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| TIEMPO CLIMA AGUA | Organización Meteorológica Mundial**CONGRESO METEOROLÓGICO MUNDIAL****Decimonovena reunión**Ginebra, 22 de mayo a 2 de junio de 2023 | **Cg-19/Doc. 4.1(2)**  |
| Presentado por:presidencia de la plenaria 30.V.2023**APROBADO** |

**PUNTO 4 DEL ORDEN DEL DÍA: ESTRATEGIAS TÉCNICAS EN APOYO
DE LA CONSECUCIÓN DE LAS METAS
A LARGO PLAZO**

**PUNTO 4.1: Servicios para atender las necesidades
de la sociedad**

# PROPUESTA DE ENMIENDAS AL *REGLAMENTO TÉCNICO* (OMM-Nº 49), VOLUMEN I, Y PUESTA AL DÍA DE LA PUBLICACIÓN *COMPENDIUM OF WMO COMPETENCY FRAMEWORKS* (WMO-NO. 1209) EN LO CONCERNIENTE A LAS COMPETENCIAS Y LAS CALIFICACIONES DEL PERSONAL ESPECIALIZADO EN METEOROLOGÍA AERONÁUTICA

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**CONSIDERACIONES GENERALES**

### Propuesta de enmiendas al [*Reglamento Técnico*](https://library.wmo.int/index.php?lvl=notice_display&id=14073#.ZD0nMXZBwuU)(OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas, y de puesta al día de la publicación [*Compendium of WMO Competency Frameworks*](https://library.wmo.int/index.php?lvl=notice_display&id=21607#.ZD0nSHZByUk)(WMO-No. 1209) en lo concerniente a las competencias y las calificaciones del personal especializado en meteorología aeronáutica

1. El Comité Permanente de Servicios para la Aviación (SC-AVI) de la Comisión de Aplicaciones y Servicios Meteorológicos, Climáticos, Hidrológicos y Medioambientales Conexos (SERCOM), con la ayuda de su Equipo de Expertos sobre Enseñanza, Formación Profesional y Competencias (ET-ETC), determinó que los actuales requisitos en cuanto a competencias y calificaciones del personal especializado en meteorología aeronáutica definidos en el [*Reglamento Técnico*](https://library.wmo.int/index.php?lvl=notice_display&id=14073#.ZD0nMXZBwuU)(OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas, así como aquellos centrados en las competencias que se detallan en las orientaciones de la publicación [*Compendium of WMO Competency Frameworks*](https://library.wmo.int/index.php?lvl=notice_display&id=21607#.ZD0nSHZByUk)(WMO-No. 1209) (Compendio de marcos de competencias de la Organización Meteorológica Mundial), no son totalmente adecuados para especialidades del ámbito de la meteorología aeronáutica como las cenizas volcánicas, el tiempo espacial y los ciclones tropicales. De hecho, los proveedores de servicios de meteorología aeronáutica encargados de vigilar de forma continua dichos fenómenos en su área de competencia actualmente disponen de medios limitados o nulos para evidenciar que sus pronosticadores especializados en meteorología aeronáutica cumplen plenamente los requisitos de la Organización Meteorológica Mundial (OMM) en materia de competencias y calificaciones.

2. En respuesta a las disposiciones del Anexo 3 al Convenio sobre Aviación Civil Internacional de la Organización de Aviación Civil Internacional (OACI), el SC-AVI reconoció que los requisitos en cuanto a calificaciones de los pronosticadores especializados en meteorología aeronáutica, establecidos por la OMM en 2011, se habían introducido a modo de “red de seguridad” porque la Organización era consciente de que la instauración de una norma sobre competencias era una medida novedosa y de gran magnitud para la mayoría de los Miembros de la OMM. En la última década, los marcos de competencias para el personal especializado en meteorología aeronáutica se han perfeccionado, han madurado y han sido adoptados por los Miembros de la OMM. En vista de la transformación que está previsto que experimente la prestación de servicios a lo largo de esta década y en el futuro, y de los cambios resultantes que es de esperar que se produzcan en las funciones y los cometidos del personal especializado en meteorología aeronáutica, el SC-AVI determinó que es importante velar por que los marcos de competencias en meteorología aeronáutica sigan siendo suficientemente ágiles y permitan responder a los cambios previstos, en lugar de estar limitados por la rigurosa aplicación de un requisito en materia de calificaciones de naturaleza académica.

