of the Aircraft-Based Observations Metadata Repository, including Member maintenance of metadata.Continued development of the plan for, and the holding of the UAS Demonstration Campaign.Designation and continued development of the functions of the Lead Centre for Aircraft-Based Observations and the ABO WDQMS.Development and implementation of a proposed resourcing framework for ABO data sources. | Finalization of the report of the UAS Demonstration Campaign.Intercomparison of UAS.Global development of Aircraft Derived Data from Mode S and ADS-B systems.UAS operational under RBON/GBON. | Holding of Workshop on Aircraft Derived Data (Sep. 2022)second Meeting of the JET-ABO, June 2022.Commenced development of the ABO Metadata Repository.Continued maintenance of the AMDAR Coverage Analysis Tool.Provision of Flyht global TAMDAR and Automated Flight Information & Reporting System (AFIRS) data on the WIS.Support for ABO data provision over Africa.Support for development of the Kenya AMDAR Programme. |
| SC-ON |  | 2.1.2 | RB, SC-MINT, SC-ESMP | **New technologies:**1. Work with the research community on emerging technologies including AI/Exascale computing; Identify new and low-cost technologies and develop appropriate guidance;

Uncrewed Aircraft Systems: UAS Demonstration Campaign completed**.**  |  |  | Workshop on UAV held in July 2019.BAMS Report on UAS developed & submitted for publication.INFCOM-1 Part III adopted [Decision 18 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=247) - Plan for a Global Demonstration Project on Uncrewed Aircraft Systems (UAS) Use in Operational Meteorology.Work on whitepaper commenced. |
| SC-ON |  | 2.1.2 |  | **Surface-based observing systems regulatory material**:(1) Radiosonde systems regulatory material(2) Radar wind profilers guidance. |  |  | Guidance material and relevant WMO/ISO standard on radar wind profilers under development, by SC-MINT/ET-UAM, second half of 2021. |
| SC-ON |  | 2.1.2 |  | **Radiosonde scheduling changes**: |  |   | In progress. |
| SC-ON, -GCOS  | [Res. 39 (Cg-17)](https://library.wmo.int/doc_num.php?explnum_id=3138#page=501) | 2.1.2 (aligned to 1.2.16) | GCOS | **Reporting on Progress to UNFCCC/SBSTA** on the evolving needs of the climate observing system for land, atmosphere and ocean, and actions to address them.  |  |  | Plans for reporting Implementation Plan to UNFCCC COP 2022. |
| SC-ON | [Dec. 4 (EC-75)](https://meetings.wmo.int/EC-75/SiteAssets/SitePages/Session%20Information/EC-75-LIST-OF-RESOLUTIONS-AND-DECISIONS_en.docx) | 2.1.2 | SC-MINT | **Business Continuity Plan (SC-ON part):**Respond to EC decision on proposed approaches to the Business Continuity and Contingency Planning requesting INFCOM:* to collect various cases from different levels of capacity of the Members to be used as one good reference for the other Members.
* to develop guidance material for Members, particularly for those who need support for business continuity and contingency planning, based on the initial approaches as provided in the annex to [EC Decision 4 (EC-75)](https://meetings.wmo.int/EC-75/SiteAssets/SitePages/Session%20Information/EC-75-LIST-OF-RESOLUTIONS-AND-DECISIONS_en.docx).
 |  |  |  |
| **Output 2.1.3**  | **◦ Operational space mission implemented in line with the WIGOS Vision 2040;****◦ Climate Services value chain fully addressed by satellite observation; roles and responsibilities of actors and coordination mechanisms understood; Physical Architecture for Climate Monitoring from Space implemented, after identifying and addressing key gaps in the climate value chain, from satellites to decision-making. Output will include: gap analysis, Statement of Guidance, reporting to CEOS/CGMS, actions by Space agencies;** **◦ Guidance on calibration and measurement techniques, including intercomparison results in order to ensure fit-for-purpose traceable measurements**  |
| SC-ON | [Res. 51 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=177)[Res. 54 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=185) | 2.1.3 | CGMS | **WIGOS Vision 2040 implementation for space-based systems**: Monitoring the progress of the advancement of the WIGOS 2040 Vision space component:1. What core data;
