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| TEMPS CLIMAT EAU | A picture containing text, clipart, ceramic ware, porcelain  Description automatically generated**Organisation météorologique mondiale**  **CONGRÈS MÉTÉOROLOGIQUE MONDIAL**  **Dix-neuvième session** 22 mai–2 juin 2023, Genève | **Cg-19/Doc. 4.1(2)** |
| Présenté par: Président de la plénière  30.V.2023  **VERSION APPROUVÉE** |

**POINT 4 DE L’ORDRE DU JOUR: STRATÉGIES TECHNIQUES À L’APPUI DES BUTS À LONG TERME**

**POINT 4.1 DE L’ORDRE DU JOUR:** **Des services pour répondre aux besoins de la société**

# PROPOSition de modification du volume I du *Règlement technique* (OMM-N° 49) et de mise à jour du *COMPENDIUM OF WMO COMPETENCY FRAMEWORKS* (wmo-nO. 1209) relative aux qualifications et compétences du personnel chargé de fournir des services de météorologie aéronautique



# considérations générales

### Proposition de modification du *[Règlement technique, Volume I: Pratiques météorologiques générales normalisées et recommandées](https://library.wmo.int/index.php?lvl=notice_display&id=14073)* (OMM-N° 49) et de mise à jour du *[Compendium of WMO Competency Frameworks](https://library.wmo.int/index.php?lvl=notice_display&id=21607)* (WMO-No. 1209) relative aux qualifications et compétences du personnel chargé de fournir des services de météorologie aéronautique

1. Le Comité permanent des services à l’aviation (SC-AVI) relevant de la Commission des services (SERCOM) a établi, avec l’aide de son Équipe d’experts pour l’enseignement, la formation et les compétences (ET-ETC), que les exigences actuelles en matière de qualifications et compétences du personnel chargé de fournir des services de météorologie aéronautique, définies dans le *[Règlement technique, Volume I](https://library.wmo.int/index.php?lvl=notice_display&id=14073)* (OMM-N° 49), ainsi que les compétences de ce type développées dans le texte d’orientation qu’est le *[Compendium of WMO Competency Frameworks](https://library.wmo.int/index.php?lvl=notice_display&id=21607" \l ".Yt_uknZBwuU)* (WMO-No. 1209) (*Répertoire des cadres de compétences de l’OMM*) n’étaient pas entièrement adaptées aux domaines spécialisés de la météorologie aéronautique tels que les cendres volcaniques, la météorologie spatiale et les cyclones tropicaux. En effet, les prestataires de services de météorologie aéronautique chargés de surveiller en permanence ces phénomènes dans leur zone de responsabilité n’ont actuellement guère de moyens de démontrer que leurs spécialistes des prévisions de météorologie aéronautique satisfont pleinement aux qualifications et compétences requises par l’OMM.

2. Compte tenu des dispositions de l’Annexe 3 à la Convention relative à l’aviation civile internationale – Assistance météorologique à la navigation aérienne internationale, le SC‑AVI a reconnu que, en 2011, l’OMM avait précisé les qualifications exigées de ces spécialistes pour qu’elles servent de «filet de sécurité», car elle était consciente que l’introduction d’une norme de compétence représentait un grand pas pour une majorité de Membres de l’OMM. Au cours des dix dernières années, les cadres de compétences s’appliquant au personnel chargé de fournir des services de météorologie aéronautique ont été établis, éprouvés et adoptés par les Membres de l’OMM. Étant donné que le secteur de la prestation de services va subir des transformations au cours de la présente décennie, que cette situation devrait se poursuivre et que les rôles et responsabilités du personnel chargé de fournir des services de météorologie aéronautique devraient évoluer en conséquence, le SC-AVI a établi qu’il importait de s’assurer que les cadres de compétences s’appliquant au personnel chargé de fournir des services de météorologie aéronautique restent suffisamment souples et adaptables aux changements prévus et ne sont pas limités par l’application rigoureuse d’une exigence de qualification universitaire.

3. Ainsi, le SC-AVI a élaboré une proposition de modification de la partie V du *[Règlement technique, Volume I: Pratiques météorologiques générales normalisées et recommandées](https://library.wmo.int/index.php?lvl=notice_display&id=14073)* (OMM-N° 49) et une mise à jour de la section 2.2 du *[Compendium of WMO Competency Frameworks](https://library.wmo.int/index.php?lvl=notice_display&id=21607" \l ".Yt_uknZBwuU)* (WMO-No. 1209). De l’avis du SC-AVI, les changements proposés permettraient aux Membres de l’OMM de démontrer de manière plus pragmatique et plus souple de quelle façon ont été obtenues les connaissances et aptitudes sous-jacentes requises pour valider l’acquisition des compétences de personnel chargé de fournir des services de météorologie aéronautique. Le SC-AVI était également conscient que suivre avec succès le Programme d’enseignement de base pour les météorologistes ou le Programme d’enseignement de base pour les techniciens en météorologie reste un moyen efficace pour un candidat de démontrer qu’il possède les aptitudes et connaissances sous-jacentes décrites dans le cadre de compétences le concernant.

4. Il est intéressant de noter que, au début de l’année 2022, les membres du Groupe d’experts pour le développement des capacités ont examiné les changements proposés par le SC-AVI et l’ET-ETC et y ont largement adhéré. De plus, les participants de la deuxième session de la SERCOM (octobre 2022) ont largement soutenu ces changements et ont apporté des améliorations à la proposition initialement présentée par le SC-AVI et l’ET-ETC. Pour aider les Membres de l’OMM à mieux comprendre le contexte et la raison d’être de ces changements, ainsi que les avantages à tirer de leur adoption, le SC-AVI a rédigé un [dossier de communication comprenant une «foire aux questions»](https://community.wmo.int/activity-areas/aviation/resources/amp-qual-comp-amendments).

**Mesure attendue**

5. Par sa [recommandation 2 (SERCOM-2)](https://meetings.wmo.int/SERCOM-2/_layouts/15/WopiFrame.aspx?sourcedoc=/SERCOM-2/French/2.%20Version%20provisoire%20du%20rapport%20(documents%20approuv%C3%A9s)/SERCOM-2-d05-1(3)-AMENDMENT-WMO-49-V1-UPDATE-WMO-1209-approved_fr.docx&action=default), la Commission des services a souscrit à la proposition de modification du Volume I de la publication OMM-N° 49 et de mise à jour de la publication WMO‑No. 1209. Compte tenu de ce qui précède, le Congrès météorologique mondial est invité à adopter la résolution 4.1(2)/1 (Cg-19).

