Cadre de
Gestion des
Données

Data
Management
Framework

Encoder IWXXM AIRMET

Version 1A
January 2026

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1 Document Information

1.1 History

Author(s)	Date	Ver	Remarks
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1.2 Filename & Location

tbd

1.3 Related Documents

Title	Version
ICAO Annex 3 to the Convention on International Civil Aviation Meteorological Service for International Air Navigation https://portal.icao.int/icao-net/Annexes/an03_cons.pdf	AMD 82
ICAO PANS-MET Doc 10157 - Procedures for air navigation services - Meteorology https://portal.icao.int/icao-net/ICAO%20Documents/10157_1ed_en.pdf	1st edition
MANAIR – Manual of Standards and Procedures for Aviation Forecasts https://publications.gc.ca/collections/collection_2024/eccc/En56-238-4-2024-eng.pdf	8th Edition

2 Quick Overview

ICAO Meteorological Information Exchange Model is a format for reporting weather information in XML/GML. IWXXM includes XML/GML-based representations for products standardized in International Civil Aviation Organization (ICAO) Annex 3, such as METAR/SPECI, TAF, SIGMET, AIRMET, Tropical Cyclone Advisory and Volcanic Ash Advisory. IWXXM products are used for operational exchanges of meteorological information for use in aviation.

Unlike the traditional forms of the ICAO Annex 3 products, IWXXM is not intended for direct human consumption. Instead IWXXM is designed to be ingested and manipulated by systems for downstream human consumption such as display software.

An AIRMET is an Information message issued by a meteorological watch office (MWO) to advise pilots of the occurrence or expected occurrence of specified weather phenomena, which may affect the safety of aircraft operations, and the development of those phenomena in time and space.

This document details the generation of IWXXM AIRMET from the DMS XML decode of TAC bulletins. Canadian IWXXM AIRMET is built on WMO schema version 3.0.0 found at
https://schemas.wmo.int/iwxxm/3.0.0/

Please refer to MANAIR for more details on AIRMET (link in section 1.3 above).

2.1 Useful IWXXM links

WMO SIGMET IWXXM Schema and Class Diagrams:
https://schemas.wmo.int/iwxxm/3.0.0/airmet.xsd
https://schemas.wmo.int/iwxxm/3.0.0/html/

IWXXM AIRMET examples:
https://github.com/wmo-im/iwxxm/tree/master/IWXXM/examples
https://schemas.wmo.int/iwxxm/3.0.0/examples/

WMO Code Table
http://codes.wmo.int/

3 Input source and Output

The input source is the TAC SIGMET bulletin that has been decoded to DMS XML.

Input source
/data/msc/alert/atmospheric/aviation/airmet-2.0-ascii/decoded-xml-2.0

Output of IWXXM
/msc/alert/atmospheric/aviation/airmet-2.0-ascii/product-iwxxm_xml-1.0

4 Header portion of IWXXM AIRMET and Flag Values

4.1 Bulletin structure

In Canada, an IWXXM AIRMET files will contain only 1 AIRMET bulletin. The bulletin structure will look like this:

```
<collect:MeteorologicalBulletin gml:id="uuid.....
        <collect:meteorologicalInformation>
                <iwxxm:AIRMET gml:id="uuid.....
                ...
                ...
                </iwxxm:AIRMET>
        </collect:meteorologicalInformation>
        ..........
        ..........
</collect:MeteorologicalBulletin>
```

4.2 GML:ID

Special attention is required to the values of the GML IDs to ensure successful aggregation of IWXXM messages at national or international data aggregators. This is because all GML IDs defined within an XML/GML instance must be unique. As IWXXM messages are prepared by different originators, ensuring the global uniqueness of GML IDs is essential to ensure smooth aggregation of IWXXM messages from different originators.

The values of the "gml:id" can be defined in accordance with some rules related to the characteristics of the report. Another approach to creating globally unique strings is to use a Universally Unique IDentifier (UUID) generator. The latter technique relieves the burden on the originator to devise a custom-made algorithm to generate them. TT-AvXML team has chosen to make use of UUID generators to create values for gmi:ids in its IWXXM examples.

The rule for GML IDs requires a string starting with a letter, so a prefix beginning with one ensures this when using a UUID generator. Whichever technique you use, the GML ID value does not necessarily have to begin with 'uuid.'

Also, rule from the schema https://schemas.wmo.int/iwxxm/3.0.0/rule/iwxxm.sch

```
<sch:pattern id="Common.Report-5">
<sch:rule
context="//iwxxm:METAR|//iwxxm:SPECI|//iwxxm:TAF|//iwxxm:SIGMET|//iwxxm:VolcanicAshSIGMET|//iwxxm:TropicalCycloneSIGMET|//iwxxm:AIRMET|//iwxxm:TropicalCycloneAdvisory|//iwxxm:VolcanicAshAdvisory|//iwxxm:SpaceWeatherAdvisory">
<sch:assert test="( if( //@gml:id[not(matches(.,'uuid\.[a-z0-9]{8}-[a-z0-9]{4}-[a-z0-9]{4}-[a-z0-9]{4}-[a-z0-9]{12}'))] ) then( false() ) else( true() ) )">Common.Report-5: All gml:ids in IWXXM reports must be prefixed with 'uuid.' and must be UUID version 4</sch:assert>
</sch:rule>
</sch:pattern>
```

5 Content of <meteorologicalInformation> section

5.1 IWXXM-CA

The use of extensions will allow Canada to include additional meteorological parameters found in Canadian AIRMET which are not directly supported by the core XML schemas. A Canadian extension schema (iwxxm-ca) has been published and is available at
https://dd.meteo.gc.ca/aviation/iwxxm/schema
See section 14.1 for the details on encoding Canadian extension content.

5.2 Report Status

The attribute "reportStatus" for AIRMET shall be set to "NORMAL".
Corrections or Amendments to an AIRMET do not exist.

5.3 Permissible Usage

PermissibleUsage defines the restricted set of permitted usages of data.
There are two possible values to report: “OPERATIONAL” and “NON-OPERATIONAL”.