2. Space agencies to plan additional capabilities per WIGOS Vision 2040).
 |  |  | INFCOM-1 Part II adopted [Decision 9 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=204) on Space-Based Observations and the Review of WMO Data Policies and PracticesPosition Paper for Satellite data Requirements for Global NWP was adopted by INFCOM-I Part III as [Decision 17 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=237) and CGMS-49 Plenary.Climate related activities coordinated together with CEOS/CGMS/WGClimate. |
| [Res. 5 (Cg-XIV)](https://library.wmo.int/doc_num.php?explnum_id=4239) | 2.1.3 | CGMS | **Access to Satellite data and products:** |  |  | (i) Ongoing(ii) Regional SDR activities have been supported, to date no updated requirements have been established. RA I activities for preparation for EUMETSAT MTG supported and approved by EUMETSAT Council in 2020. |
| [Res. 52 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=178) | 2.1.3 | CGMS | **Enhanced capacity of WMO Members to use space-based systems data**:1. Implementation of Strategy for the WMO-CGMS Virtual Laboratory for Education and Training in Satellite Meteorology 2020–2024 ([Res. 52 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=178)) and

Enhanced coordination with ETR in the framework. |  |  | (ii) Despite COVID-19 training activities have been successfully pursued through virtual training. Document on Guidelines satellite skills and knowledge for operational meteorologists (SP-NO 12) under preparation(ii) ongoing. |
| [Res. 53 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=184) | 2.1.3 | SERCOM | **Progress regarding Space Weather Services integration into WIGOS and WIS** in line with the Four-Year Plan for WMO Activities Related to Space Weather 2020–2023 ([Res. 53 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=184)). |  |  | Expert Team for Space Weather being re-established as part of the reorganization to support the integration activities, support to ICAO SWx services and for international coordination. Consideration is made to have such team established under SC-ESMP. |
| **Output 2.1.4**  | **Response to the WIGOS Vision 2040 during 2020–2023, including consideration of Earth system prediction requirements and urban services** |
| SC-ON | [Res. 39 (Cg-17)](https://library.wmo.int/doc_num.php?explnum_id=3138#page=501) | 2.1.4 | GCOS | **Fourth GCOS assessment and review cycle**:  | Consideration GCOS IP Actions to be included in future development plans.  |  | GCOS Implementation Plan describes actions to improve the global climate observing system, and will be submitted to UNFCCC for consideration at COP27. NMHS are amongst the implementers of those actions. GCOS will submit a recommendation for INFCOM-2 as draft Recommendation 6.1(11)/1, asking INFCOM to recommend EC to consider a draft decision. This draft decision will request members to consider the GCOS IP Actions relevant to WMO/NMHS. |
| SC-ON | [Res. 38 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=137)[Res. 40(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=144) | 2.1.4 | SERCOM, RB, RAs | **Redesign of Rolling Review of Requirements (RRR)**:1. Principles and Plan for redesigned of RRR taking into account Earth System Analysis, Prediction and Projection incl. plan for evolving OSCAR/Requirements to take into account such requirements; Plan for transition of RRR to the new RRR process;
2. Assessment of the impact of observations (impact studies and tools, together with the Research Community); results of NWP impact studies reviewed and new ones promoted with list of science questions to address;
3. Observational user requirements and Statements of Guidance of two Application Areas updated;
4. Observing network design and optimization of the observing system; incl. Integration of satellite and in situ observations, and concept of virtual observation with agreed terminology.
 | Implementation of the transition plan for the redesigned RRR process. | Routine execution of the new RRR process. | 1: See draft Recommendation 6.1(3)/1 submitted to INFCOM-2;2: See recommendations of Impact workshop, Dec. 2020;3: to be done as part of new RRR process;4: to be addressed by JET-EOSDE. |
| SC-ON | [Res. 38 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=137)[Res. 40(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=144) | 2.1.4 | SERCOM, RB, RAs | **High Level Guidance (HLG) in response to WIGOS Vision 2040**:1. Adoption of High Level Guidance on the Evolution of Global Observing Systems in response to WIGOS Vision 2040.
2. Consideration of updating technical regulations to address some of the HLG priority actions.
3. Recommendation on the life cycle & frequency of the WIGOS Vision and associated implementation activities (HLG).
4. Provide plan for monitoring implementation and monitoring of high priority actions under High Level Guidance on Evolution of observing systems in response to WIGOS Vision 2040.