3. Por consiguiente, el SC-AVI preparó una propuesta de enmiendas a la parte V del [*Reglamento Técnico*](https://library.wmo.int/index.php?lvl=notice_display&id=14073#.ZD0nMXZBwuU)(OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas, así como una propuesta para poner al día la sección 2.2 de la publicación [*Compendium of WMO Competency Frameworks*](https://library.wmo.int/index.php?lvl=notice_display&id=21607#.ZD0nSHZByUk)(WMO-No. 1209). El SC-AVI consideró que los cambios propuestos establecerían un marco más pragmático y flexible para que los Miembros de la OMM pudieran demostrar el modo en que el personal especializado en meteorología aeronáutica ha adquirido los conocimientos teóricos y prácticos fundamentales que se necesitan para alcanzar las correspondientes competencias. El SC-AVI también reconoció que completar el Paquete de Instrucción Básica para Meteorólogos (PIB-M) y el Paquete de Instrucción Básica para Técnicos en Meteorología (PIB-TM) todavía es una forma eficaz de demostrar que un candidato posee los conocimientos teóricos y prácticos fundamentales descritos en el marco de competencias correspondiente.

4. Cabe destacar que, a principios de 2022, los cambios propuestos a raíz de la labor del ET‑ETC del SC-AVI se sometieron a la consideración del Grupo de Expertos del Consejo Ejecutivo sobre Desarrollo de Capacidad (EC-CDP) y obtuvieron de ese órgano un amplio apoyo. Además, la SERCOM, en su segunda reunión celebrada en octubre de 2022, expresó un amplio apoyo a la propuesta inicial fruto de la labor del ET-ETC del SC-AVI e introdujo en ella algunas mejoras. Para ayudar a los Miembros de la OMM a comprender mejor el contexto de los cambios y los motivos que los justifican, así como los beneficios que se derivarán de su aprobación, el SC-AVI ha preparado un [conjunto de recursos que incluye un documento con respuestas a preguntas frecuentes](https://community.wmo.int/en/activity-areas/aviation/resources/amp-qual-comp-amendments).

**Medida prevista**

5. Por conducto de la [Recomendación 2 (SERCOM-2)](https://meetings.wmo.int/SERCOM-2/_layouts/15/WopiFrame.aspx?sourcedoc=/SERCOM-2/Spanish/2.%20VERSI%C3%93N%20PROVISIONAL%20DEL%20INFORME%20(Documentos%20aprobados)/SERCOM-2-d05-1(3)-AMENDMENT-WMO-49-V1-UPDATE-WMO-1209-approved_es.docx&action=default) — Propuesta de enmiendas al *Reglamento Técnico* (OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas, y de puesta al día de la publicación *Compendium of WMO Competency Frameworks* (WMO-No. 1209) en lo concerniente a las competencias y las calificaciones del personal especializado en meteorología aeronáutica, la SERCOM hizo suya la propuesta de enmiendas al *Reglamento Técnico* (OMM-Nº 49), Volumen I, y de puesta al día de la publicación *Compendium of WMO Competency Frameworks* (WMO-No. 1209). En virtud de lo que antecede, el Congreso Meteorológico Mundial podría aprobar la Resolución 4.1(2)/1 (Cg-19) en consecuencia.

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# PROYECTO DE RESOLUCIÓN

## Proyecto de Resolución 4.1(2)/1 (Cg-19)

## Propuesta de enmiendas al *Reglamento Técnico* (OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas, y de puesta al día de la publicación *Compendium of WMO Competency Frameworks* (WMO-No. 1209)

El CONGRESO METEOROLÓGICO MUNDIAL,

**Reconociendo** el significativo cambio global que experimentarán los servicios meteorológicos aeronáuticos durante la próxima década y la evolución de las funciones del personal especializado en meteorología aeronáutica en respuesta a la metamorfosis de la prestación de servicios;

**Reconociendo también** la necesidad de actualizar los actuales requisitos en materia de calificaciones y competencias del personal especializado en meteorología aeronáutica definidos en el [*Reglamento Técnico*](https://library.wmo.int/?lvl=notice_display&id=14073#.ZGs8rHZByUk) (OMM-Nº 49), Volumen I — Normas meteorológicas generales y prácticas recomendadas, y, en el caso de las competencias, elaborados teniendo en cuenta las orientaciones contenidas en el [*Compendium of WMO Competency Frameworks*](https://library.wmo.int/index.php?lvl=notice_display&id=21607) (WMO‑No. 1209) (Compendio de marcos de competencia de la OMM), para satisfacer las necesidades de los servicios meteorológicos aeronáuticos, incluidas las delas especialidades, como las cenizas volcánicas, la meteorología espacial y los ciclones tropicales;

