|  |  |  |
| --- | --- | --- |
| WEATHER CLIMATE WATER | **World Meteorological Organization**  **COMMISSION FOR OBSERVATION, INFRASTRUCTURE AND INFORMATION SYSTEMS**  **Second Session** 24 to 28 October 2022, Geneva | **INFCOM-2/INF. 6.2(1)** |
| Submitted by: Chair of SC-MINT  7.X.2022 |

## WMO STANDARD VOCABULARY

### Executive Summary

The Standing Committee on Measurements, Instrumentation and Traceability (SC-MINT), and in particular its Editorial Board, along with many other groups across WMO, recognized an evident need for an ‘authoritative, single entry point’ for WMO terminology and related definitions. These groups have expressed an urgent need for a WMO Standard Vocabulary (WSV) and recommended that its development starts as soon as possible and that this process is coordinated by the WMO Secretariat.

The recommendation was brought to the attention of the INFCOM Management Group (the eleventh virtual meeting, December 2021) and to the initial meeting of the Technical Regulations Oversight Group (TROG, physical meeting in Geneva, March 2022). Both meetings supported the recommendation.

TROG meeting examined the pros and cons of using or building on the United Nations Terminology Database (UNTERM) and concluded that UNTERM doesn’t seem to be the unique authoritative source of definitions required by WMO, and further recommended establishing a WMO Secretariat group to explore the possibilities of the most effective and efficient way to proceed with the proposal for WSV, considering the following principles/requirements.

WSV must:

• include a clear, concise definition of the terms;

• be open to new entries;

• be available to all free of charge; freely accessible;

• be used as the mandatory reference;

• be comprehensive, covering all WMO Earth System domains;

• respect and refer to the internationally recognized vocabularies with generally accepted and authorized definitions (for example, the International Vocabulary of Metrology (VIM; Joint Committee for Guides on Metrology (JCGM), 2012) the [*International Glossary of Hydrology*](https://library.wmo.int/index.php?lvl=notice_display&id=7394#.YzvxTHZBw2w) (WMO-No. 385);

• be based on modern technologies (dynamic database, etc.) to be easily accessible online and maintainable;

• have clear governance, including traceability of decisions/modifications.

Envisaged development phases:

1. Requirements analysis phase;
2. Data collection/content phase;
3. Tool phase.

### Introduction

Efficient and effective international cooperation, and the exchange and standardization of technical information used by WMO, depend on a common language. International communication in the domains of Earth System Sciences (ESS) – in particular, weather, water, and climate – would be enhanced by using a widely accepted vocabulary and definition of technical and scientific terms. When speaking a shared language, that is often not the native language of either party, good communication requires agreement on the meaning and use of those terms. This goes beyond translations as found, for example, in the United Nations Terminology Database (UNTERM). A standardized terminology would benefit not only WMO and its Members, but also WMO partners, the Hydrometeorological Equipment Industry (HMEI), scientists, etc., as it would leave no or little room for misunderstandings and confusion.

It is obvious, that the existing publications, such as the [*International Meteorological Vocabulary*](https://library.wmo.int/index.php?lvl=notice_display&id=220#.YzvwuXZBw2x) (WMO-No. 182), the [*International Glossary of Hydrology*](https://library.wmo.int/index.php?lvl=notice_display&id=7394#.YzvxTHZBw2w) (WMO-No. 385), and the [*WIGOS Metadata Standard*](https://library.wmo.int/index.php?lvl=notice_display&id=19925#.YzvxcHZBw2w) (WMO-No. 1192), cannot be that dynamical, easily accessible ‘single entry point’ to all interested communities within and outside WMO. Online tools as provided for the [*International Cloud Atlas*](https://library.wmo.int/index.php?lvl=notice_display&id=5357#.YzvxmHZBw2w) (ICA, WMO-No. 407) or OSCAR/Surface may serve as a starting point for consideration. In a first step the ‘authoritative’ vocabulary/glossary should include all definitions found in WMO regulatory and guidance material.

Based on this, a WSV would contain concise definitions in plain English of terms used in the Earth System domains (weather, climate, hydrology, atmospheric composition, cryosphere, oceans, space weather, terrestrial realms, and further related fields). Care should be taken not to define measurands based on any particular technology or practice used to measure them. Methods of measurements and observations should remain within corresponding guidance documents. In addition, the WSV should not redefine terms that are widely established outside those domains, for example, metrology-related terms defined in <https://www.bipm.org/en/committees/jc/jcgm>.