 | Consideration of updating technical regulations to address some of the HLG priority actions. | Update of the HLG document per evolved user requirements, data gaps and available observing technology. | 1: See draft Recommendation 6.1(1)/1 submitted to INFCOM-2;2, 3, 4: In JET-EOSDE work programme. |
| SC-ON | [Res. 38 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=137)[Res. 40(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=144) | 2.1.4 | SC-MINT, GCOS | **Tiered Networks**: Concepts and principles for streamlining of WIGOS observing networks according to tiered networks approach, and integration of reference station concept; criteria for tiering and implementation roadmap. | Tiered Networks: Update of WIGOS Manual and Guide for streamlining of WIGOS observing networks according to tiered networks approach, and integration of reference station concept. |  | Concept submitted to INFCOM-2 as draft Recommendation 6.1(7)/1. |
| SC-ON |  | 2.1.4 |  | **Station Sets:** Guidance on observing Station and observing network Sets. |  |  |  |
| SC-ON | [Res. 1 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=14)[Res. 32 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=114) | 2.1.4 | SERCOM | **Urban Observations**:draft Strategy and guidance for urban observations; (ii) Assessment of last advances in situ observations and end-user requirements analysis for urban observations. | Urban Observations: Strategy and guidance for urban observations approved. |  | Relevant section included in HLG document;Guidance on Urban instrumentation and traceability for update of [WMO-No. 8](https://library.wmo.int/index.php?lvl=notice_display&id=12407). |
| **Output 2.1.5**  | **◦ Standards and guidance developed for observations, operational practices and system performance monitoring, calibration and instrument testing, and data-related aspects for Earth system observations and fit-for-purpose traceable measurements, particularly from extreme and harsh environments and remote areas (including oceans and polar and high-mountain regions);****◦ New and emerging measurement techniques and non-conventional, innovative measurement methods developed (e.g. cryospheric observations, radar technologies, ground-based remote sensing, autonomous vehicles, measurement devices, citizen observatories). Existing standards updated to reflect evolving technologies, with a focus on precipitation (different timescales and phases) and specific instruments (e.g. remote sensing, including radars);****◦ Guidance on calibration and measurement techniques, including intercomparison results in order to ensure fit-for-purpose traceable measurements** |
| SC-MINT | [Res. 2 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=29) | 2.1.5 | SC-ON | **Environment Sustainability of Observations:**Roadmap to improved sustainability of observations for meteorological and marine domains. | Extension of activities to hydrology and atmospheric chemistry. | Inclusion of suitable practice related to environmental sustainability of observations in WMO regulatory material. | Survey of Member practices initiated. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | SC-ON, SC-ESMP, SC-IMT, RB, SERCOM | **Harmonization of Terminology and streamlining of WMO regulatory and guidance material:**1. Concept for WMO Standard Vocabulary submitted to Cg. Suitable technical solution to maintain the WMO Standard Vocabulary identified. Task team starting the work;
2. Plan for consistency of uncertainty-related terminology reviewed between WMO-No. 8 and RRR;
3. Contribute to update WMO Metadata Standard for measurement aspects
4. Example on use of measurement classification scheme.
 | 1. Review of terms originally part of IVM;2. Uncertainty-related terminology consistent btw WMO-No. 8 and RRR;4. Guidance on how to ensure that measurement meet user requirements/ use of classification schemes. | 1. WMO Standard Vocabulary finalized. | Concept for WMO Standard Vocabulary submitted to INFCOM-2 as draft Recommendation 6.2(1)/1. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | BSRN | **Traceability of solar and terrestrial radiation measurements**- Publication of IPC-XIII and IPgC-III reports;- Conduction of RPCs in 2 RAs. | Practices for dissemination of new reference, through transfer group, documented. | IPC-XIV and IPgC-IV (2025)Proposal for new references documented, including relevant maintenance practices, and relevant text for guidance and regulatory publication. | IPC-XIII and IPgC-III conducted (final reports in preparation).Conditions for change of radiation references submitted to INFCOM-2 as draft Recommendation 6.2(5)/1. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | SC-ON, JET-HYDMON, RB | **Measurement best practices for Earth System Observation, including Update of WMO-No. 8**1. Update of several chapters (atmospheric composition, precipitation, radiation, QMS, humidity, urban, eddy covariance) and new Volume on Marine measurements in collaboration with relevant stakeholders (BSRN, GAW, etc.);
2. Concept to extend competency framework to cover hydrometric measurements.
 | 1. New edition of WMO-No. 8 submitted for INFCOM-3 approval;2. Competency framework covering hydrometric measurements. | New edition of WMO-No. 8 submitted for INFCOM-4 approval (focus on Greenhouse Gas (GHG) measurements). | New edition of WMO-No. 8 submitted for INFCOM-2 approval as draft Recommendation 6.2(2)/1. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | SC-IMT, RAs,RB | **Performance and compliance of WMO designated measurement-related centres (RICs, RMICs, RRC, WRC)**1. Concept for publication of ToRs/duties of measurement-related centres in relevant regulatory documents agreed;
2. Streamlined concept on WMO instrument-related centres;
3. Interlaboratory comparison in RA III &
4. Publication of RA I interlaboratory comparison results.
 | - Update of regulatory material related to RICs/RRCs etc.- Assessment scheme for RRCs developed;- Regular assessment of RICs/RMICs/RRCs/LCs- Inter-laboratory comparison RA IV. | - Regular assessment of RICs/RMICs/RRCs.- ISO 17025 implemented in all RICs. | RICs performance reviewed.Recommendations on RICs drafted for attention of RAs. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | SC-ON, SC-ESMP, GCW-AG | **Improving traceability of measurements and their value to WMO programmes**1. Guidance document on field inspection published;
2. Training modules on wind and precipitation measurements;
3. Workshop on uncertainty calculation;

Training workshops on instrument calibrations in collaboration with RTCs for RA I and RA II;1. Collaborate with users to identify avenues for increasing value of measurements to users.
 | Guidance material on best practices on traceability assurance in line with traceability strategy.  | Guidance material on field calibration. | Training units on traceability and uncertainty developed. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | SC-ON, CGMS | **Instrument intercomparisons – Assessment of systems performances**1. Final report of Upper-Air Instrument intercomparison published;
2. Concept for new intercomparison (topic TBC, possibly non-catchment precipitation gauge);
3. Strengthen collaboration with relevant groups/Space agencies on ground-truthing/intercomparison of satellite measurements.