**Toma nota** de la [Recomendación 2 (SERCOM-2)](https://meetings.wmo.int/SERCOM-2/_layouts/15/WopiFrame.aspx?sourcedoc=/SERCOM-2/Spanish/2.%20VERSI%C3%93N%20PROVISIONAL%20DEL%20INFORME%20(Documentos%20aprobados)/SERCOM-2-d05-1(3)-AMENDMENT-WMO-49-V1-UPDATE-WMO-1209-approved_es.docx&action=default) — Propuesta de enmiendas al [*Reglamento Técnico*](https://library.wmo.int/index.php?lvl=notice_display&id=14073#.ZD0nMXZBwuU)(OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas, y de puesta al día de la publicación [*Compendium of WMO Competency Frameworks*](https://library.wmo.int/index.php?lvl=notice_display&id=21607#.ZD0nSHZByUk)(WMO-No. 1209);

**Nota** la propuesta de enmiendas al *Reglamento Técnico* (OMM-Nº 49), Volumen I, y de puesta al día de la publicación *Compendium of WMO Competency Frameworks* (WMO-No. 1209) (Compendio de marcos de competencias de la Organización Meteorológica Mundial) en lo concerniente a los requisitos en materia de calificaciones y competencias del personal especializado en meteorología aeronáutica, que figuran, respectivamente, en el [anexo 1](#Anexo_1) y en el [anexo 2](#Anexo_2) a la presente resolución;

**Aprueba** las enmiendas al *Reglamento Técnico* (OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas, que entrarán en vigor el 1 de enero de 2026;

**Aprueba** la puesta al día asociada de la publicación *Compendium of WMO Competency Frameworks* (WMO-No. 1209);

**Solicita** al Secretario General que adopte las medidas necesarias para la pronta publicación de la versión enmendada del *Reglamento Técnico* (OMM-Nº 49), Volumen I, y de la publicación *Compendium of WMO Competency Frameworks* (WMO-No. 1209) puesta al día;

**Solicita** a la Comisión de Aplicaciones y Servicios Meteorológicos, Climáticos, Hidrológicos y Medioambientales Conexos (SERCOM) que, con la asistencia del Grupo de Expertos del Consejo Ejecutivo sobre Desarrollo de Capacidad (EC-CDP), según resulte necesario:

1) lleve a cabo una actualización adicional del conjunto de recursos en línea en la que se tomen en consideración los resultados del Decimonoveno Congreso Meteorológico Mundial;

2) siga velando por que el Reglamento Técnico de la Organización Meteorológica Mundial y los textos de orientación relativos a las calificaciones y las competencias del personal especializado en meteorología aeronáutica se examinen y se pongan al día periódicamente, cuando sea necesario, de conformidad con los procedimientos establecidos, y por que se ayude a los Miembros con el perfeccionamiento adicional de sus marcos de competencia y los programas de formación asociados

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[Anexos: 2](#AnexoResolución)

**Anexo 1 al proyecto de Resolución 4.1(2)/1 (Cg-19)**

**Enmiendas al *Reglamento Técnico* (OMM-Nº 49), Volumen I — Normas meteorológicas de carácter general y prácticas recomendadas**

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| Nota de la edición 1: La siguiente propuesta se basa en la actualización de 2021 de la edición de 2019 del *Reglamento Técnico* (OMM-Nº 49), Volumen I, disponible en la [biblioteca electrónica de la OMM](https://library.wmo.int/index.php?lvl=notice_display&id=14073#.ZD0sv3ZByUk).Nota de la edición 2: El texto de las enmiendas se presenta de modo que el texto que debe suprimirse figura en color rojo, subrayado con trazo discontinuo y tachado, mientras que el texto nuevo figura en color verde y subrayado con trazo discontinuo, como se ilustra a continuación:

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| ~~El texto que ha de suprimirse aparece tachado.~~ | Texto que debe suprimirse. |
| El texto nuevo que debe introducirse aparece subrayado. | Texto nuevo que debe introducirse. |
| ~~El texto que debe suprimirse aparece tachado~~ y, a continuación, el texto nuevo aparece subrayado. | Texto nuevo que debe sustituir al actual. |

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[...]