For IWXXM AIRMET this field is reported as:
permissibleUsage="OPERATIONAL"

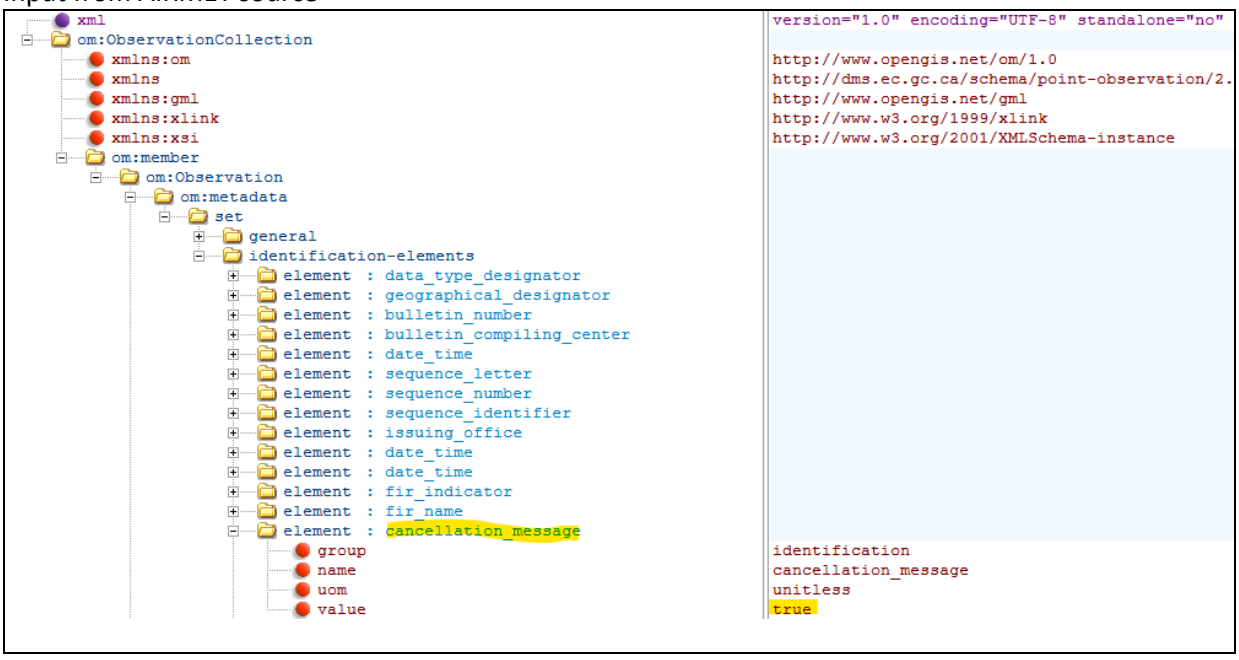
For TEST IWXXM AIRMET this field is reported as:
permissibleUsage="NON-OPERATIONAL"
Additionally, the field permissibleUsageReason=”TEST”

```
<iwxxm:AIRMET gml:id="uuid.b4488af8-3a10-4402-9425-c3fa2d082e69" reportStatus="NORMAL"
   permissibleUsage="NON-OPERATIONAL" permissibleUsageReason="TEST" >
```

5.4 Cancelled AIRMET

If an AIRMET is cancelled, an additional attribute shall be reported:
isCancelReport="true"

Input from AIRMET source



IWXXM Output:

```
<iwxxm:AIRMET gml:id="uuid.fff20d63-f802-4b8a-8c2f-f2b24a5abec5" xsi:schemaLocation="http://icao.int/iwxxm/3.0
    http://schemas.wmo.int/iwxxm/3.0/iwxxm.xsd" reportStatus="NORMAL" permissibleUsage="OPERATIONAL"
    isCancelReport="true" >
```

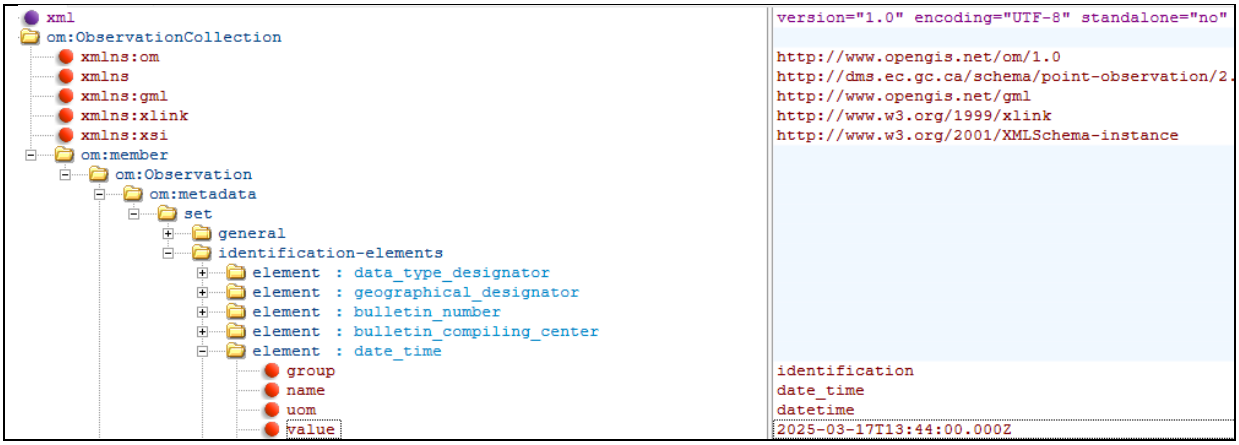
6 Issue Time

Issue Time is the time an AIRMET bulletin was issued.

In the TAC AIRMET bulletin, this value is found in the first line also known as the WMO bulletin header. The generic form being: ***$T_1T_2A_1A_2ii$ CCCC YYGGgg***

where ***YYGGgg*** International date-time group.

Input from AIRMET source:



IWXXM Output:

```
<iwxxm:issueTime>
  <TimeInstant gml:id="uuid.80530dd5-4da3-4848-b47f-e817d15867f7" >
     <gml:timePosition>2025-03-17T13:44:00.000Z</gml:timePosition>
   </TimeInstant>
 </iwxxm:issueTime>
```

7 Issuing Air Traffic Service Unit

In the TAC AIRMET bulletin, this element is found in the second line. The generic form being:

CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC

where the first CCCC (in red above) is the ICAO location indicator of the ATS unit serving the FIR to which the AIRMET refers. The codes and names are defined in the Aeronautical Information Exchange Model (**AIXM**).

Input from AIRMET source

In Canada, the ***Issuing Air Traffic Service Unit*** is identical to the ***Issuing Air Traffic Services Region***. Therefore, the input source is that found in section 9 below.

IWXXM Output

```
<iwxxm:issuingAirTrafficServicesUnit>
  <aixm:Unit gml:id="uuid.bc1bbca1-fb59-440d-8784-a74d72d3a949" >
    <aixm:timeSlice>
      <aixm:UnitTimeSlice gml:id="uuid.8376b2ca-ebd4-4806-845a-f7fd76d39785" >
         <gml:validTime/>
         <aixm:interpretation>SNAPSHOT</aixm:interpretation>
         <aixm:name>CZWG FIC</aixm:name>
         <aixm:type>FIC</aixm:type>
         <aixm:designator>CZWG</aixm:designator>
       </aixm:UnitTimeSlice>
     </aixm:timeSlice>
   </aixm:Unit>
 </iwxxm:issuingAirTrafficServicesUnit>
```

8 Originating Meteorological Watch Office

In the TAC AIRMET bulletin, this element is found on the second line. The generic form being:

CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC

where the second CCCC (in red above) is the ICAO location indicator of the MWO originating the message. The codes and names are defined in the Aeronautical Information Exchange Model (**AIXM**).