 | Intercomparison initiated. | Intercomparison conducted. | 1. Upper-air Instrument Intercomparison held. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | TT-GBON, SOFF | **Guidance on new/emerging measurement techniques and on measurement best practices*** Guidance on new/emerging measurement technologies published (surface & upper-air)
* IOM report on automation of cloud observations (TBC)
* IOM report on estimation of precipitation from microwave links
* Guidance material on low-cost Automatic Weather Station (AWS) developed
* Online training units on calibration practices
 | Extension of generic tender specification (if appropriate)E-learning units on transition to AWS. | E-learning training units (topic TBC). | Generic tender specification for AWS published (no update/extension planned before feedback on concrete use in GBON/SOFF).Guidance material on replacement of mercury-based instruments published. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | RAs | **Outreach and implementation of measurement best practices*** Training workshop on transition to automation for RA III and RA II
* Concept for AWS Conference (in RA I, TBC).
 | Measurement TECO held in conjunction with MWE-2024;AWS Conference (RA I, TBC);Outreach/guidance material on instrument maintenance. | Measurement TECO held in conjunction with MWE-2026AWS Conference in another region;Training workshop on transition to automation for RA I and RA V. | Measurement TECO held in conjunction with MWE-2026. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 |  | **Development of common WMO-ISO standards**Standards (if completed) for INFCOM approval.* Concept for standard on testing performance of AWS
* Plan for improvement of siting classification scheme.
 | Standards (if completed) for INFCOM approval.Concept on AWS testing standards shared with ISO. | Standards (if completed) for INFCOM approval.Standard finalized.Siting classification updated. |  |
| SC-ON | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.5 | SC-MINT | **Protection of radio-frequency bands**: Operational characteristics of ground-based passive sensors documented and provided to "SG-RFC-successor". |  |   | Preliminary WMO Position on the WRC-23 Agenda prepared by Expert Team on Radio-Frequency Coordination approved by INFCOM-I Part II, which adopted [Decision 8 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=189) on Preserving the Radio-Frequency Spectrum for Meteorological and Related Environmental Activities.SC-MINT/ET-UAM provided inputs to SC-ON/ET-RFC. |
| SC-MINT | [Res. 43(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=149) | 2.1.4 | SC-ON | **Operational Weather Radars:**Development of operational weather radar best practices guide.Contribute to review of curriculum and programme on radar trainings organized by RTCs/training centres. | Parts A, B, C and G of the guide approved. Drafts versions of the remaining parts of the guide finalized. BPG conducted jointly with ISO and could constitute Part 2 of standard 19926. | All parts of the guide available in its full form. The content of the guide reviewed and updated.Radar training regularly organized (by RTCs or others) and meeting Members’ needs. | INFCOM-2 is invited to adopt draft Recommendation 6.2(4)/1: Draft versions of Parts A, B, C and G of the guide.Radar trainings regularly organized. |
| **Output 2.1.6** | **GCW pre-operational phase concluded (2023), further integration across value cycle (2024 –on):****◦ Short-term demonstration projects and long-term plans for high-mountain observations, prediction, research and services;****Workplan reflective of the GCW pre-op plan (**[**Res 18, EC-73**](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338)**) and INFCOM-2 (SG-Cryo recommendations):****Standardization of observations and data, best practices, Cryosphere Observing Requirements in the revised WMO RRR process, implementation of Data Policy – Cryosphere Data, coordinate consultations on coupling of cryosphere in the ES, definition of cryo hazards in DRR-WMO, scientific support to the implementation of dedicated polar and high-mountain services (climate, mountains, cold-regions hydrology), roadmap for the infrastructure for fully coupled cryosphere in NWP◦ Intercomparison of products for sea ice thickness and snow-mountains****◦ GCW Data Portal operating as a WIS DCPC initiated in 2022, as a pilot project of WIS2.** |
| GCW-AG | [Res. 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338) and INFCOM-2  | 2.1.6 |  | **GCW Work Plan*** Revised ToRs for GCW-AG based on recommendations from SG-Cryo
* Increased alignment and integration across all SC of INFCOM and the linkages with SERCOM, RB and EC-PHORS
* Address governance of activities in INFCOM, SCs vs GCW-AG substructures
 | GCW-AG: operationalization of GCW.  | GCW-AG fully functional in INFCOM, providing coordination across relevant structures, with a focus on the integration of cryosphere in the relevant activities. | [Resolution 7 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=146) - established the Global Cryosphere Watch Advisory Group; SG-Cryo to provide recommendations on the priority activities for the integration of cryosphere – at INFCOM-2 as draft Recommendation 6.6/1– as decided by [Resolution 1 (INFCOM-1).](https://library.wmo.int/doc_num.php?explnum_id=11197#page=18) |
| SC-ON, GCW-AG | [Res. 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338) and INFCOM-2 | 2.1.6 |  | **GCW Observing Stations**:* Completion of transfer of EC 70 approved stations in OSCAR/Surface, followed by data harvesting via GCW Data Portal.