## PROJET DE RÉSOLUTION

**Projet de résolution 4.1(2)/1 (Cg-19)**

### Proposition de modification du *Règlement technique, Volume I: Pratiques météorologiques générales normalisées et recommandées* (OMM-N° 49) et de mise à jour du *Compendium of WMO Competency Frameworks* (WMO-No. 1209)

LE CONGRÈS MÉTÉOROLOGIQUE MONDIAL,

**Reconnaissant** que les services de météorologie aéronautiques vont significativement changer au plan mondial au cours de la prochaine décennie et que le rôle du personnel chargé de fournir de tels services va évoluer en réponse à la transformation de la prestation de services*,*

**Reconnaissant en outre** la nécessité d’actualiser les exigences actuelles en matière de qualifications et de compétences du personnel de la météorologie aéronautique définies dans le *[Règlement technique, Volume I: Pratiques météorologiques générales normalisées et recommandées](https://library.wmo.int/?lvl=notice_display&id=14073" \l ".ZGtC7nZBwuU)* (OMM-N° 49) et, dans le cas des compétences, élaborées sous forme d'orientations dans le *[Compendium of WMO Competency Frameworks](https://library.wmo.int/index.php?lvl=notice_display&id=21607" \l ".ZGtDI3ZBwuU)* (WMO-No. 1209) afin qu’elles répondent aux exigences des services de météorologie aéronautique, notamment pour les spécialités telles que les cendres volcaniques, la météorologie de l'espace et les cyclones tropicaux*,*

**Prend note** de la [recommandation 2 (SERCOM-2)](https://meetings.wmo.int/SERCOM-2/_layouts/15/WopiFrame.aspx?sourcedoc=/SERCOM-2/French/2.%20Version%20provisoire%20du%20rapport%20(documents%20approuv%C3%A9s)/SERCOM-2-d05-1(3)-AMENDMENT-WMO-49-V1-UPDATE-WMO-1209-approved_fr.docx&action=default) – Proposition de modification du *[Règlement technique, Volume I: Pratiques météorologiques générales normalisées et recommandées](https://library.wmo.int/?lvl=notice_display&id=14073" \l ".Yt_4cXZBwuW)*(OMM-N° 49) et de mise à jour du *[Compendium of WMO Competency Frameworks](https://library.wmo.int/index.php?lvl=notice_display&id=21607" \l ".Yt_3LXZBwuV)* (WMO‑No. 1209);

**Prend note également** de la proposition de modification du Volume I de la publication OMM‑N° 49 et de la proposition de mise à jour de la publication WMO‑No. 1209 concernant les qualifications et compétences exigées du personnel chargé de fournir des services de météorologie aéronautique, lesquelles propositions figurent dans l’[annexe 1](#Annex1) et l’[annexe 2](#Annex2), respectivement, de la présente résolution;

**Adopte** la modification du *Règlement technique, Volume I: Pratiques météorologiques générales normalisées et recommandées* (OMM-N° 49), qui entrera en vigueur le 1er janvier 2026;

**Approuve** la mise à jour associée du *Compendium of WMO Competency Frameworks* (WMO‑No. 1209) (*Répertoire des cadres de compétences de l’OMM*);

**Prie** le Secrétaire général de prendre les dispositions nécessaires pour faire publier, dans les plus brefs délais, la version amendée du *Règlement technique, Volume I* (OMM-N° 49), et la version actualisée du *Compendium of WMO Competency Frameworks* (WMO-No. 1209);

**Demande** à la Commission des services et applications se rapportant au temps, au climat, à l’eau et à l’environnement (SERCOM), avec l’aide du Groupe d’experts pour le développement des capacités selon les besoins:

1. D'entreprendre une nouvelle mise à jour du dossier de communication en ligne, en tenant compte des résultats de sa dix-neuvième session;
2. De continuer de veiller à ce que les dispositions du Règlement technique et les textes d’orientations de l’OMM concernant les qualifications et compétences du personnel chargé de fournir des services de météorologie aéronautique fassent l’objet de révisions périodiques et des mises à jour nécessaires, conformément aux procédures établies, et qu’une assistance supplémentaires soit apportée aux Membres pour la poursuite de l’élaboration de leurs cadres de compétences et des programmes de formation connexes;

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[Annexes: 2](#Annex1)

## Annexe 1 du projet de résolution 4.1(2)/1 (Cg-19)

## Modification du *Règlement technique, Volume I: Pratiques météorologiques générales normalisées et recommandées (OMM-N° 49)*

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| Note rédactionnelle 1. – *La proposition ci-dessous repose sur la mise à jour 2021 de l’édition 2019 du Volume I de la publication OMM-N° 49, disponible sur le site Web de la bibliothèque de l’OMM [ici](https://library.wmo.int/index.php?lvl=notice_display&id=14532).*  Note rédactionnelle 2. – *Le texte de la modification est présenté de la manière suivante:*   |  |  | | --- | --- | | ~~Le texte à supprimer est rayé.~~ | Texte à supprimer | | Le nouveau texte à insérer est souligné. | Nouveau texte à insérer | | ~~Le texte à supprimer est rayé~~et suivi du texte le remplaçant, qui est souligné | Nouveau texte remplaçant le texte existant | |

[…]

**PARTIE V. QUALIFICATIONS ET COMPÉTENCES DU PERSONNEL PARTICIPANT À LA PRESTATION DE SERVICES MÉTÉOROLOGIQUES ~~(TEMPS ET CLIMAT)~~, ~~ET~~ CLIMATOLOGIQUES, HYDROLOGIQUES, MARITIMES ET ENVIRONNEMENTAUX CONNEXES**

1. **QUALIFICATIONS ET COMPÉTENCES**

1.1 **Généralités**

1.1.1 Les qualifications et les compétences requises du personnel participant à la prestation de services météorologiques, climatologiques, hydrologiques, maritimes et ~~climatologiques~~environnementaux connexes devraient être déterminées par les Membres conformément aux sections 1.2 à 1.8.

Note~~s~~:

~~1. Lorsqu’une personne acquiert une qualification donnée, celle-ci reste valable en principe tout au long de sa carrière.~~ Dans le présent contexte, une qualification est obtenue en achevant un cours ou un apprentissage formel qui donne les aptitudes et les connaissances sous-jacentes requises pour soutenir l’acquisition d’une compétence.

~~2. Les qualifications et les compétences du personnel relevant d’autres domaines seront définies en temps utiles et insérées dans le présent chapitre.~~

1.1.2 Les Membres devraient déterminer, en se fondant sur les exigences nationales, régionales et/ou mondiales pertinentes, le niveau de qualification(s) requis pour chaque catégorie de personnel d’exploitation.

~~1.1.2~~1.1.3 Les Membres devraient garder une trace des qualifications pertinentes de tout le personnel participant à la prestation de services météorologiques, climatologiques, hydrologiques, maritimes ~~climatologiques,~~ et environnementaux connexes, conformément aux bonnes pratiques de gestion de la qualité et/ou aux exigences en vigueur.