**PARTE V. CALIFICACIONES Y COMPETENCIAS DEL PERSONAL QUE PARTICIPA
EN LA PRESTACIÓN DE SERVICIOS METEOROLÓGICOS ~~(TIEMPO Y CLIMA~~, ~~E~~ CLIMATOLÓGICOS, HIDROLÓGICOS, MARINOS Y MEDIOAMBIENTALES CONEXOS**

1. **CALIFICACIONES Y COMPETENCIAS**

1.1 **Generalidades**

1.1.1 Los Miembros deberían establecer, con arreglo a las secciones 1.2 a 1.8, las calificaciones y competencias que se exigen al personal que participa en la prestación de servicios meteorológicos, climatológicos, hidrológicos ~~y climatológicos~~ , marinos y medioambientales ~~pertinentes~~ conexos ~~, así como de otros servicios conexos~~.

Nota~~s~~:

~~1. Una calificación específica se adquiere, por lo general, una única vez y sigue siendo válida durante toda la carrera profesional de una persona.~~ En el presente contexto, por “calificación” se entiende el hecho de haber completado actividades de aprendizaje formal, o cursos de estudio, que proporcionan los conocimientos teóricos y prácticos fundamentales necesarios para respaldar la adquisición de una competencia.

~~2. Las calificaciones y competencias del personal en otras esferas de servicios se elaborarán a su debido tiempo y se incorporarán posteriormente a este capítulo.~~

1.1.2 Los Miembros deberían determinar, en función de los requisitos nacionales, regionales o mundiales pertinentes, el nivel de calificación necesario para cada categoría de personal operativo.

~~1.1.2~~1.1.3 Los Miembros deberían llevar registros de las calificaciones aplicables de todo el personal que participa en la prestación de servicios meteorológicos, climatológicos, hidrológicos, marinos y ~~climatológicos y servicios~~ medioambientales conexos, de conformidad con las buenas prácticas en materia de gestión de la calidad o los requisitos aplicables.

~~1.1.3 Los Miembros deberían decidir si, en función de sus circunstancias nacionales, se exigirán calificaciones más estrictas o específicas para ciertas categorías de personal de operaciones que las que figuran en las secciones 1.2 a 1.8.~~

1.1.4 Las competencias del personal de los Miembros deberían demostrarse a través de la ejecución de la actividad laboral y evaluarse mediante procedimientos de evaluación de competencias, según convenga.

Nota: Se proporciona orientación sobre los procedimientos de aplicación de competencias en la publicación *Guide to Competency* (WMO-No. 1205) (Guía sobre competencias).

1.1.5 Los Miembros deberían establecer procedimientos de evaluación de competencias para ~~diferentes categorías~~ cada una de las categorías del personal de operaciones; la evaluación de competencias debería realizarse periódicamente, según la frecuencia definida por las prácticas de gestión de la calidad de cada Miembro.

1.1.6 Los Miembros deberían aplicar las competencias establecidas por la OMM para el personal teniendo debidamente en cuenta las condiciones, reglamentos, requisitos y procedimientos locales, nacionales y regionales *[República Unida de Tanzanía]*.

Nota: Solo las competencias de máximo nivel se incluyen en el Reglamento Técnico, mientras que las competencias de segundo nivel más detalladas se incluyen en el material orientativo adicional señalado. La adaptación nacional de las competencias de la OMM requerirá un examen cuidadoso de la aplicabilidad de la información de segundo nivel.

1.1.7 Los Miembros deberían velar por que su personal de operaciones participe en cursos de formación profesional continua para mantener las competencias adquiridas.

1.2 **Personal que participa en la prestación de servicios de meteorología aeronáutica**

1.2.1 ***Calificaciones***

1.2.1.1 Los Miembros, respecto del área y espacio aéreo bajo su responsabilidad, ~~teniendo en cuenta los efectos de los fenómenos y parámetros meteorológicos en las operaciones aeronáuticas~~ y de conformidad con las necesidades de los usuarios, los reglamentos internacionales y los procedimientos y las prioridades locales relacionados con la aviación, velarán por que ~~todo pronosticador meteorológico aeronáutico haya completado con éxito~~ la calificación o calificaciones necesarias para sustentar las competencias exigidas a los pronosticadores ~~y observadores~~ operativos que se ocupan de la meteorología aeronáutica sean congruentes con los marcos educativos pertinentes y los requisitos en materia de conocimientos teóricos y prácticos generales que se describen en el Paquete de Instrucción Básica para Meteorólogos (PIB-M) ~~y el Paquete de Instrucción Básica para Técnicos en Meteorología (PIB-TM), respectivamente~~, según se definen en el apéndice A.