* Address gap – registration of Snow Depth in OSCAR/Surface.
* Survey RA II on existing observations and their use; follow with other RAs, linked to TPRCC-Network and JB-SMSC.
* Cryosphere category – Cryosphere Monitoring – pilot on the implementation in the revised RRR process.
* Station Sets – CryoNet Cluster: implementation in OSCAR/Surface.
* ESA project SIN’XS “Sea Ice-thickness product intercomparison eXerciSe”: engagements in the Stakeholder Board (SB) or SIN’XS Scientific Advisory Committee (SAC).
* Prepare/socialize concept of Mountain Snow Satellite Product Intercomparison (with EUMETSAT) - workshop 22–24 Nov 2022, intercomparison 2023+.
* Contribute to the year 2 of 4 of the IACS/MRI/WMO Joint Body Status of Mountain Snow Cover (JB-SMSC) (2022–2025) focus on RA II and RA III.
* Mutual engagements with WMO relevant projects: pan-Arctic Integrated Observing Systems (ArcticPASSION) and ESA Glacier Mass Balance Assessment GLambiE).
* Antarctica Observations: transition to RBON and address observing and technology performance and best practice – gaps (also linked to SC-MINT).
 | Improved representation of cryosphere observations in OSCAR/Surface;Cryosphere Monitoring Application Areas – under the revised RRR – report and SoG;Advance scientific support and stakeholder engagements for the relevant satellite product intercomparison;Organize engagements with relevant structures and partners on data requirements and data assimilation. | Improved representation of cryosphere observations in OSCAR/Surface;Approve Cryosphere Monitoring SoG;Expand to other Cryosphere category AAs;Prepare recommendations on improvements to cryosphere data assimilation and use for Earth System coupling through cryosphere. | WIP – work in progress, as planned – [Resolution 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338).To be revised based on Report from SG-Cryo to INFCOM-2 draft Recommendation 6.6/1. |
| SC-MINT, GCW-AG | [Res. 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338) and INFCOM-2 | 2.1.6 |  | **GCW regulatory and guidance material**:Best Practices:* Publication – Glaciers and Ice Caps: 2023
* Completion of development – Permafrost: 2023 – with publication 2024
* Sea Ice – under development – completion 2024
 | Best Practices:- completion – Sea Ice and Freshwater Ice;- Review – Snow (incorporate snow on ice and glaciers)Metadata: completion of submission to WIGOS Metadata Standard for all variables documented in Best Practices. | Best Practices: Publication Sea and Freshwater Ice, and Snow-revised. | WIP – work in progress, as planned.[Resolution 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338),To be revised based on Report from SG-Cryo to INFCOM-2, draft Recommendation 6.6/1. |
| SC-IMT, GCW-AG | [Res. 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338) and INFCOM-2 | 2.1.6/2.2 |  | GCW Data Portal – as DCPC – application; Sea Ice and other cryo variables – metadata submitted to Metadata TT. |  |  |  |
| SC-ESMP, GCW-AG |  [Res. 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338) and INFCOM-2 | 2.1.6/2.3 |  | Workshop – coupling of cryosphere in the Earth system (recommendation from SG-Cryo). |  |  | INFCOM-2 is invited to adopt draft Recommendation 6.6/1. |
| GCW-AG | [Res. 18 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=338) and INFCOM-2 | 2.1.6 | SERCOM/SC-CLI, SC-DRR, RA II and III | Recommended methodologies on the development of assessments and indicators on the state of the cryosphere, published together with relevant users, e.g. Regional Climate Centres, and for inclusion in the WMO Statement on the State of the Global Climate, progressively from 2021Cryosphere science support TPRCC-Network implementation.Consultations – proposal for inclusion of cryosphere hazards in the DRR framework | Recommended methodologies on the development of assessments and indicators on the state of the cryosphere, published together with relevant users, e.g. Regional Climate Centres, and for inclusion in the WMO Statement on the State of the Global Climate, progressively from 2021; | Recommended methodologies on the development of assessments and indicators on the state of the cryosphere, published together with relevant users, e.g. Regional Climate Centres, and for inclusion in the WMO Statement on the State of the Global Climate,  | Delayed to 2022, due to resources.Report of SG-Cryo to INFCOM-2 will provide details. as draft Recommendation 6.6/1. |
| **Output 2.1.7**  | **The Global Ocean Observing System (GOOS) responding to Earth system prediction requirements – WMO contribution to GOOS including technical support to Members provided with regard to monitoring, implementation and maintenance of ocean observing systems through the World Meteorological Organization (WMO)-Intergovernmental Oceanographic Commission (IOC) Joint Centre for Oceanography and Marine Meteorology in situ Observations Programmes Support (OceanOPS, and support to JCB** |