~~1.1.3 Les Membres devraient décider, compte tenu de leurs particularités nationales, s’il convient de requérir des qualifications plus élevées ou plus précises que celles décrites dans les sections 1.2 à 1.8 pour certaines catégories de personnel d’exploitation.~~

1.1.4 Les compétences du personnel employé par les Membres devraient être démontrées à travers le comportement professionnel et évaluées dans le cadre de procédures pertinentes, selon qu’il convient.

Note: Des directives sur les procédures d’application des compétences figurent dans le guide consacré à ce sujet (*Guide to Competency* (WMO-N° 1205)).

1.1.5 Les Membres devraient mettre en place des procédures d’évaluation des compétences pour ~~différentes catégories~~ chaque catégorie de personnel d’exploitation; les évaluations devraient être effectuées régulièrement, à des intervalles définis par chaque Membre en fonction des méthodes de gestion de la qualité qu’il applique.

1.1.6 Les Membres devraient appliquer les compétences requises du personnel qui ont été définies par l’OMM, en tenant dûment compte des particularités, réglementations, exigences et procédures locales, nationales et régionales *[République-Unie de Tanzanie]*.

Note: Le *Règlement technique* renferme uniquement les compétences de haut niveau; il renvoie à des textes d’orientations complémentaires qui exposent en détail les compétences de deuxième niveau. Il faudra, pour adapter les compétences définies par l’OMM à la situation nationale, déterminer avec soin si les informations de deuxième niveau s’appliquent.

1.1.7 Les Membres devraient veiller à ce que le personnel d’exploitation suive une formation continue pour rester compétent.

1.2 **Personnel chargé de fournir des services de météorologie aéronautique**

1.2.1 ***Qualifications***

1.2.1.1 **Les Membres doivent veiller ~~à ce que tout prévisionniste de l’aéronautique~~, pour la zone et l’espace aérien qui relèvent de leur responsabilité ~~–~~ et compte tenu ~~de l’incidence des phénomènes et des paramètres météorologiques sur la navigation aérienne ainsi que~~ des besoins des usagers de l’aéronautique, des règlements internationaux, des procédures locales et des priorités définies, à ce que les qualifications demandées, sur lesquelles faire reposer les compétences exigées des prévisionnistes d’exploitation chargés de fournir des services de météorologie aéronautique, concorde avec les aptitudes et connaissances de base et les cadres éducatifs requis décrits dans le Programme d’enseignement de base pour les météorologistes~~le Programme d’enseignement de base pour les techniciens en météorologie~~, tel que défini dans l’appendice A.**

Note rédactionnelle. – *Déplacer les notes 1 à 3 ci-dessous directement entre le titre de la section 1.2 et celui du point 1.2.1 ci-dessus.*

Notes :

1. Dans le contexte ci-après, les prévisionnistes et observateurs chargés de fournir des services de météorologie aéronautique incluent le personnel chargé de fournir de tels services au plan national, régional ou mondial.

2. Le niveau de qualification requis pour chaque catégorie peut varier d’un Membre à l’autre, étant entendu que les Membres peuvent avoir besoin que leur personnel d’exploitation chargé de fournir des services de météorologie aéronautique dispose de qualifications supplémentaires ou d’un niveau plus élevé.

3. Il peut être nécessaire que le personnel chargé de fournir des services opérationnels dans des domaines spécialisés de la météorologie aéronautique tels que les risques volcaniques et la météorologie de l’espace valide des qualifications supplémentaires et/ou complémentaires sur lesquelles faire reposer les compétences requises à cet égard.

~~1.2.1.2 Les Membres devraient décider si, compte tenu de leurs particularités nationales, les observateurs en météorologie aéronautique ont besoin de qualifications particulières.~~

Note rédactionnelle. – *Sur la base des interventions du Japon et de l’Australie (propositions de suppression dans le paragraphe 1.2.1.1 ci-dessus), le paragraphe 1.2.1.2 est conservé (c’est‑à‑dire sans suppression).*

1.2.1.2 Les Membres devraient décider si, compte tenu de leurs particularités nationales, les observateurs en météorologie aéronautique ont besoin de qualifications particulières.

1.2.2 ***Compétences***

Note: ~~On trouvera des orientations complémentaires, y compris des informations sur les compétences de deuxième niveau, dans la section «Education & Training» du site https:// www .wmo .int/ aemp/ implementation areas~~. Les normes de compétence pour le personnel chargé de fournir des services de la météorologie aéronautique relèvent ~~de la~~ ~~Commission de météorologie aéronautique du Comité permanent des services à l’aviation (SC AVI)~~ de la Commission des services et applications se rapportant au temps, au climat, à l'eau et à l'environnement (SERCOM*)* de l’OMM et sont publiées dans le *Compendium of WMO Competency Frameworks* (WMO-No. 1209). Il convient de se référer au portail de formation Moodle[[1]](#footnote-2) du SC-AVI pour avoir accès à des cours de formation sur la météorologie aéronautique et à des documents d’orientation sur le sujet provenant du monde entier.

1.2.2.1 **Prévisionniste de l’aéronautique**

**Les Membres doivent s’assurer que, pour la zone et l’espace aérien sous leur responsabilité et compte tenu de l’incidence, sur la navigation aérienne, des phénomènes et des paramètres météorologiques et relatifs à d’autres aspects de l’environnement ainsi que des besoins des usagers de l’aéronautique, des règlements internationaux, des procédures locales et des priorités définies, tout prévisionniste de l’aéronautique a les compétences requises pour:**

**a) Analyser ~~la~~ les situations météorologiques et/ou relatives à d’autres aspects de l’environnement et surveiller sans relâche ~~son~~ leur évolution;**

**b) Prévoir les phénomènes et paramètres ~~relevant de la météorologie aéronautique~~** **météorologiques et/ou relatifs à d’autres aspects de l’environnement;**

**c) Donner l’alerte en cas de phénomènes dangereux, qu’ils soient météorologiques et/ou relatifs à d’autres aspects de l’environnement;**

**d) S’assurer de la qualité des informations et services fournis aux utilisateurs ~~météorologiques~~ s’agissant de la météorologie et/ou d’autres aspects de l’environnement;**

**e) Communiquer les informations météorologiques et/ou relatives à d’autres aspects de l’environnement aux utilisateurs internes et externes.**

Note: Dans le présent contexte, les situations, phénomènes, paramètres et informations relatifs à d’autres aspects de l’environnement peuvent inclure (sans s’y limiter) la présence de cendres volcaniques, les dégagements de matières radioactives ou de produits chimiques toxiques dans l’atmosphère ainsi que la météorologie de l’espace.