Input from AIRMET source

IWXXM Output

```
<iwxxm:originatingMeteorologicalWatchOffice>
  <aixm:Unit gml:id="uuid.b81be478-7659-4420-8f23-bd3a9ac8ceb4" >
    <aixm:timeSlice>
      <aixm:UnitTimeSlice gml:id="uuid.a4ffad53-f87c-4b67-9aef-acf20c8d4623" >
        <gml:validTime/>
        <aixm:interpretation>SNAPSHOT</aixm:interpretation>
        <aixm:name>CWUL MWO</aixm:name>
        <aixm:type>MWO</aixm:type>
        <aixm:designator>CWUL</aixm:designator>
      </aixm:UnitTimeSlice>
    </aixm:timeSlice>
  </aixm:Unit>
</iwxxm:originatingMeteorologicalWatchOffice>
```

9 Issuing Air Traffic Services Region

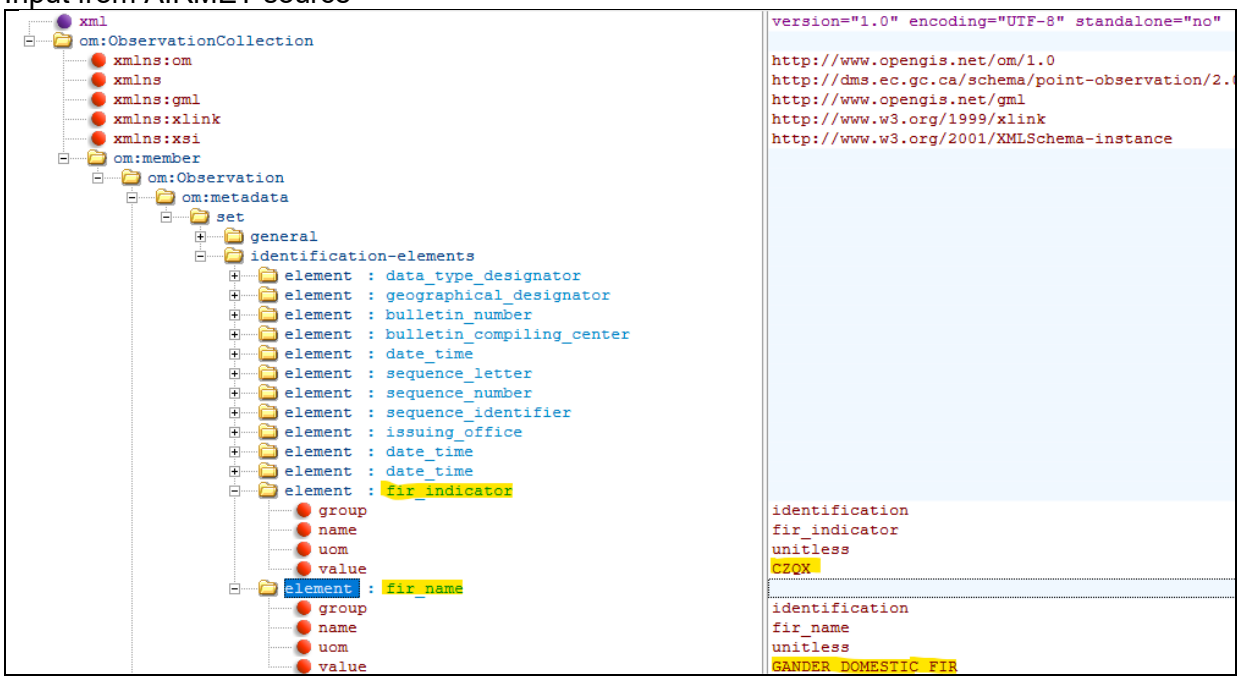
In the TAC AIRMET bulletin, these elements (1 and 2 below) are found on the third line. The generic form being:

1	2	3	4	5
Location indicator of the FIR	**Name of the FIR**	Description of the phenomenon	Observed or forecast	Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

6	7	8	9
Level	Movement or expected movement	Change in intensity	Remark
FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	MOV <direction, speed>KT Or STNR	INTSFYG or WKNG or NC	RMK

Ex:
WACN27 CWAO 311751
CZQX AIRMET A1 VALID 311750/312150 CWUL-
CZQX GANDER DOMESTIC FIR MOD ICE FCST WI 60NM WID LINE BTN /N4722 W05321/30 SW CYYT - /N4859 W05437/5 NW CYQX - /N4929 W05708/20 NE CYDF FL005/020 STNR WKN
RMK GFACN34=

Input from AIRMET source



IWXXM Output

```
<iwxxm:issuingAirTrafficServicesRegion>
  <aixm:Airspace gml:id="uuid.7adba630-b2c2-461e-8c2a-f6bc754b4dd7" >
    <aixm:timeSlice>
      <aixm:UnitTimeSlice gml:id="uuid.f6010498-ddac-4260-b8f4-942df35a4376" >
        <gml:validTime/>
        <aixm:interpretation>SNAPSHOT</aixm:interpretation>
        <aixm:type>OTHER:GANDER DOMESTIC</aixm:type>
        <aixm:designator>CZQX</aixm:designator>
        <aixm:name>GANDER DOMESTIC FIR</aixm:name>
      </aixm:UnitTimeSlice>
    </aixm:timeSlice>
  </aixm:Airspace>
</iwxxm:issuingAirTrafficServicesRegion>
```

10 Alphanumeric Sequence

In the TAC AIRMET bulletin, this element is found in the second line. The generic form being:

CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC

where **[n]nn** (in red above) is the daily alphanumeric sequence.