WSV is a matter of concern to all WMO working bodies. To ensure and enforce its use, WSV must be a part of the WMO regulatory material.

### Historical background

In 1953, the Terms of Reference of the WMO Commission for Bibliography and Publication (CBP) included the preparation of a Meteorological Lexicon (terms with definitions) and a Polyglot Vocabulary (multilingual equivalents without definitions). In 1959, the CBP was replaced by a panel of experts to, “… complete and keep up to date the International Meteorological Vocabulary and the Multilingual Meteorological Nomenclature; …” (Cg-3 and EC-XI). The work of this panel resulted in 1966 in the first edition of the [*International Meteorological Vocabulary*](https://library.wmo.int/index.php?lvl=notice_display&id=220#.YzvwuXZBw2x) (WMO-No. 182), which contained around 2 000 terms (see Vandenplas, 1966).

In 1967, an ‘anonymous’ review by W.S.G. in the Quarterly Journal of the Royal Meteorological Society states:

“… After many years of laborious international consultation, there is, at last, a usable multilingual vocabulary for the international meteorologist. …

… The opportunity has been missed of offering advice on how to form new terms so that they are likely to be understood internationally.

The multilingual section will be welcomed. Its limitations must be kept in mind – it is not a dictionary but a list of standard equivalent terms. …”.

With the development of meteorological and atmospheric sciences as well as the continual refinement of the technologies used in practical applications, the need to produce a new edition of the IMV became evident. The task was undertaken by the Working Group on Bibliographic Problems of the WMO Commission for Atmospheric Sciences and completed by Environment Canada after the disbandment of the Working Group. The foreword to its 2nd edition published in 1992 stressed that the IMV should “serve as a valuable reference work for those using more than one language in their work on meteorological subjects, particularly translators” and “help to establish the correspondence of meteorological concepts in the different languages, and thus facilitate international cooperation in this field, the importance of which is growing in the light of concern regarding the environment and climate change”.

In 2007, Cg-XV clearly underlined the importance of the IMV by pointing out:

“… the importance of updating the [*International Meteorological Vocabulary*](https://library.wmo.int/index.php?lvl=notice_display&id=220#.YzvwuXZBw2x) (WMO-No. 182) and including in the new edition both Arabic and Chinese languages.”,

recognizing that,

“… by establishing standardized terminology and definitions, the International Meteorological Vocabulary greatly facilitated international cooperation.”,

and noting,

“… that further improvements were required in: …; (ii) the consistency in the definitions and use of terminology; …”.

Obviously at that time there was a great support for the IMV and stimulus to get Chinese and Arabic languages on board. However, despite these statements, in 2011, Congress XVI decisions had the opposite result. Following the comments from the Meeting of the Presidents of the Technical Commissions (TC), the list of mandatory publications was reorganized and restructured. Unfortunately, during that process the terminology part was fully overlooked, most probably because it was not the responsibility of any TC. Moreover, it was stated that the term “mandatory publications” should be dispensed with, to avoid possible confusion. As a result, both, WMO-No. 182 and the International Glossary of Hydrology (WMO-No. 385), are not on the list of ‘Governance and technical publications’ anymore. Instead, both publications were supposed to be included in METEOTERM that has now itself been moved to UNTERM.

### Current status

Currently, definitions of terms are scattered across different kinds of WMO publications: Technical Regulations, Manuals, Guides, etc. This is a major stumbling block and the absence of a ‘single entry point’ makes it very difficult for communities inside and outside WMO to identify which publications should be looked for when seeking an ‘authoritative definition’. Within WMO, there is presently neither a mechanism nor a body responsible for implementing such a ‘single entry point’.