| SC-ON, AG-Ocean (if approved) | [Res. 45 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=154)[Res. 47 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=161) | 2.1.7 | SC-ON, SC-IMT, SC-MINT, GOOS | **Implementation of GOOS Strategy 2030**:Engagement with GOOS Regional Alliances concerning ocean observations. |  |   | Work in progress as planned;INFCOM-1 Part II adopted [Recommendation 8 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=321);Establishment of Data Acquisition Centre (DAC) in the Marine Climate Data System (MCDS);INFCOM-1 Part III adopted [Decision 23 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=253) on Optimum functional connections for marine meteorological observations and data management. |
| [Res. 46 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=159)[Res. 47 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=161) | 2.1.7 | SC-ON, SC-IMT, SC-MINT, GOOS, GCOS, WCRP, JCB | **Contribution to WMO-IOC Collaborative Strategy**:Reinforced contribution from OceanOPS to metadata management and coordination of monitoring networks. | Plan responding to the adopted WMO-IOC collaborative strategy drafted. | Implementation of WMO-IOC collaborative strategy started. | Work in progress as planned;JCB is working on a roadmap and top priorities for enhanced collaboration between WMO and IOC. |
| **Output 2.1.11** | **Carbon and GHG monitoring** |
| SG-GHG | [Res. 4 (EC-75)](https://meetings.wmo.int/EC-75/SiteAssets/SitePages/Session%20Information/EC-75-LIST-OF-RESOLUTIONS-AND-DECISIONS_en.docx) | 2.1/2.3 | SERCOM, RB | **Development of the concept for architecture**WMO International Greenhouse Gas Monitoring Symposium;Endorsement of the concept by Cg-19;Pilot of high priority components. | Further refinement of the concept based on the pilot. | Implementation of the concept. | INFCOM-2 is invited to discuss and adopt draft Recommendation 4.2/1, an early version of the draft proposal for the architecture. |
| **Output 2.2** | **Improved and increased access to, exchange and management of, current and past Earth system observation data and derived products through the WMO Information System** |
| SC-IMT | [Res. 22 (EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008#page=365) | 2.2/2.1.6 |  | WIS 2.0 implementationEstablish WIS 2.0 pilot phase with pilot projects for WIS 2.0 Global Infrastructure and pilot projects for National Centres (NCs) and Data Production and Collection Centres (DCPCs)Develop tools and organizational structure to monitor the transition from the Global Telecommunication System (GTS) to WMO Information System (WIS) 2.0Release WIS 2.0 in a box version 1.0 and establish a governance for the development of the open-source project in alignment with WIS 2.0 architecture and technical specifications.Deliver workshops and training on WIS 2.0 to all the WMO Regions, in coordination with the Regional Associations. | Finalization of WIS 2.0 pilot phase and start pre-operational phaseUpdate WIS 2.0 technical guidance in the Guide to WISLead WIS2 in a box community developmentWIS 2.0 transition guidance and KPIsFinalize WIS 2.0 Architecture and technical specifications.Deliver workshops and training on WIS 2.0 to all the WMO Regions, in coordination with the Regional Associations. | Start WIS 2.0 operational phaseTransition from GTS to WIS 2.0 started.Lead WIS2 in a box community developmentMonitor GTS to WIS 2.0 transitionDeliver workshops and training on WIS 2.0 to all the WMO Regions, in coordination with the Regional Associations.Audit and Certification of WIS 2.0 Centres | INFCOM-2 is invited to adopt draft WIS 2.0 technical specifications in Manual on WIS as part of draft Recommendation 6.3(1)/1.WIS 2.0 implementation plan updated.WIS2 in a box beta version.Workshop WIS 2.0 introduction for industry.WIS2 in a box continuously exchanging data for Malawi.WIS 2.0 demonstration projects final report. |
| SC-IMT | [Res. 19](https://library.wmo.int/doc_num.php?explnum_id=11008" \l "page=360)[(EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008" \l "page=360)[Res. 20](https://library.wmo.int/doc_num.php?explnum_id=11008" \l "page=361)[(EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008" \l "page=361)[Res. 21](https://library.wmo.int/doc_num.php?explnum_id=11008" \l "page=363)[(EC-73)](https://library.wmo.int/doc_num.php?explnum_id=11008" \l "page=363)[Res. 25](https://library.wmo.int/doc_num.php?explnum_id=9827" \l "page=103)[(Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827" \l "page=103)[Res. 5 (EC-71), Annex 1](https://library.wmo.int/doc_num.php?explnum_id=10248#page=16)  | 2.2/1.2.1/1.3.4 | SERCOM/SC-CLI | Climate Data Management in the WIS 2.0Harmonize the Manual on the High-quality Global Data Management Framework for Climate (WMO-No. 1238) and the CDMS Specifications (WMO-No. 1131) into the WIS technical regulations and guidanceDevelopment and implementation of OpenCDMS in accordance with WIS 2.0 architecture and implementation planDeliver workshops