Input from AIRMET source

IWXXM Output

```
<iwxxm:sequenceNumber>B1</iwxxm:sequenceNumber>
```

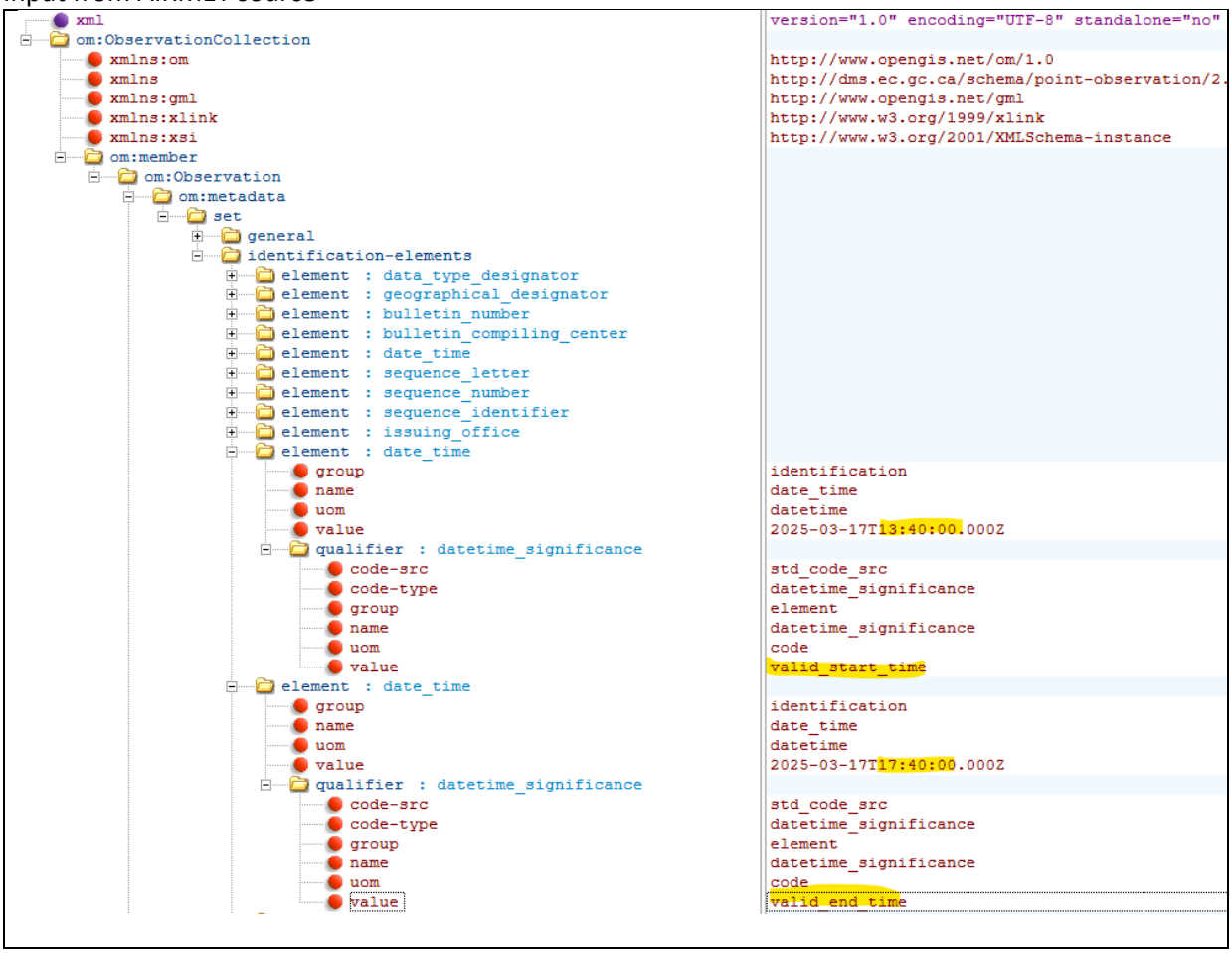
11 Valid Period

In the TAC AIRMET bulletin, this element is found in the second line. The generic form being:

CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC

where **YYGGgg/YYGGgg** (in red above) is the validity period of AIRMET given by date/time group of the beginning and date/time group of the end of the period.

Input from AIRMET source



IWXXM Output

```
<iwxxm:validPeriod>
  <gml:TimePeriod>
     <gml:beginPosition>2025-03-17T13:40:00.000Z</gml:beginPosition>
     <gml:endPosition>2025-03-17T17:40:00.000Z</gml:endPosition>
   </gml:TimePeriod>
```

12 Cancelled Report Sequence Number

The cancellation of an AIRMET is done by issuing the same type of AIRMET with a statement and alphanumeric sequence of the AIRMET being cancelled (in red font in the example below)

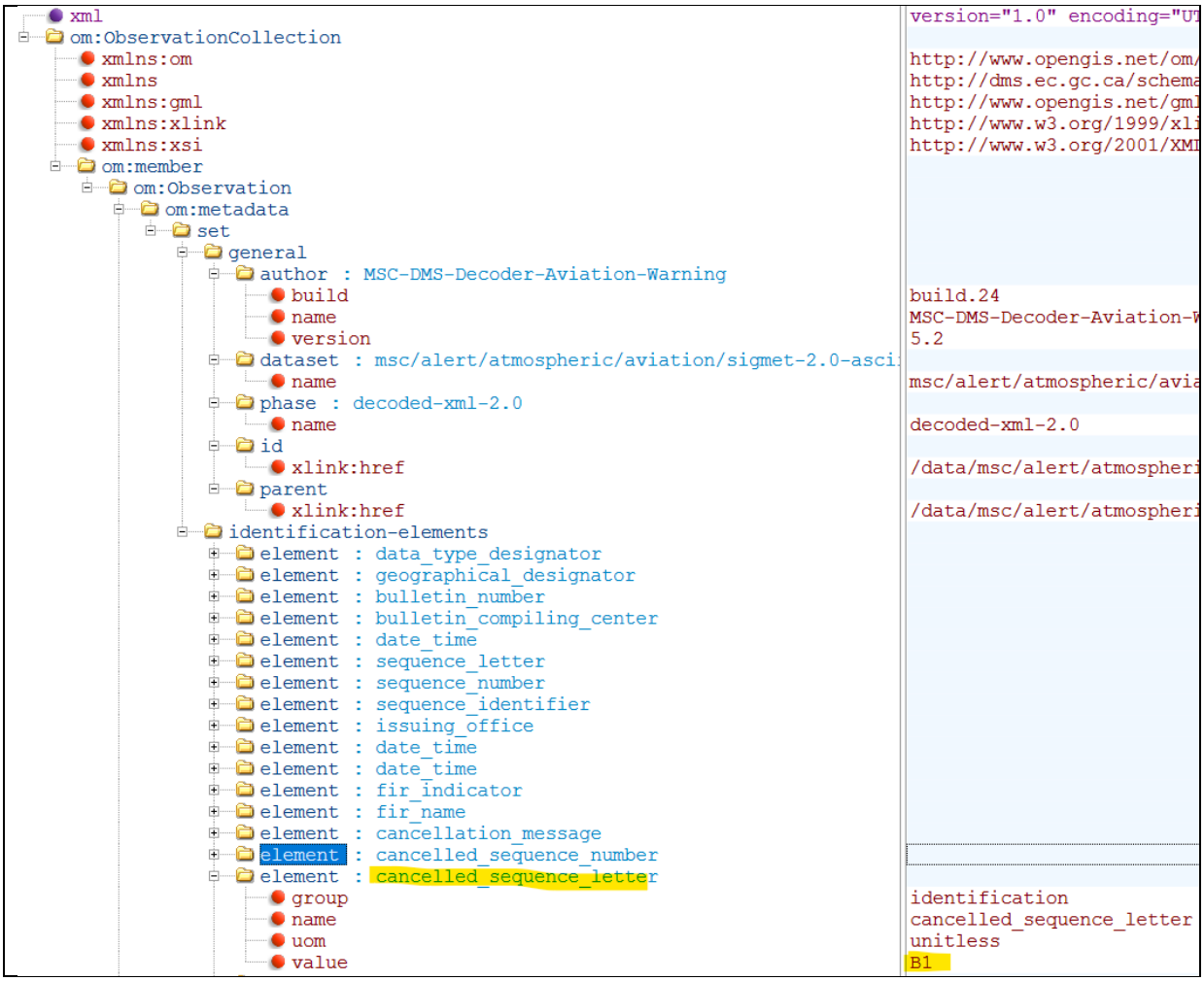
Ex:

WACN05 CWAO 161120

CZUL AIRMET B2 VALID 161120/161130 CWUL

CZUL MONTREAL **CNL AIRMET B1** 160730/161130=

Input from AIRMET source



IWXXM Output

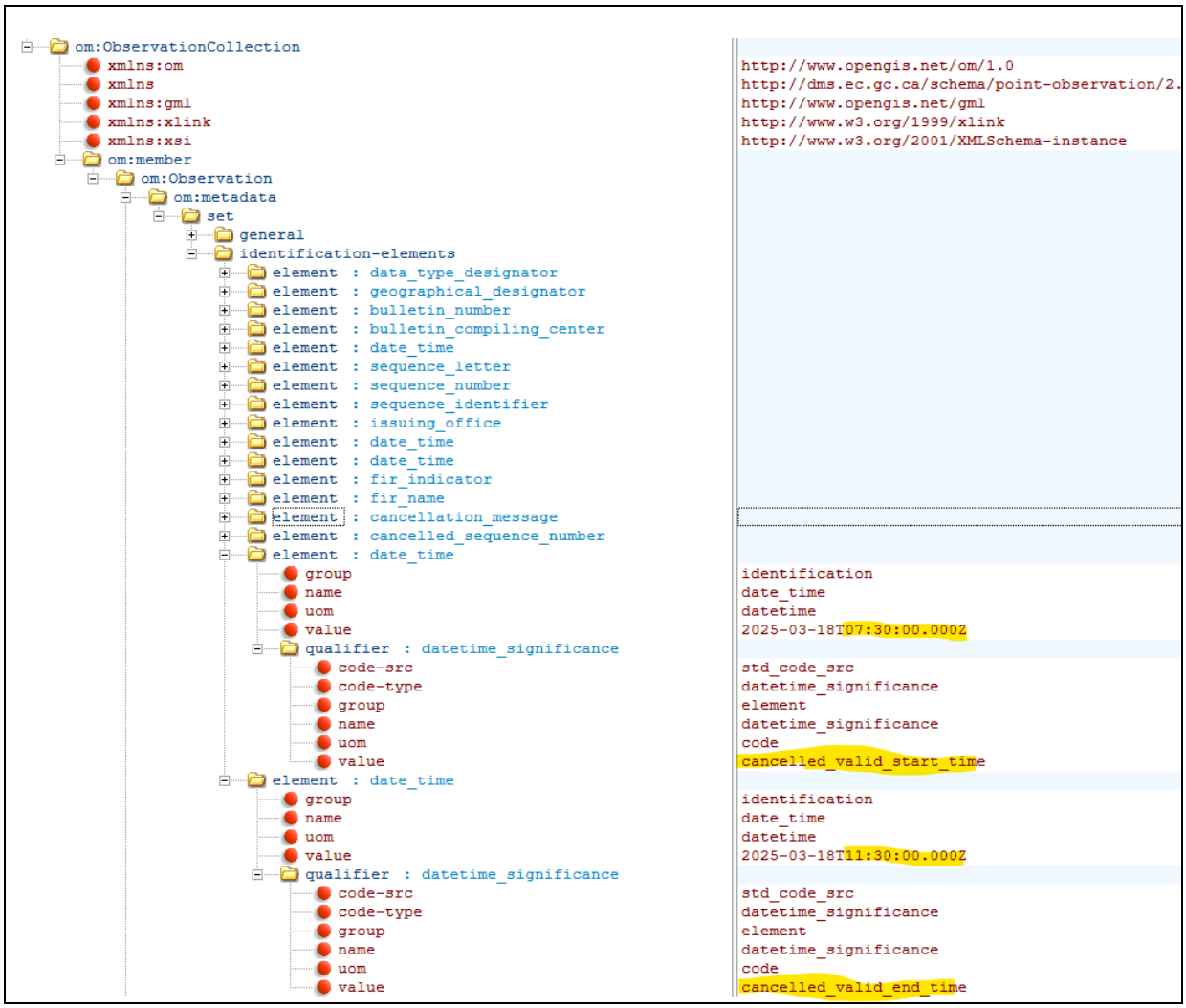
```
<iwxxm:cancelledReportSequenceNumber>B1</iwxxm:cancelledReportSequenceNumber
```

13 Cancelled Report Valid Period

The cancellation AIRMET also includes the valid period of the AIRMET message being cancelled (in red font in the example below).

Ex:
WACN05 CWAO 161120
CZUL AIRMET M4 VALID 161120/161130 CWUL
CZUL MONTREAL FIR CNL AIRMET M3 **160730/161130**=

Input from AIRMET source



IWXXM Output

```
  <iwxxm:cancelledReportSequenceNumber>31807341209771013</iwxxm:cancelledReportSequenceNumber>
<iwxxm:cancelledReportValidPeriod>
  <gml:TimePeriod>
     <gml:beginPosition>2025-03-18T07:30:00.000Z</gml:beginPosition>
     <gml:endPosition>2025-03-18T11:30:00.000Z</gml:endPosition>
   </gml:TimePeriod>
 </iwxxm:cancelledReportValidPeriod>
```

14 AIRMET Phenomenon

In the TAC AIRMET bulletin, this elements (3) is found on the third line. The generic form being:

1	2	3	4	5
Location indicator of the FIR	Name of the FIR	**Description of the phenomenon**	Observed or forecast	Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

6	7	8	9
Level	Movement or expected movement	Change in intensity	Remark
FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	MOV <direction, speed>KT Or STNR	INTSFYG or WKNG or NC	RMK

Ex:

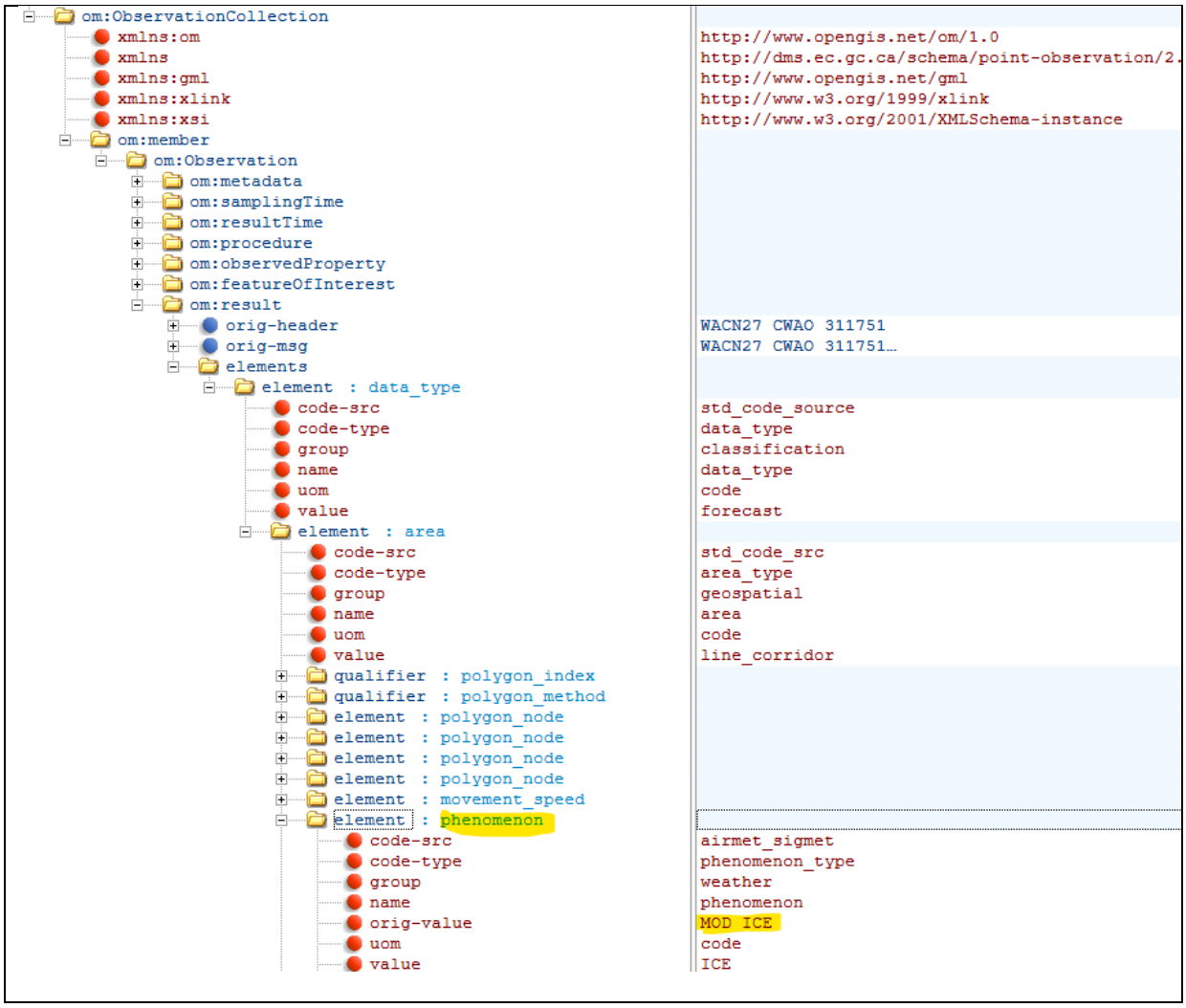
WACN27 CWAO 311751

CZQX AIRMET A1 VALID 311750/312150 CWUL-

CZQX GANDER DOMESTIC FIR **MOD ICE** FCST WI 60NM WID LINE BTN /N4722 W05321/30 SW CYYT - /N4859 W05437/5 NW CYQX - /N4929 W05708/20 NE CYDF FL005/020 STNR WKN

RMK GFACN34=

Input from AIRMET source



The IWXXM output must refer to a WMO code of the AIRMET phenomenon published at https://codes.wmo.int/49-2/AirWxPhenomena.

IWXXM Output

```
<iwxxm:phenomenon>xlink:href="http://codes.wmo.int/49-
   2/AirWxPhenomena/MOD ICE"</iwxxm:phenomenon>
```

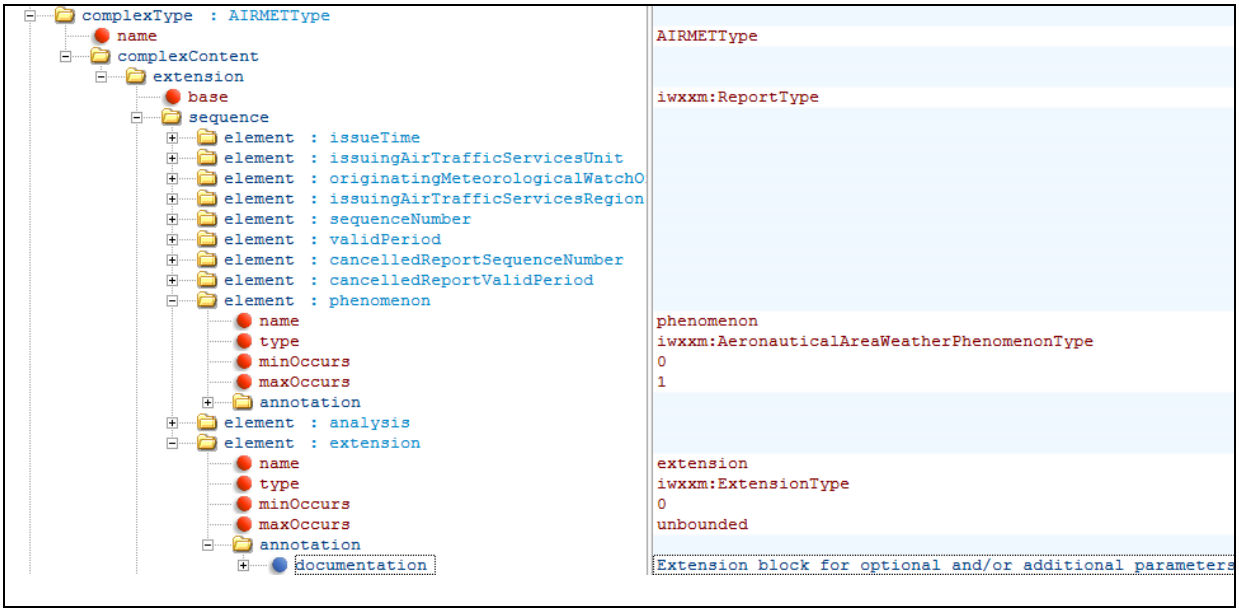
14.1 Canadian AIRMET phenomena

In Canada, an AIRMET can be issued for a combination of TCU and TS. We can also issue an AIRMET combining SFC VIS and CLD (either BKN or OVC). As such, Canada has filed State differences against ICAO Annex 3 for these specific AIRMET phenomena which have the following descriptions:

SFC VIS and BKN CLD	Widespread areas affected by reductions of visibility to less than three statute miles (5 000 m), including the weather phenomena causing the reduction of visibility **AND** widespread areas of broken or overcast cloud with height of base less than 1,000 ft (300 m) above ground level.
SFC VIS and OVC CLD	
OCNL TCU – ISOL TS	Occasional towering cumulus and isolated thunderstorms.
OCNL TCU – ISOL TSGR	Occasional towering cumulus and isolated thunderstorms with hail.
FRQ TCU – ISOL TS	Frequent towering cumulus and isolated thunderstorms.
FRQ TCU – ISOL TSGR	Frequent towering cumulus and isolated thunderstorms with hail

The generation of IWXXM AIRMET for these specific Canadian phenomena will involve the use of an extension block as well as the URL to the Canadian Code and Phenomena Registry where these phenomena are defined (https://dd.meteo.gc.ca/today/aviation/iwxxm/code-ca/).