1.2.2.2 **Observateur en météorologie aéronautique**

**Les Membres doivent s’assurer que, pour la zone et l’espace aérien sous leur responsabilité et compte tenu de l’incidence, sur la navigation aérienne, des phénomènes et des paramètres météorologiques et/ou relatifs à d’autres aspects de l’environnement ainsi que des besoins des usagers de l’aéronautique, des règlements internationaux, des procédures locales et des priorités définies, tout observateur en météorologie aéronautique a les compétences requises pour:**

**a) Surveiller sans relâche l’évolution des ~~la~~ situations météorologiques et/ou relatives à d’autres aspects de l’environnement;**

**b) Observer et enregistrer les phénomènes et paramètres ~~relevant de la météorologie aéronautique~~** **météorologiques et/ou relatifs à d’autres aspects de l’environnement;**

**c) S’assurer du bon fonctionnement des systèmes d’observation et de la qualité des informations fournies aux utilisateurs ~~météorologiques~~ s’agissant de la météorologie et/ou d’autres aspects de l’environnement;**

**d) Communiquer les informations météorologiques et/ou relatives à d’autres aspects de l’environnement aux utilisateurs internes et externes.**

Note: Dans le présent contexte, les situations, phénomènes, paramètres et informations relatifs à d’autres aspects de l’environnement peuvent inclure (sans s’y limiter) la présence de cendres volcaniques et la météorologie de l’espace.

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## Annexe 2 du projet de résolution ##/1 (Cg-19)

## Mise à jour du *Compendium of WMO Competency Frameworks* (WMO-No. 1209)

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| Editorial Note 1. — *The following proposal is based on the 2019 edition of WMO-No. 1209 available on the WMO e-Library* [*here*](https://library.wmo.int/index.php?lvl=notice_display&id=21607).  Editorial Note 2. — *The text of the amendment is arranged to show deleted text with a line through it and new text with underline, as shown below:*   |  |  | | --- | --- | | ~~Text to be deleted is shown with a line through it.~~ | text to be deleted | | New text to be inserted with underline. | new text to be inserted | | ~~Text to be deleted is shown with a line through it~~ followed by the replacement text with underline | new text to replace existing text | |

[…]

2.2 **COMPETENCY STANDARDS FOR AERONAUTICAL METEOROLOGICAL PERSONNEL**

The following guidance supplements the competency standards for aeronautical meteorological personnel endorsed by the World Meteorological Congress at its sixteenth session, in May 2011, and laid out in the *Technical Regulations* (WMO-No. 49), Volume I, Part V.

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| Editorial Note. – *The foregoing reference to the sixteenth session of the World Meteorological Congress, in May 2011, will need to be replaced by a reference to the nineteenth session of the World Meteorological Congress, in May/June 2023.* |

The competency standards listed below apply to aeronautical meteorological forecasters and observers, taking into consideration the following conditions:

(a) The area and airspace of responsibility;

(b) The impact of meteorological and/or other relevant environmental phenomena and parameters on aviation operations;

(c) Compliance with aviation user requirements, international regulations, local procedures and priorities.

**Regional variations**

The importance of the conditions above is emphasized. There will be considerable variation in the legitimate functions of aeronautical meteorological offices and centres worldwide, and it is not possible to write a document that exactly matches every office~~'s~~ or centre's function(s). Therefore, the performance criteria should be applied in a way that is consistent with these variations. For example, it is recognized that aeronautical meteorological offices in the tropics will not be responsible for forecasting blowing snow (performance criterion 2.1). The conditions (a), (b) and (c) provide for this.

It is intended that the responsibility for meeting the top-level competency standards will, in the first instance, rest with the organization to which the aeronautical meteorological personnel belongs. The responsibility of the individual will then be to meet (or exceed) the particular competencies which apply to his or her specific job within the organization (usually specified in terms of a job description).

Note: In this context, the word ‘organization’ is being used to denote the aeronautical meteorological service provider of the WMO Member concerned. The aeronautical meteorological service provider may be a national meteorological and hydrological service (NMHS) or a non-NMHS entity, as designated by the meteorological authority of the WMO Member concerned.

In some organizations, the competencies may be collectively satisfied by a team or by several groups. In such cases, the organization is responsible for ensuring that each individual does his or her part of the job to the required standard so that the top-level competency standards are met.

The role of aeronautical meteorological personnel will continue to change in response to evolving technology and user requirements, and that in itself will also likely require high standards of competency and underlying knowledge definition. The guidelines presented here attempt to anticipate imminent changes as far as possible, but a review cycle of not more than 3–5 years is strongly recommended as part of the overall quality management and risk management approach.

The organization is responsible for managing a programme of competency assessments to ensure that competency standards are maintained. It is important that the programme is integrated into the organization’s quality management system.

~~An implicit requirement in the background knowledge and skills of aeronautical meteorological forecasters is that they have successfully completed the Basic Instruction Package for Meteorologists (BIP-M), as described in the~~ *~~Technical Regulations~~* ~~(WMO-No. 49) Volume I, Part V, taking into account the conditions (a) to (c) mentioned above. It should, however, be recognized that national qualification requirements for aeronautical meteorological forecasters can be set at a higher level certified, for example, by a degree.~~

The level of qualification(s) necessary to underpin the required competencies of operational aeronautical meteorological forecasters is to be consistent with the relevant educational frameworks, background skills and knowledge requirements described in the Basic Instruction Package for Meteorologists (BIP-M) . Information on the BIP-M is described in the *Technical Regulations* (WMO-No. 49), Volume I, *General Meteorological Standards and Recommended Practices*, Part V, Qualifications and Competencies of Personnel Involved in the Provision of Meteorological, Climatological*,* Hydrological, Marine and Related Environmental Services.

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| --- |
| Editorial Note. – *The foregoing referenced title of Part V will need to be validated in light of a corresponding proposed amendment to WMO-No. 49, Volume I.* |

The aeronautical meteorological service provider is expected to record evidence that the aeronautical meteorological personnel, responsible for the provision of its services, have completed the necessary formal learning or courses of study to demonstrate they possess the background skills and knowledge as described in the relevant competency framework.

The WMO Standing Committee on Services for Aviation (SC-AVI) Moodle ~~website~~ training portal[[2]](#footnote-3) ~~of the WMO Commission for Aeronautical Meteorology~~ is a resource designed to provide aeronautical meteorology training and guidance material sourced from around the world. The ~~website’s~~ portal’s content covers both operational and non-operational aspects of aeronautical meteorology, including quality management, regulatory issues, conferences, seminars and workshops, as well as source material in different languages. The ~~site~~ portal has played a key role in assisting organizations with changes such as the implementation of competency assessment for aeronautical meteorological personnel. The ~~website~~ portal includes frequently asked questions and discussion forums, where ~~members~~ registered users can ask questions, participate in discussions and share resources and expertise.