Nota de la edición: *desplácense las notas 1 a 3 que figuran a continuación para situarlas directamente entre los párrafos 1.2 y 1.2.1.*

Notas:

1. En el ~~presente~~ contexto que se define a continuación, los pronosticadores y observadores que se ocupan de la meteorología aeronáutica incluyen al personal encargado de prestar cualquier servicio de meteorología aeronáutica a nivel nacional, regional o mundial.

2. El nivel de calificaciones necesario que se requiere para cada una de las categorías puede presentar diferencias en función del Miembro de que se trate, y se entiende que cabe la posibilidad de que los Miembros exijan al personal operativo especializado en meteorología aeronáutica la adquisición de niveles de calificación adicionales o superiores.

3. Puede que, para prestar algunos servicios especializados en el ámbito de la meteorología aeronáutica, como los relacionados con los peligros volcánicos y el tiempo espacial, entre otros, deban haberse completado satisfactoriamente marcos de calificación adicionales o alternativos que sustenten las competencias exigidas al personal que presta servicios operativos en tales ámbitos de especialidad.

~~1.2.1.2 Los Miembros deberían decidir si sus propias circunstancias nacionales exigen que los observadores meteorológicos aeronáuticos cuenten con calificaciones específicas.~~

Nota de la edición: *de acuerdo con las intervenciones del Japón y Australia, el actual párrafo 1.2.1.2 se conserva (es decir, no se suprime) a la luz de sus intervenciones (propuestas de supresión) en el párrafo 1.2.1.1 anterior.*

1.2.1.2 Los Miembros deberían decidir si sus propias circunstancias nacionales exigen que los observadores meteorológicos aeronáuticos cuenten con calificaciones específicas.

1.2.2 ***Competencias***

Nota: ~~Para obtener orientación adicional, véase la sección~~ *~~Education & Training~~* ~~(Enseñanza y formación profesional) en~~ [~~https://www.wmo.int/aemp/implementation\_areas~~](https://www.wmo.int/aemp/implementation_areas)~~, incluida la información sobre las competencias de segundo nivel.~~ ~~El Comité Permanente de Servicios para la Aviación (SC-AVI)~~ La Comisión de Aplicaciones y Servicios Meteorológicos, Climáticos, Hidrológicos y Medioambientales Conexos (SERCOM) de la OMM ~~La Comisión de Meteorología Aeronáutica~~ administra las normas de competencia para el personal especializado en meteorología aeronáutica, que figuran en el *Compendium of WMO Competency Frameworks* (WMO‑No. 1209) (Compendio de marcos de competencias de la Organización Meteorológica Mundial). Consúltese el portal de formación del SC-AVI alojado en Moodle[[1]](#footnote-1) para acceder a material de formación y orientación en meteorología aeronáutica procedente de todo el mundo.

1.2.2.1 **Pronosticador meteorológico aeronáutico**

**Los Miembros, teniendo en cuenta los efectos de los fenómenos y parámetros meteorológicos y relacionados con otros aspectos medioambientales pertinentes en las operaciones aeronáuticas, y de conformidad con las necesidades de los usuarios, los reglamentos internacionales y los procedimientos y las prioridades locales relacionados con la aviación, velarán por que en el área y espacio aéreo bajo su responsabilidad todo pronosticador meteorológico aeronáutico sea capaz de:**

**a) analizar y vigilar continuamente las ~~situación~~ situaciones meteorológicas ~~y~~ o relacionadas con otros aspectos medioambientales pertinentes;**

**b) predecir fenómenos y parámetros meteorológicos ~~y~~ o relacionados con otros aspectos medioambientales pertinentes ~~aeronáuticos~~;**

**c) emitir avisos sobre fenómenos peligrosos de carácter meteorológico ~~y~~ o relacionados con otros aspectos medioambientales pertinentes;**

**d) velar por la calidad de la información y los servicios meteorológicos ~~y~~ o relacionados con otros aspectos medioambientales pertinentes que se suministren a los usuarios;**

**e) comunicar información meteorológica ~~y~~ o relacionada con otros aspectos medioambientales pertinentes a usuarios internos y externos.**

Nota: En el presente contexto, las situaciones, fenómenos, parámetros e información relacionados con otros aspectos medioambientales pertinentes pueden incluir, entre otras cosas, la presencia de cenizas volcánicas, la liberación de material radiactivo o de sustancias químicas tóxicas a la atmósfera y el tiempo espacial.