WMO IWXXM AIRMET schema



The element: phenomenon will need to be encoded as:

<iwxxm:phenomenon nilReason = "http://codes.wmo.int/common/nil/template"/>

The extension block (at the very end of the complexType: AIRMETType) will need to carry the following:

<iwxxm:extension>

<iwxxm-ca:phenomenon xlink:href="https…*URL of specific phenomenon from the Canadian Registry*"**>**

Example of encoding for Canadian phenomena SFC VIS and OVC CLD

15 AIRMET Phenomenon Observed or Forecast

In the TAC AIRMET bulletin, this element (4) is found on the third line. The generic form being:

1	2	3	4	5
Location indicator of the FIR	Name of the FIR	Description of the phenomenon	**Observed or forecast**	Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

6	7	8	9
Level	Movement or expected movement	Change in intensity	Remark
FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	MOV <direction, speed>KT Or STNR	INTSFYG or WKNG or NC	RMK

15.1 When element (4) is FCST:

Ex:

WACN27 CWAO 311751

CZQX AIRMET A1 VALID 311750/312150 CWUL-

CZQX GANDER DOMESTIC FIR MOD ICE **FCST** WI 60NM WID LINE BTN /N4722 W05321/30 SW CYYT - /N4859 W05437/5 NW CYQX - /N4929 W05708/20 NE CYDF FL005/020 STNR WKN

RMK GFACN34=

Input from AIRMET source

IWXXM Output

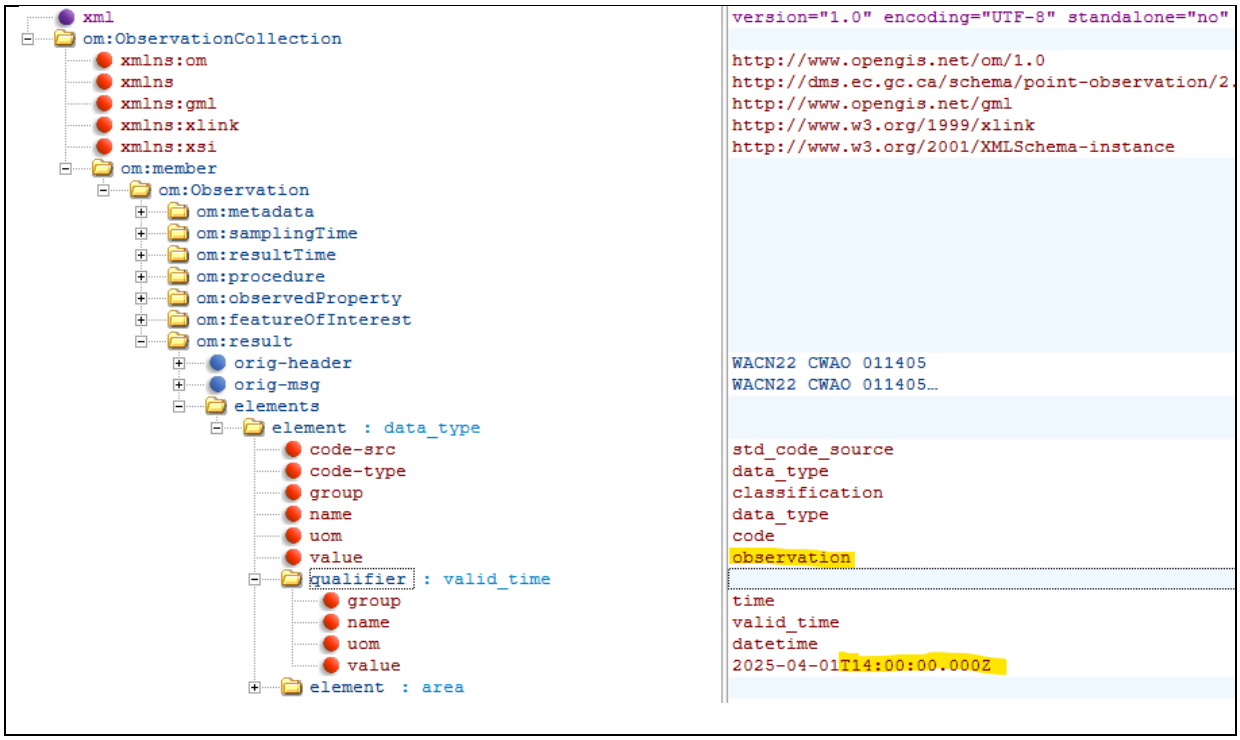
```
<iwxxm:AIRMETEvolvingConditionCollection gml:id="uuid.5e32775c-1177-4646-b01b-d34c7258ce1e"
    timeIndicator="FORECAST" >
```

15.2 When element (4) is OBS

OBS is optionally followed by the time group in the form of AT <GGggZ>, where GGgg is the time of the observation in hours and minutes UTC.

Ex:
WACN22 CWAO 011405
CZEG AIRMET B1 VALID 011405/011805 CWEG-
CZEG EDMONTON FIR MOD TURB **OBS AT 1400Z** WI 50NM WID LINE BTN /N5326 W11813/25 N CYJA - /N5014 W11352/60 S CYYC FL080/140 STNR WKN
RMK GFACN32=

Input from SIGMET source



IWXXM Output

```
<iwxxm:AIRMETEvolvingConditionCollection gml:id="uuid.194a30f7-071d-4762-a7db-9b675174f1f3
   timeIndicator="OBSERVATION" >
  <iwxxm:phenomenonTime>
    <gml:TimeInstant gml:id="uuid.822e6844-8279-4c08-9706-fc620f8999cf" >
      <gml:timePosition>2025-04-01T14:00:00.000Z</gml:timePosition>
    </gml:TimeInstant>
  </iwxxm:phenomenonTime>
 </iwxxm:AIRMETEvolvingConditionCollection>
```

16 AIRMET Location

The location of the AIRMET phenomenon is depicted as an area using coordinate points:

- The description always begins with the abbreviation WI (within)
- the area can be described as a circle, a line or a polygon
- the coordinate point are latitude and longitude in degrees and minutes
- in most cases, every coordinate point is associated with an equivalent location with respect to an aviation reference point (ex: airport) using distances in nautical miles and direction to the eight points of compass

16.1 Line corridor

Ex:
WACN25 CWAO 191304
CZUL AIRMET A1 VALID 191300/191700 CWUL-
CZUL MONTREAL FIR MOD ICE OBS AT 1300Z **WI 40NM WID LINE BTN /N4825 W07708/30 NE CYVO** -
/**N5043 W07308/75 W CRB4** SFC/FL020 MOV E 15KT WKN
RMK GFACN33=

Input from AIRMET source

```
<element code-src="std_code_src" code-type="area_type" group="geospatial" name="area" uom="code
    value="line_corridor" >
   <qualifier group="index" name="polygon_index" uom="unitless" value="1" />
   <qualifier code-src="std_code_src" code-type="polygon_method" group="polygon"
     name="polygon_method" uom="code" value="coordinates_width" />
  <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node"
     uom="code" value="coordinate" >
    <qualifier group="index" name="coordinate_index" uom="unitless" value="1" />
    <element group="geospatial" name="node_latitude" uom="°" value="48.4166666666666" />
    <element group="geospatial" name="node_longitude" uom="°" value="-77.13333333333334" />
    <element group="geospatial" name="distance_from_aviation_reference_site" uom="n.mi"
      value="30" />
    <element group="geospatial" name="direction_from_aviation_reference_site" uom="unitless"
      value="NE" />
    <element group="geospatial" name="aviation_reference_site" uom="unitless" value="CYVO" />
   </element>
  <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node"
     uom="code" value="coordinate" >
    <qualifier group="index" name="coordinate_index" uom="unitless" value="2" />
    <element group="geospatial" name="node_latitude" uom="°" value="50.71666666666667" />
    <element group="geospatial" name="node_longitude" uom="°" value="-73.13333333333334" />
    <element group="geospatial" name="distance_from_aviation_reference_site" uom="n.mi"
      value="75" />
    <element group="geospatial" name="direction_from_aviation_reference_site" uom="unitless"
      value="W" />
    <element group="geospatial" name="aviation_reference_site" uom="unitless" value="CRB4" />
   </element>
  <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node"
     uom="code" value="line_buffer" >
    <element group="geospatial" name="line_buffer" uom="n.mi" value="40" />
   </element>
```

The DMS decoded XML converts the coordinate points from degrees-minutes to degrees-decimals. The polygon represented as a line corridor (two coordinate points and a width in the example above) is then converted to a “true” polygon with all vertices described as coordinate points.