~~1.2.1~~2.2.1 **Aeronautical Meteorological Forecaster**

An aeronautical meteorological forecaster should be able to perform the tasks specified under the following top-level competency standards:

1. Analyse and monitor continually the ~~weather and~~ meteorological and/or other relevant environmental situations;

2. Forecast ~~aeronautical~~ meteorological and/or other relevant environmental phenomena and parameters;

3. Warn of hazardous meteorological and/or other relevant environmental phenomena;

4. Ensure the quality of meteorological and/or other relevant environmental information and services supplied to users;

5. Communicate meteorological and/or other relevant environmental information to internal and external users.

Notes:

1. Other relevant environmental situations, phenomena, parameters and information in this context may include (but not be limited to) the presence of volcanic ash, the release of radioactive material or toxic chemicals into the atmosphere and space weather.

2. An aeronautical meteorological forecaster in this context may include (but not be limited to) a person with responsibility to provide aeronautical meteorological service at an aerodrome meteorological office (which may or may not be located at an aerodrome), a meteorological watch office, a world area forecast centre, a volcanic ash advisory centre, a tropical cyclone advisory centre or a space weather centre.

**COMPETENCY 1: ANALYSE AND MONITOR CONTINUALLY THE ~~WEATHER AND~~ METEOROLOGICAL AND/OROTHER RELEVANT ENVIRONMENTAL SITUATIONS**

**Competency description**

Observations and forecasts of ~~weather~~ meteorological phenomena ~~and significant weather phenomena~~, in particular significant weather, and/or other relevant environmental phenomena and parameters are continually monitored during hours of operation to determine the need for issuance, cancellation or amendment/update of forecasts, warnings and alerts according to documented thresholds and regulations.

**Performance criteria**

1. Analyse and diagnose[[3]](#footnote-4) ~~the weather and~~ meteorological and/or other relevant environmental situations as required in forecast, warning and alert preparation;

2. Monitor ~~weather~~ meteorological phenomena ~~parameters and evolving significant weather phenomena~~, in particular significant weather, and/or other relevant environmental phenomena and parameters, and validate current forecasts, warnings and alerts based on these parameters;

3. Appraise the need for amendments to forecasts and updates of warnings and alerts against documented criteria and thresholds.

**Background knowledge and skills**

 Mechanisms generating different types of cloud and precipitation, and local mechanisms enhancing cloud and precipitation;

 Topographic influences on cloud, precipitation, fog and visibility, in typical wind and moisture regimes;

 Interpretation of:

- Radar, lidar, wind profiler and satellite imagery to identify fog and stratus, gravity waves in cirrus cloud and jet streams, inference of icing potential in layer cloud, and of volcanic ash and wind shear;

- Numerical weather prediction (NWP) guidance and other forms of objective guidance, to be incorporated into forecasts, warnings and alerts;

- Observed parameters when variations result from differences between automatic sensor technologies and manual observing techniques;

 The International Standard Atmosphere (ISA);

 ~~Aeronautical wWeather and~~ Meteorological and/or other relevant environmental monitoring and observing technologies, and ~~aeronautical~~ forecasting techniques in use at the service provider;

 Common terms relevant to aeronautical meteorology, including:

- (Special) Visual and instrument Flight rules and conditions;

- Flight Information Region (FIR) and, where used, Functional Airspace Block (FAB);

- Final approach, missed approach;

- Cruising and transition level, transition layer, transition altitude, flight level;

- Minimum safe altitude (MSA), indicated altitude, true altitude;

- Category I, II and III aerodrome operations, Aeronautical Information Publication (AIP);

- NOTAMs/ASHTAMs;

- ATIS/VOLMET;

• International Civil Aviation Organization (ICAO) location indicators and/or WMO synoptic station numbers, particularly for aerodromes or stations that ~~lie~~ lay within and near the area of responsibility.

**COMPETENCY 2: FORECAST ~~AERONAUTICAL~~ METEOROLOGICAL AND/OR OTHER RELEVANT ENVIRONMENTAL PHENOMENA AND PARAMETERS**

**Competency description**

Forecasts of ~~weather~~ meteorological and/or other relevant environmental phenomena and parameters are prepared and issued in accordance with documented requirements, priorities and deadlines.

**Performance criteria**

1. Forecast the following ~~weather~~ meteorological and/or other relevant environmental phenomena and parameters:

 Temperature and relative humidity;

 Wind including temporal and spatial variability (wind shear, directional variability and gusts);

 QNH;

 Cloud (type, amount, height of cloud base and vertical extent);

 Precipitation (type, amount, intensity and temporal variations, onset and cessation or duration) and associated visibility;

 Fog or mist, including onset and cessation or duration, and associated reduced visibility;

 Other types of obscuration, including dust, smoke, haze, sandstorms, dust storms, blowing snow and associated visibility;

 Hazardous ~~weather~~ meteorological and/or other relevant environmental phenomena listed under Competency 3 below;

 Wake vortex advection and dissipation, as required;

2. Ensure that forecasts are prepared and issued in accordance with ICAO Annex 3 to the Convention on International Civil Aviation (hereafter ICAO Annex 3), the *Technical Regulations* (WMO-No. 49), Volume II, regional and national formats, codes and technical regulations on content, accuracy and timeliness;

3. Ensure that forecasts of ~~weather~~ meteorological and/or other relevant environmental phenomena and parameters are consistent (spatially and temporally) across boundaries of the area of responsibility as far as practicable, while maintaining meteorological integrity. This will include monitoring forecasts, warnings and alerts issued for other locations or regions~~, and~~ as well as liaising with adjacent locations or regions as required.

**Background knowledge and skills**

 The formation and dissipation, characteristics, occurrence and effects of fog and other forms of obscuration and low-level cloud, and associated diagnostic and prognostic parameters;

 Formation mechanisms and characteristics of other aeronautical meteorological phenomena, such as dust storms, sandstorms, dust devils and funnel clouds (tornadoes or waterspouts);

 Local topography and its effects on weather, such as gap flows, downslope windstorms, orographic turbulence, sea breezes and upslope fog;

 Ability to interpret all observational products (for example, Aerodrome Routine Meteorological Reports (METAR)) and encode forecast products (for example, Terminal Aerodrome Forecasts (TAF)) into Traditional Alphanumeric Codes (TAC) or other required formats;

 Aerodrome climatology, including frequency of occurrence of significant cloud, thunderstorms, precipitation, strong winds, low-level wind shear, reduced visibility, fog and other phenomena;

 Local forecasting guides and techniques, including diagnostic and prognostic parameters, for forecasting significant cloud, thunderstorms, turbulence, aircraft icing, precipitation, strong winds, low-level wind shear, reduced visibility, fog and other phenomena;

 International, national and local aeronautical forecast, warning and monitoring procedures, directives and instructions;