The experience and challenges faced by cryosphere experts related to WMO documentation and to terminology when they started to develop the Global Cryosphere Watch (GCW) exemplify this problem. GCW had first to provide basic definitions to [*Technical Regulations*](https://library.wmo.int/index.php?lvl=notice_display&id=14073#.YzvylnZBw2w) (WMO-No. 49, Vol I), second to deliver definitions of variables and descriptions of observing methods to the key WIGOS publications: [*Manual on WIGOS*](https://library.wmo.int/index.php?lvl=notice_display&id=19223#.YzvyK3ZBw2w) (WMO-No. 1160), [*Guide to WIGOS*](https://library.wmo.int/index.php?lvl=notice_display&id=20026#.YzvyVnZBw2w) (WMO-No. 1165) and [*WIGOS Metadata Standard*](https://library.wmo.int/index.php?lvl=notice_display&id=19925#.YzvxcHZBw2w) (WMO-No. 1192), and third to ensure consistency across these documents. The latter task faced a systemic challenge as both changes to GCW proposals and translations were hardly discussed with the experts.

On the other hand, the consultation can facilitate coherency. For example, while developing the chapter on snow measurements of the new Volume II of the Guide on Instruments and Methods of Observations (GIMO, WMO-No. 8), care was taken not to include measurands and methods of observation regarding solid precipitation as it is dealt with in Chapter 6 of GIMO/Volume I. This followed from an agreement with the community in charge of that chapter.

Furthermore, measurement-related terminology and uncertainty evaluation methods appear in multiple WMO publications, but ambiguities and inconsistencies persist. The proposal is to adopt the documents published by the JCGM to facilitate internal consistency across WMO publications, aligning terminology and methods with vocabularies already in wide use by the overall scientific and technical communities.

These examples are relevant to many other areas within WMO, first as the organization is engaging with further observing communities, such as oceanographers and marine researchers, and second as it identifies inconsistencies in the current WMO documentation.

It is obvious that IMV had two goals: (1) to have a consistent vocabulary with definitions of all meteorological terms in four languages; and (2) to make translations available to WMO translators and interpreters. The first goal is close to the intent of the proposal for WSV, to ensure a ‘single entry point’ resource.

However, the inclusion of IMV at first instance in METEOTERM and then in UNTERM, neither guarantees an ‘authoritative source’ nor provides a clearly identified body in charge of updates. With regards to the second goal, the inclusion in UNTERM may suffice, even though a plethora of entries without clear guidance makes a choice difficult at times.

On the other hand, the WMDS and its representation within the WIGOS Metadata Registry (WMDR) cannot be overlooked. At present, WMDS/WMDR serves as a kind of ‘entry point’ for all terms related to WMDS, in particular, regarding measurands and methods of observations/measurements. It should also be recognized that all the Earth System disciplines/domains mentioned in Annex 1 of the new WMO ‘Unified Policy for the International Exchange of Earth System Data’ refer to WMO-No. 1160 when it comes to defining core observational data. However, the descriptions given in WMDS/WMDR are by nature concise and inclusive. So, one needs to go back to other documents, for example, WMO-No. 8, to find more explicit and detailed definitions. In addition, not all WMO ‘regulatory’ terminology is included in WMDS/WMDR, which definitely does not designate WMDS as a ‘single entry point’ either.

### Existing practices

***5.1*** ***Commission Internationale de l’Eclairage (CIE)***

The CIE publishes Technical Reports and Standards. There is a basic template, and a style guide that follows ISO, for example, for a decimal marker, 23,4 rather than 23.4 (see Bureau International des Poids et Mesures (BIPM), 2019). With respect to vocabulary, the CIE follows its own International Lighting Vocabulary (ILV), the latest version of which took many years and much pain to produce, given the wide range of subdisciplines in light and lighting and their individual preferences or definitions of terms. ILV is available online (E-ILV) but you have to pay to download the PDF-version. This (and much else) is policed by CIE’s Technical Manager and inquiries can be directed to [helpdesk@cie.co.at](mailto:helpdesk@cie.co.at).

***5.2*** ***U.S. Geological Survey (USGS)***

The response of the USGS head of publications on the question about standard names/nomenclature says: "The need for adequate nomenclature review is codified in Fundamental Science Practices. Specifically, Survey Manual 502.4 – Fundamental Science Practices: Review, Approval, and Release of Information Products under paragraph 3.L ‘Names Review’. The requirement is minimal. All it says is:"

"Ensures the accuracy of specialized technical names used, including geologic, geographic, biologic, and hydrologic names. This review may be performed separately or as part of the peer review or other review".