and training on OpenCDMS to all the WMO Regions, in coordination with the Regional Associations.DAYCLI start operational phaseMCH implementation according to priorities and new modules. MCH integration into CDMS | Draft harmonized climate provisions in Manual on WIS and Guide to WISDeliver workshops and training on OpenCDMS to all the WMO Regions, in coordination with the Regional Associations.DAYCLI operationally exchanged and monitored. | OpenCDMS widely adopted by MembersDeliver workshops and training on OpenCDMS to all the WMO Regions, in coordination with the Regional Associations.DAYCLI operationally exchanged and monitored. | OpenCDMS software released experimental version.INFCOM-2 is invited to adopt the updated Manual on HQ-GDMFC as draft Recommendation 6.3(1)/3.DAYCLI new Binary Universal Form for the Representation (BUFR) format approved with operational status.Implementation of MCH (Haiti, Cameroon) delayed because of COVID-19; integration into Open CDMS delayed as well, restarting in 2022. |
| SC-IMT | [Res. 57 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=192)[Decision 21](https://library.wmo.int/doc_num.php?explnum_id=11197" \l "page=251)[(INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197" \l "page=251) | 2.2 | SERCOM, SC-ON | **Data Formats in support of all WMO Disciplines and Domains**Operational implementation of CF-NetCDF profiles for marine trajectory and weather radar and lidarExperimental phase of CF-NetCDF profiles for UASContinuous improvements of BUFR and GRIBDevelopment of IWXXM according to ICAO requirementsExperiment with new data formats as required by WMO disciplines and domains or partner organizations. | Continuous improvements of BUFR and GRIBImplementation of CF-NetCDF for UASDevelopment of IWXXM according to ICAO requirementsExperiment with new data formats as required by WMO disciplines and domains or partner organizations. | Continuous improvements of BUFR and GRIBContinue implementation of CF-NetCDF for UASDevelopment of IWXXM according to ICAO requirementsExperiment with new data formats as required by WMO disciplines and domains or partner organizations. | INFCOM-2 is invited to adopt the final draft of CF-NetCDF profiles for marine and weather radar data in the Manual on Codes as part of draft Recommendation 6.3(3)/1.First draft of CF-NetCDF profile for UAS to be endorsed by INFCOM-2 as experimental. |
| SC-IMT | [Res. 57 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=192) | 2.2 |  | Guidance on Information Management in the Guide to the WIS. |  |  | INFCOM-2 is invited to adopt draft Guidance on Information Management inserted in the Guide to WIS as part of draft Recommendation 6.3(2)/1. |
| SC-IMT | [Decision 22](https://library.wmo.int/doc_num.php?explnum_id=11197" \l "page=252)[(INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197" \l "page=252) | 2.2 |  | WIS metadata KPIs regularly computed, and dashboard produced. Process to improve WIS metadata quality to be implemented. | WIS 2.0 metadata KPIs implemented. | Process to improve WIS 2.0 metadata established. | INFCOM-2 is invited to adopt draft WIS metadata KPIs and tools implemented as part of draft Recommendation 6.3(2)/1. |
| **Output 2.3.3** | **Enhanced marine data-processing and forecasting systems implemented by marine RMSCs and/or National Marine Meteorological Centres**  |
| SC-ESMP | [Res. 18 (EC-69)](https://library.wmo.int/doc_num.php?explnum_id=3645#page=154)[Res. 1 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=9) | 2.3.3  | SERCOM (SC-MMO) | Complete the updates of the functions of RSMCs for global numerical ocean prediction.Review the requirements for ocean prediction data and products and consider the potential list of core data.  | Propose the list of core data for ocean prediction to INFCOM-3. | Support RSMCs to implement the proposed list of core data. | INFCOM-2 is invited to adopt draft Recommendation 6.4(2)/4: updated functions of RSMC for global numerical ocean prediction and new designations of the RSMCs based on the recommendation of SERCOM-2. |
| **Output 2.3.4** | **GDPFS designated centres audited for compliance** |
| SC-ESMP | [Res. 18 (EC-69)](https://library.wmo.int/doc_num.php?explnum_id=3645#page=154)[Decision 4 (EC-75)](https://meetings.wmo.int/EC-75/SiteAssets/SitePages/Session%20Information/EC-75-LIST-OF-RESOLUTIONS-AND-DECISIONS_en.docx) | 2.3.4  | SERCOM | Complete the development of the compliance review process of RSMCs and finalize the compliance review scheduleReview of overall requirements, including new ones such as Business Continuity and Contingency Planning. | Review the Centres’ complianceUpdate overall requirements if necessary. | Review the Centres’ compliance. | INFCOM-2 is invited to adopt draft Recommendation 6.4(3)/2: the new compliance review process. |
| **Output 2.3.6** | **Implementing the Seamless GDPFS (S/GDPFS)** |