 Local diagnostic and forecast tools and aeronautical forecast preparation systems, including basic operating system functions, data processing and visualization technologies;

 Relevant ICAO and WMO documents, including ICAO Annex 3, the *Technical Regulations* (WMO-No. 49), Volume II, the *Manual on Codes* (WMO-No. 306) and the ICAO *Manual of Aeronautical Meteorological Practice* (Doc 8896);

 ICAO, WMO and national aeronautical meteorological codes and forms of data representation;

 Aviation user requirements, including:

- The effects on aircraft performance of air density, humidity, icing, low-level wind shear, turbulence and wind, and the meteorological factors related to fuel consumption;

- The requirements for en route wind, temperature and significant weather forecasts and aerodrome forecasts for pre-flight planning and in-flight ~~replanning~~ re-planning;

- Meteorological aspects of flight planning; definitions; procedures for meteorological services for international air navigation; types of meteorological information required for Air Traffic Services (ATS), aerodrome control towers, approach/area control and flight information centres;

- Low-visibility runway operating procedures;

- Effects of unfavourable meteorological and/or other relevant environmental conditions on ~~aeronautical~~ aviation operations, including air traffic disruption, holding and diversions;

- Meteorological effects on aerodrome ground services, such as snow ~~clearing~~ clearance, the effect of wet runways, and the effect of thunderstorms and strong winds on apron operations;

- Aerodrome operating minima, the need for alternates and impacts on fuel consumption;

- Altimeter setting procedures.

**COMPETENCY 3: WARN OF HAZARDOUS METEOROLOGICAL AND/OR OTHER RELEVANT ENVIRONMENTAL PHENOMENA**

**Competency description**

Warnings are issued in a timely manner when hazardous ~~meteorological and other relevant environmental~~ phenomena are occurring, expected to occur or when parameters are expected to reach documented threshold values. They are updated or cancelled according to documented warning criteria.

**Performance criteria**

1. Forecast the following hazardous ~~weather~~ meteorological and/or other relevant environmental phenomena, including spatial extent, onset and cessation, duration, and intensity and its temporal variations:

 Thunderstorms, particularly organized systems, including associated turbulence, in-flight icing, hail, heavy precipitation with poor visibility, electrical phenomena, downburst and microburst or gust front and tornadic activity (funnel cloud as tornado or waterspout);

 Turbulence (moderate or greater) including type (orographic, mechanical, convective and clear air turbulence (CAT));

 Moderate and severe low-level wind shear;

 Aircraft icing (moderate or greater) including accumulation rate (if known), spatial extent, type (rime or opaque, glaze or clear, freezing rain, hoar frost, mixed ice, ingested high-altitude ice crystals);

 Height of cloud base and/or surface visibility below aerodrome minima, affecting take-off, landing and approach procedures;

 Hazardous phenomena affecting aerodromes such as strong surface winds including cross-winds and squalls, frost, freezing precipitation, snowfall, lightning and wake vortices;

 Sandstorms and dust storms;

 Volcanic ash on the basis of observations, reports and/or advisory products;

 Tropical cyclones;

 Radioactive cloud;

2. Ensure that warnings are prepared and issued in accordance with thresholds for hazardous meteorological and other relevant environmental phenomena, and with ICAO Annex 3, *Technical Regulations* (WMO-No. 49), Volume II, regional and national formats, codes, and technical regulations on content, accuracy and timeliness;

3. Ensure that warnings of hazardous ~~weather~~ meteorological and/or other relevant environmental phenomena are consistent (spatially and temporally) across boundaries of the area of responsibility as far as practicable, while maintaining meteorological integrity. This will include monitoring forecasts and warnings issued for other locations and regions~~, and~~ as well as liaising with adjacent locations or regions as required.

**Background knowledge and skills**

 Knowledge of volcanic eruptions, volcanic ash cloud displacement, ~~and~~ dispersion and/or re-suspension;

 Areas of likely volcanic activity, especially within the region of responsibility (for offices with responsibility for issuing volcanic ash advisories and warnings and offices located close to or downwind of volcanoes);

 Meteorological hazards to aviation operations, including thunderstorms and associated phenomena, aircraft icing, turbulence, low-visibility, low-level cloud, tropical cyclones, wind shear and volcanic ash;

 The generation mechanisms of low-level jet streams, boundary layer turbulence and gusts, and their effects on aircraft performance;

 Ability to interpret all observational products (for example, METAR), and encode forecast products (for example, TAF) into TAC or other required formats;

 Aerodrome climatology, including occurrence of significant cloud, thunderstorms, precipitation, strong winds, low-level wind shear, reduced visibility, fog and other phenomena;

 Local forecasting guides and techniques, including diagnostic and prognostic parameters, for forecasting significant cloud, thunderstorms, turbulence, aircraft icing, precipitation, strong winds, low-level wind shear, reduced visibility, fog and other phenomena;

 International, national and local aeronautical forecast, warning and monitoring procedures, directives and instructions;

 Local diagnostic and forecast tools and aeronautical forecast preparation systems, including basic operating system functions, data processing and visualization technologies;

 The significance of warning thresholds on aviation operations, and the ability to describe the likely impact of warnings of hazardous ~~weather~~ meteorological and/or other relevant environmental phenomena on these aviation operations;

 Relevant ICAO and WMO documents, including ICAO Annex 3, the *Technical Regulations* (WMO-No. 49), Volume II, the *Manual on Codes* (WMO-No. 306), and the ICAO *Manual of Aeronautical Meteorological Practice* (Doc 8896);

 ICAO, WMO and national aeronautical meteorological codes and forms of data representation;

 Aviation user requirements, including:

- The effects on aircraft performance of air density, humidity, icing, low-level wind shear, turbulence and wind, and the meteorological factors related to fuel consumption;

- The requirements for en route wind, temperature and significant weather forecasts and aerodrome forecasts for pre-flight planning and in-flight ~~replanning~~ re-planning;

- Meteorological aspects of flight planning; definitions; procedures for meteorological services for international air navigation; types of meteorological information required for ATS, aerodrome control towers, approach and area control, and flight information centres;

- Low-visibility runway operating procedures;

- Effects of unfavourable meteorological and other relevant environmental conditions on ~~aeronautical~~ aviation operations, including air traffic disruption, holding and diversions;

- Meteorological and other environmental effects on aerodrome ground services, such as volcanic ash and snow ~~clearing~~ clearance, the effect of wet runways, and the effect of thunderstorms and strong winds on runway and apron operations;

- Aerodrome operating minima, the need for alternates and impacts on fuel consumption;

- Altimeter setting procedures.

**COMPETENCY 4: ENSURE THE QUALITY OF METEOROLOGICAL AND/OR OTHER RELEVANT ENVIRONMENTAL INFORMATION AND SERVICES SUPPLIED TO USERS**

**Competency description**

The quality of meteorological and/orother relevant environmental forecasts, warnings, alerts and related ~~products~~ services is ensured at the required level by the application of documented quality management processes.