The USGS does recognize some definitive sources for the review of particular types of names. These are described in, for example, ‘Suggestions to Authors of the Reports of the U.S. Geological Survey, version 8’ that is not quite finalized for public use yet. The publicly accessible seventh version (Hansen, 1991) is an example of how the USGS deals with standardizing nomenclature. Looking through it, it can be seen that, for example, groundwater became one word in all of USGS reports, while the stream gages are spelled without the ‘u’.

***5.3 Bureau International des Poids et Mesures (BIPM)***

The BIPM experienced a similar challenge related to the definitions of metrology-related terms. That was eventually solved by publishing the International Vocabulary of Metrology (VIM; JCGM, 2012) developed by the JCGM. The tasks of the JCGM are to maintain and promote the use of the ‘Guide to the Expression of Uncertainty in Measurement’ (known as the GUM) and the ‘International Vocabulary of Metrology’ (known as the VIM). The JCGM has taken over responsibility for these two documents from ISO TAG 4, who originally published them under the auspices of the BIPM, IEC, IFCC, ISO, IUPAC, IUPAP and OIML. The JCGM operates through two working groups, the JCGM-WG1, with responsibility for the GUM, and the JCGM-WG2, with responsibility for the VIM.

***5.4 UNTERM***

UNTERM is a multilingual terminology database maintained jointly by the UN Secretariat (including the main duty stations and regional commissions) and certain specialized agencies of the United Nations system, including the International Maritime Organization, the United Nations Educational, Scientific and Cultural Organization, the World Health Organization and the World Meteorological Organization.

UNTERM provides terminology and nomenclature in subjects relevant to the work of the United Nations system. Information is provided in the six UN official languages, and there are also entries in German and Portuguese.

Nowadays it also comprises the METEOTERM which used to be WMO terminology database.

### References

BIPM, 2019: The International System of Units (SI), ninth ed., International Bureau of Weights and Measures (BIPM), Sèvres, France, 218 pp.,   
<https://www.bipm.org/documents/20126/41483022/SI-Brochure-9.pdf>.

Hansen, W. R., 1991: Suggestions to authors of the reports of the United States Geological Survey, United States Geological Survey, Reston, VA, <https://doi.org/10.3133/7000088>.

JCGM (Ed.), 2012: International vocabulary of metrology: Basic and general concepts and associated terms (VIM), third ed., edited by: BIPM, JCGM, Paris, France, 91+xvi pp.,   
<https://www.bipm.org/documents/20126/2071204/JCGM_200_2012.pdf>.

Vandenplas, A., 1966: International Meteorological Vocabulary, WMO Bull., 15(4), 219–220, <https://library.wmo.int/doc_num.php?explnum_id=6541>,.

W.S.G., 1967: International meteorological vocabulary, Q. J. R. Meteorol. Soc., 148–148, <https://doi.org/10.1002/qj.49709339524>.

WMO (Ed.), 2018: [*Guide to Instruments and Methods of Observation*](https://library.wmo.int/index.php?lvl=notice_display&id=12407), (WMO-No. 8, Vol I-V).

WMO (Ed.), 2019: [*Technical Regulations – Basic Documents No. 2*](https://library.wmo.int/index.php?lvl=notice_display&id=14073), (WMO-No. 49, Vol I-III).

WMO (Ed.), 1966: International Meteorological Vocabulary, first ed., (WMO-No. 182), xvi+276 pp.

WMO (Ed.), 1992: [*International Meteorological Vocabulary*](https://library.wmo.int/index.php?lvl=notice_display&id=5533), second ed., (WMO-No. 182), 802 pp..

WMO and UNESCO (Eds.), 2012: [*International Glossary of Hydrolog*y](https://library.wmo.int/index.php?lvl=notice_display&id=7394), (WMO-No. 385), 469 pp.

WMO (Ed.), 2019: [*Manual on the WMO Integrated Global Observing System: Annex VIII to the WMO Technical Regulations*](https://library.wmo.int/index.php?lvl=notice_display&id=19223), (WMO-No. 1160), 152 pp.

WMO (Ed.), 2019: [*Guide to the WMO Integrated Global Observing System*](https://library.wmo.int/index.php?lvl=notice_display&id=20026), (WMO-No. 1165), 96 pp.

WMO (Ed.), 2019: [*WIGOS Metadata Standard*](https://library.wmo.int/index.php?lvl=notice_display&id=19925), (WMO-No. 1192), 51 pp.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_