| SC-ESMP | [Res. 58 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=193) | 2.3.6  | SERCOM | Develop pilot projects to support S/GDPFS implementation. | Evaluate the pilot projects and implement the S/GDPFS through the pilot projects. | Complete the initial implementation of S/GDPFS. | SC-ESMP approved one pilot project at its first virtual session and has been reviewing other potential pilot projects. |
| SC-ESMP  | [Res. 58 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=193) | 2.3.6 | SERCOM/RB | Finalize the Roadmap for S/GDPFS. | Implement S/GDPFS according to the Roadmap. | Implement S/GDPFS according to the Roadmap. | INFCOM-2 is invited to consider and adopt draft Recommendation 6.4(1)/1: Roadmap for S/GDPFS for approval by Cg-19 (2023). |
| **Output 2.3.7** | **Toolbox for accessing seamless GDPFS data and products** |
| SC-ESMP  | [Res. 58 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=193) | 2.3.7 | SC-IMT | Establish an expert group to improve the metadata of GDPFS products. | Develop the guidelines on the metadata of GDPFS products. | Support RSMCs to improve the accessibility and discoverability of their products via WIS. | Launched the GDPFS Web Portal at the end of 2021. Issues about the metadata of GDPFS were analysed. |
| **Output 2.3.8** | **Operational aspects of Climate Services Information System (CSIS) integrated into GDPFS process** |
| SC-ESMP | [Res. 20 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=90)[Dec. 9 (EC-72)](https://library.wmo.int/doc_num.php?explnum_id=10504#page=120) | 2.3.7/1.2.1 | SERCOM/SC-CLI | Develop and improve the GDPFS Centres’ activities for Climate Services such as GPCs, RCCs and LCs according to the work plan which is developed at the third Workshop for Operational Climate Prediction (OCP-3) (2022; Lisbon, Portugal). | Propose the new Designation of GPCs and RCCs as well as the improvement of those Centres’ functions if necessary. | Organize the fourth Workshop for Operational Climate Prediction to develop a new work plan to further improve the climate information. | The new types of Centre, LC and GPCs for Sub-seasonal forecasting (LC-SSFMME, GPCs-SSF), were established in 2021.INFCOM-2 is invited to adopt draft Recommendation 6.4(2)/6: the designation of new LC-SSFMME and GPCs-SSF.The third Workshop for Operational Climate Prediction (OCP-3) will be organized in September 2022 in Lisbon, Portugal to develop the workplan for further development of climate information.  |
| **Output 2.3.9** | **Hydrology data processing and forecasting integrated into seamless GDPFS** |
| SC-ESMP | [Res. 15 (Cg-18)](https://library.wmo.int/doc_num.php?explnum_id=9827#page=80)[Res. 4 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=36) | 2.3.9/1.1.3 | SERCOM/SC-HYD | Establish new GDPFS activities for hydrological services according to the implementation plan. | Continue to develop more GDPFS activities for hydrological services according to the implementation plan. | Continue to develop more GDPFS activities for hydrological services according to the implementation plan. | The concept of GDPFS for hydrological services was endorsed by [Resolution 8 (SERCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=10767#page=89) and [Resolution 12 (INFCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=11197#page=157).Implementation Plan of GDPFS for hydrological services was endorsed at the first Hydrological Assembly. |
| **Output 2.3.10**  | **Updated/new technical and regulatory materials, including: (1) A new guide to the Global Data-processing and Forecasting System; (2) New guidelines on high-resolution numerical weather prediction (NWP); (3) Guidelines on the use and interpretation of non-nuclear ERA products and services provided by RSMC; (4) Guidelines on humanitarian services; (5) *Manual on the Global Data-processing and Forecasting System* (WMO-No 485); (6) Guidelines on Ensemble Prediction System and Post-processing (EPSPP)** |
| SC-ESMP | [Res. 26 (EC-70)](https://library.wmo.int/doc_num.php?explnum_id=4981#page=86) | 2.3.10 |  | Further develop the *Guide ~~on~~ to GDPFS* (WMO-No. 3505). | Complete the *Guide to GDPFS.* |   | INFCOM-2 is invited to adopt draft Recommendation 6.4(3)/1: the initial version of the Guide to GDPFS. |
| [Dec. 57 (EC-68)](https://library.wmo.int/doc_num.php?explnum_id=3166#page=186) | 2.3.10 |  | Finalize the development of the Guidelines on high-resolution NWP. |  |   | Draft Guidelines are being developed. |
| [Res. 1 (Cg-Ext.(2021))](https://library.wmo.int/doc_num.php?explnum_id=11113#page=9) | 2.3.10 |  | Demonstrate the provision of core data products from RSMCs to meet Members’ needs. | Update the core data products in the Manual on the GDPFS. | Further develop GDPFS to expand core data products in all Earth system domains as well as to improve the accessibility of core data products. | INFCOM-2 is invited to review draft Recommendation 6.4 (2)/1 to integrate the concept of ‘core data’ products into the Manual on GDPFS. |

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