**Performance criteria**

1. Apply the organization’s quality management system and procedures;

2. Assess the impact of known observational error characteristics (for example, bias and achievable accuracy of observations and sensing methods) on forecasts, warnings and alerts;

3. Validate ~~aeronautical~~ meteorological and/or other relevant environmental data and information, ~~products,~~ forecasts, warnings and alerts (timeliness, completeness, accuracy) using real-time checks;

4. Monitor the functioning of operational systems and take remedial actions when necessary.

**Background knowledge and skills**

 International, national and local ~~aeronautical~~ forecast, warning and monitoring procedures, directives and instructions;

 Local diagnostic and forecast tools and ~~aeronautical~~ forecast preparation systems, including basic operating system functions, data processing and visualization technologies;

 Applicable ~~TAF~~ forecast verification ~~system(s)~~ scheme(s) and verification statistics;

 Quality management systems;

 Aviation safety management systems, as required;

 Standards (as defined in ICAO Annex 3 and the *Technical Regulations* (WMO-No. 49), Volume II) and quality management system procedures (as defined in ISO 9001 standards and national regulations):

- Procedures for checking, ~~and~~ identifying and correcting errors and omissions;

- Methods for identifying significant differences between factual and forecast data;

- Knowing when to ignore information and where to go to resolve points of contention;

- Desirable accuracy of forecasts as stipulated in ICAO Annex 3, the *Technical Regulations* (WMO-No. 49), Volume II, and national regulations;

- Priorities and schedules;

- Actions to be taken in the event of recurrent discrepancies, inconsistencies and malfunctions;

- Fall-back procedures in the case of computer or other such system failure;

- Contingency arrangements in case of emergencies such as fire alarms, bomb alerts and natural disasters.

**COMPETENCY 5: COMMUNICATE METEOROLOGICAL AND/OR OTHER RELEVANT ENVIRONMENTAL INFORMATION TO INTERNAL AND EXTERNAL USERS**

**Competency description**

User requirements are fully understood and are addressed by communicating concise and complete forecasts, warnings and alerts in a manner that can be clearly understood by the users.

**Performance criteria**

1. Ensure that all forecasts, warnings and alerts are disseminated through the authorized communication means and channels to designated user groups;

2. Explain[[4]](#footnote-5) ~~aeronautical~~ meteorological and/or other relevant environmental data and information to users in a clear and concise manner using suitable terminology, and provide briefings and consultations that meet specific user needs.

**Background knowledge and skills**

 Ability to carry out a routine, high-quality self-briefing, which may include a shift handover briefing, of the recent and current weather situation, and to integrate all available data to produce a consolidated diagnosis;

 Ability to explain the meteorological and procedural reasons behind a forecast, ~~and~~ warning or alert decision;

 ~~The l~~Likely impact of forecasts of meteorological and/or other relevant environmental parameters and phenomena on aviation operations;

 ~~The u~~Use and interpretation of ~~products~~ information issued by World Area Forecast Centres (WAFCs), Volcanic Ash Advisory Centres (VAACs), Tropical Cyclone Advisory Centres (TCACs) and other designated centres;

 Means of dissemination of ~~aeronautical~~ meteorological data and information to users;

 ~~Local~~ Use of aeronautical meteorological telecommunications.

**REGIONAL VARIATIONS**

 Locally agreed and documented criteria and thresholds;

 The range of ~~weather~~ meteorological and/or other relevant environmental phenomena;

 Risk assessment and estimation of forecast uncertainties;

 Types and use of forecast guidance;

 Designated offices responsible for advice on volcanic ash, tropical cyclones and other phenomena;

 Regional and local regulations;

 Boundaries of forecast areas;

 Extent, scope and exclusions of quality management system implementation;

 Communication language(s);

 Communication technology for forecast, ~~and~~ warning and alert transmission, and for ~~weather~~ flight briefing.

2.2.2 **Aeronautical Meteorological Observer**

**Competency standards**

An aeronautical meteorological observer should be able to perform the tasks specified under the following top-level competency standards.

1. Monitor continually the ~~weather or~~ meteorological and/or other relevant environmental situation;

2. Observe and record ~~aeronautical~~ meteorological ~~or~~ and/or other relevant environmental phenomena and parameters;

3. Ensure the quality of the observing system performance and of meteorological ~~or~~ and/or other relevant environmental information supplied to users;

4. Communicate meteorological ~~or~~ and/or other relevant environmental information to internal and external users.

Notes:

1) Other relevant environmental situation, phenomena, parameters and information in this context may include (but not be limited to) the presence of volcanic ash.

2) An aeronautical meteorological observer in this context may include (but not be limited to) a person with responsibility to provide an aeronautical meteorological service at an aeronautical meteorological station or a State volcano observatory.

**COMPETENCY 1:~~CONTINUALLY MONITOR~~ MONITOR CONTINUALLY THE ~~WEATHER OR~~ METEOROLOGICAL AND/OR OTHER RELEVANT ENVIRONMENTAL SITUATION**

**Competency description**

~~Weather or~~ Meteorological and/or other relevant environmental phenomena and parameters are continually monitored during hours of operation to identify the significant and evolving ~~weather or~~ meteorological and/or other relevant environmental phenomena that are affecting or will likely affect the area of responsibility (typically but not exclusively the aerodrome and its vicinity).

**Performance criterion**

Analyse and describe the current local ~~weather or~~ meteorological and/or other relevant environmental conditions.

**Background knowledge and skills**

 Key characteristics of the troposphere and tropopause;

 Properties of air pressure, temperature, density and water vapour;

 Atmospheric stability, inversions;

 Generation mechanisms of wind;

 Fog and cloud formation and dissipation;

 Precipitation types and intensity;

 The general circulation of the Earth's atmosphere;

 The International Standard Atmosphere (ISA);

 Characteristics, occurrence and effects of meteorological ~~or~~ and/or other relevant environmental hazards to aviation, including but not limited to low cloud, low visibility, thunderstorms and associated phenomena, aircraft icing, freezing precipitation, turbulence, tropical cyclones, wind shear and volcanic ash;

 Interpretation of surface-weather maps, satellite and radar imagery, and seamless prediction systems’ outputs;

 Region-specific ~~weather or~~ meteorological and/or other relevant environmental phenomena and likely weather sequences that are expected to affect the station;

 Nowcasting for severe weather ~~or~~ and/or other relevant environmental phenomena;

 Local topography and climatology, including local reference points;

 ICAO location indicators and WMO synoptic station numbers, particularly for aerodromes and stations that lay within and close to the area of responsibility.