1.2.2.2 **Observador meteorológico aeronáutico**

**Los Miembros, teniendo en cuenta los efectos de los fenómenos y parámetros meteorológicos ~~y~~ o relacionados con otros aspectos medioambientales pertinentes en las operaciones aeronáuticas, y de conformidad con las necesidades de los usuarios, los reglamentos internacionales y los procedimientos y las prioridades locales relacionados con la aviación, velarán por que en el área y espacio aéreo bajo su responsabilidad todo observador meteorológico aeronáutico sea capaz de:**

**a) vigilar continuamente las ~~situación~~ situaciones meteorológicas ~~y~~ o relacionadas con otros aspectos medioambientales pertinentes;**

**b) observar y registrar fenómenos y parámetros meteorológicos ~~y~~ o relacionados con otros aspectos medioambientales pertinentes ~~aeronáuticos~~;**

**c) velar por la calidad del desempeño de los sistemas de observación y de la información meteorológica ~~y~~ o relacionada con otros aspectos medioambientales pertinentes que se suministre a los usuarios;**

**d) comunicar información meteorológica ~~y~~ o relacionada con otros aspectos medioambientales pertinentes a usuarios internos y externos.**

Nota: En el presente contexto, las situaciones, fenómenos, parámetros e información relacionados con otros aspectos medioambientales pertinentes pueden incluir, entre otras cosas, la presencia de cenizas volcánicas y el tiempo espacial.

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## Anexo 2 al Proyecto de Resolución 4.1(2)/1 (Cg-19)

**Puesta al día de la publicación
*Compendium of WMO Competency Frameworks* (WMO-No. 1209)**

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| Nota de la edición 1: La siguiente propuesta se basa en la actualización de 2021 de la edición de 2019 de la publicación *Compendium of WMO Competency Frameworks* (WMO-No. 1209) (Compendio de marcos de competencias de la Organización Meteorológica Mundial), disponible en la [biblioteca electrónica de la OMM](https://library.wmo.int/index.php?lvl=notice_display&id=21607#.YzV1tnZByUk).Nota de la edición 2: El texto de las enmiendas se presenta de modo que el texto que debe suprimirse figura en color rojo, subrayado con trazo discontinuo y tachado, mientras que el texto nuevo figura en color verde y subrayado con trazo discontinuo, como se ilustra a continuación:

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| ~~El texto que debe suprimirse aparece tachado.~~ | Texto que debe suprimirse. |
| El texto nuevo que debe introducirse aparece subrayado. | Texto nuevo que debe introducirse. |
| ~~El texto que debe suprimirse aparece tachado~~ y, a continuación, el texto nuevo aparece subrayado. | Texto nuevo que debe sustituir al actual |

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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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| Nota de la edición: *La referencia anterior al Decimosexto Congreso Meteorológico Mundial, celebrada en mayo de 2011, deberá sustituirse por una referencia al Decimonoveno Congreso Meteorológico Mundial que tendrá lugar en los meses de mayo y junio de 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 ~~and observers~~  is to be consistent with the relevant educational frameworks, background skills and knowledge requirements described in the Basic Instruction Package for Meteorologists (BIP-M~~) and the Basic Instruction Package for Meteorological Technicians (BIP-MT), respectively~~. Information on the BIP-M ~~and BIP-MT~~ 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~~(Weather and Climate)~~, Climatological, Hydrological, Marine and Related Environmental Services.

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| Nota de la edición: *El título de la parte V al que se ha hecho referencia anteriormente deberá validarse a la luz de la correspondiente propuesta de enmiendas al* Reglamento Técnico *(OMM‑Nº 49), Volumen 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-2) ~~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/OR OTHER 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-3) ~~the weather and~~ meteorological and/or other relevant environmental situations as required in forecast, warning and alert preparation;

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