**COMPETENCY 2: OBSERVE AND RECORD ~~AERONAUTICAL~~ METEOROLOGICAL ~~OR~~ AND/OR OTHER RELEVANT ENVIRONMENTAL PHENOMENA AND PARAMETERS**

**Competency description**

Observations of ~~weather or~~ meteorological and/or other relevant environmental phenomena and parameters, and their significant changes, are recorded according to documented thresholds and regulations.

**Performance criteria**

1. As applicable, ~~P~~perform and record routine and non-routine (special) observations of the following:

 Surface wind direction and speed, including spatial and temporal variations;

 Visibility for aeronautical purposes, including spatial and temporal variations;

 Runway visual range (RVR), including spatial and temporal variations;

 Present weather phenomena (as defined in ICAO Annex 3);

 Cloud amount, cloud type and height of cloud base, including spatial and temporal variations;

 Vertical visibility;

 Air temperature and dewpoint temperature;

 Atmospheric pressure; determining QFE and QNH;

 Supplementary information concerning significant meteorological ~~or~~ and/or other environmental conditions, particularly those in the approach and climb-out areas such as wind shear;

2. Interpret ~~weather or~~ meteorological and/or other environmental parameters derived from automatic ~~weather~~ observing systems, such as lidar and weather radar, to ensure that observations remain representative of local conditions when differences occur between automatic sensor technologies and manual observing techniques;

3. Ensure that observations are prepared and issued in accordance with ICAO Annex 3, the *Technical Regulations* (WMO-No. 49), Volume II, regional and national formats, codes and technical regulations on content, representativeness and timeliness.

**Background knowledge and skills**

 Procedures for performing routine and non-routine (special) aeronautical meteorological observations and reports;

 The impact of ~~weather~~ meteorological ~~or~~ and/or other relevant environmental conditions on aircraft performance and airport operations;

 Strengths and weaknesses of manual observations and automatic ~~weather~~ observing systems;

 Observer directives, procedures and instructions;

 Validated sources of ~~weather~~ meteorological ~~or~~ and/or other relevant environmental information;

 Quality management systems;

 Aviation safety management systems, as required;

 Relevant ICAO and WMO documents, including ICAO Annex 3, the *Technical Regulations* (WMO-No. 49), Volume II, the *Manual on Codes* (WMO-No. 306), the ICAO *Manual of Aeronautical Meteorological Practice* (Doc 8896), and the ICAO *Manual on Automatic Meteorological Observing Systems at Aerodromes* (Doc 9837);

 ICAO definitions of relevance to meteorology;

 WMO Traditional Alphanumeric Codes (TAC),~~and~~ national aeronautical meteorological codes and other forms of data representation.

**COMPETENCY 3: ENSURE THE QUALITY OF THE OBSERVING SYSTEM PERFORMANCE AND OF METEOROLOGICAL ~~OR~~ AND/OR OTHER RELEVANT ENVIRONMENTAL INFORMATION SUPPLIED TO USERS**

**Competency description**

The quality of meteorological ~~or~~ and/or other relevant environmental observations is ensured at the required level by the application of documented quality management processes.

**Performance criteria**

1. Apply the organization’s quality management system and procedures;

2. Check and confirm the quality of meteorological or other relevant environmental observations before issuance, including relevance of content, time of validity and location of phenomena;

3. In accordance with prescribed procedures:

 Identify errors and omissions in meteorological ~~or~~and/or other relevant environmental observations;

 Correct and report errors and omissions;

 Make and disseminate corrections in a timely manner.

**Background knowledge and skills**

 Standards (as defined in ICAO Annex 3 and in the Technical Regulations (WMO-No. 49), Volume II) and quality management system procedures (as defined in ISO 9001 standards and national regulations);

 Procedures for checking,~~and~~ identifying and correcting errors and omissions (in automatically- and manually-derived data);

 Methods for identifying significant differences between observational and forecast data;

 Knowing when to ignore information and where to go to resolve points of contention;

 Desirable accuracies of measurement and observation as in ICAO Annex 3, the *Technical Regulations* (WMO-No. 49), Volume II, and national regulations;

 Priority tasks and time constraints;

 Action to be taken in the event of recurrent discrepancies, inconsistencies and malfunctions;

 Fall-back procedures in the case of computer or other such system failure;

 Contingency arrangements in case of emergencies such as fire alarms, bomb alerts and natural disasters.

**COMPETENCY 4: COMMUNICATE METEOROLOGICAL ~~OR~~ AND/OR OTHER RELEVANT ENVIRONMENTAL INFORMATION TO INTERNAL AND EXTERNAL USERS**

**Competency description**

All meteorological ~~or~~ and/or other relevant environmental data and information are concise, complete and communicated in a manner that will be clearly understood by the users.

**Performance criteria**

1. Ensure that all observations are disseminated through the authorized communication means and channels to designated user groups;

2. Present[[5]](#footnote-6) ~~aeronautical~~ meteorological ~~or~~ and/or other relevant environmental data and information in a clear and concise manner using suitable terminology that will be clearly understood by the users;

3. Alert forecasters to observed or imminent significant changes in the ~~weather~~ meteorological ~~or~~ and/or other relevant environmental conditions within the ~~local~~ area of responsibility.

**Background knowledge and skills**

 Knowing how ~~weather~~ meteorological ~~or~~ and/or other relevant environmental information is disseminated within and beyond the ~~aerodrome~~ area of responsibility;

 ~~Local~~ Use of aeronautical meteorological telecommunications;

 ~~Local~~ Air Traffic Service meteorological requirements applicable to the area of responsibility;

 ~~Local f~~Flight planning meteorological requirements applicable to the area of responsibility;

 Specifications related to flight documentation, briefing and consultations applicable to the area of responsibility.

**REGIONAL VARIATIONS**

 The range of significant ~~weather~~ meteorological ~~or~~ and/or other relevant environmental phenomena;

 Extent of automation of observing and sensing systems;

 Thresholds for significant ~~weather~~ changes in meteorological or other relevant environmental conditions;

 Local climatology;

 Extent, scope and exclusions of quality management system implementation;

 Regional regulations;

 Communication language(s);

 Available communication technologies.

2.3 **EDUCATION AND TRAINING PROVIDERS**

[…]

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1. <https://aviationtraining.wmo.int/> [↑](#footnote-ref-2)
2. [~~http://www.caem.wmo.int/moodle/~~](http://www.caem.wmo.int/moodle/) <https://aviationtraining.wmo.int/> [↑](#footnote-ref-3)
3. "Analysis" may be defined as answering the question "what is happening?", and "diagnosis" as answering "why is it happening?" [↑](#footnote-ref-4)
4. In accordance with any language proficiency requirements stipulated by the national regulator. [↑](#footnote-ref-5)
5. In accordance with any language proficiency requirements stipulated by the national regulator. [↑](#footnote-ref-6)