IWXXM Output

```
<aixm:horizontalProjection>
  <aixm:Surface gml:id="uuid.170ba923-eac7-4069-adaf-7b53ec3e0cac" srsDimension="2
      axisLabels="Lat Long" srsName="http://www.opengis.net/def/crs/EPSG/0/4326" >
    <gml:polygonPatches>
      <gml:PolygonPatch>
        <gml:exterior>
          <gml:LinearRing>
            <gml:posList>-73.47190203041046,50.971542322674026 -
              72.79841051336354,50.460847713003254 -
              76.79380612895359,48.17241226637291 -
              77.4761248340822,48.65985414440957 -
              73.47190203041046,50.971542322674026</gml:posList>
          </gml:LinearRing>
        </gml:exterior>
      </gml:PolygonPatch>
    </gml:polygonPatches>
  </aixm:Surface>
</aixm:horizontalProjection>
```

16.2 Circle

Ex:

WACN25 CWAO 191524 CZUL

SIGMET B1 VALID 191520/191920 CWUL-

CZUL MONTREAL FIR MOD TURB FCST **WI 25NM OF** /**N4545 W07343/15 N CYUL** SFC/FL010 STNR NC

RMK GFACN33=

Input from AIRMET source

```
<element code-src="std_code_src" code-type="area_type" group="geospatial" name="area" uom="code"
    value="circle" >
   <qualifier group="index" name="polygon_index" uom="unitless" value="1" />
   <qualifier code-src="std_code_src" code-type="polygon_method" group="polygon" name="polygon_method"
     uom="code" value="coordinate_radius" />
  <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node" uom="code"
     value="coordinate" >
    <qualifier group="index" name="coordinate_index" uom="unitless" value="1" />
    <element group="geospatial" name="node_latitude" uom="°" value="45.75" />
    <element group="geospatial" name="node_longitude" uom="°" value="-73.71666666666667" />
    <element group="geospatial" name="distance_from_aviation_reference_site" uom="n.mi" value="15" />
    <element group="geospatial" name="direction_from_aviation_reference_site" uom="unitless" value="N" />
    <element group="geospatial" name="aviation_reference_site" uom="unitless" value="CYUL" />
   </element>
  <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node" uom="code"
     value="radius" >
    <element group="geospatial" name="radius" uom="n.mi" value="25" />
```

IWXXM Output

```
<aixm:horizontalProjection>
  <aixm:Surface gml:id="uuid.7f31606a-c330-4c24-83a2-a254522c0266"
     srsDimension="2" axisLabels="Lat Long"
     srsName="http://www.opengis.net/def/crs/EPSG/0/4326" >
    <gml:polygonPatches>
      <gml:PolygonPatch>
        <gml:exterior>
          <gml:Ring>
            <gml:curveMember>
              <gml:Curve gml:id="uuid.79439a96-c444-455b-9eb1-
                 80660d5304f7" >
                <gml:segments>
                  <gml:CircleByCenterPoint numArc="1" >
                    <gml:posList>45.75 -
                      73.71666666666667</gml:posList>
                    <gml:radius uom="[nmi_i]" >25</gml:radius>
                  </gml:CircleByCenterPoint>
                </gml:segments>
              </gml:Curve>
            </gml:curveMember>
          </gml:Ring>
        </gml:exterior>
      </gml:PolygonPatch>
    </gml:polygonPatches>
  </aixm:Surface>
</aixm:horizontalProjection>
```

16.3 Polygon

Ex:

WACN25 CWAO 191731

CZUL SIGMET C2 VALID 191730/192130 CWUL-

CZUL MONTREAL FIR MOD TURB FCST **WI** /**N4843 W07655/60 NE CYVO - /N5156 W07620/15 NW CYHH - /N5231 W07022/120 N CRB4 - /N4843 W07655/60 NE CYVO** FL240/300 MOV NE 15KT WKN

RMK GFACN34 GFACN33=

Input from AIRMET source

```
<element code-src="std_code_src" code-type="area_type" group="geospatial" name="area" uom="code"
   value="closed_polygon" >
  <qualifier group="index" name="polygon_index" uom="unitless" value="1" />
  <qualifier code-src="std_code_src" code-type="polygon_method" group="polygon" name="polygon_method"
    uom="code" value="coordinates" />
 <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node" uom="code"
    value="coordinate" >
   <qualifier group="index" name="coordinate_index" uom="unitless" value="1" />
   <element group="geospatial" name="node_latitude" uom="°" value="48.71666666666667" />
   <element group="geospatial" name="node_longitude" uom="°" value="-76.91666666666667" />
   <element group="geospatial" name="distance_from_aviation_reference_site" uom="n.mi" value="60" />
   <element group="geospatial" name="direction_from_aviation_reference_site" uom="unitless" value="NE" />
   <element group="geospatial" name="aviation_reference_site" uom="unitless" value="CYVO" />
 </element>
 <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node" uom="code"
    value="coordinate" >
   <qualifier group="index" name="coordinate_index" uom="unitless" value="2" />
   <element group="geospatial" name="node_latitude" uom="°" value="51.93333333333333" />
   <element group="geospatial" name="node_longitude" uom="°" value="-76.33333333333333" />
   <element group="geospatial" name="distance_from_aviation_reference_site" uom="n.mi" value="15" />
   <element group="geospatial" name="direction_from_aviation_reference_site" uom="unitless" value="NW" />
   <element group="geospatial" name="aviation_reference_site" uom="unitless" value="CYHH" />
 </element>
 <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node" uom="code"
    value="coordinate" >
   <qualifier group="index" name="coordinate_index" uom="unitless" value="3" />
   <element group="geospatial" name="node_latitude" uom="°" value="52.516666666666666" />
   <element group="geospatial" name="node_longitude" uom="°" value="-70.36666666666666" />
   <element group="geospatial" name="distance_from_aviation_reference_site" uom="n.mi" value="120" />
   <element group="geospatial" name="direction_from_aviation_reference_site" uom="unitless" value="N" />
   <element group="geospatial" name="aviation_reference_site" uom="unitless" value="CRB4" />
 </element>
 <element code-src="std_code_src" code-type="polygon_node" group="polygon" name="polygon_node" uom="code"
    value="coordinate" >
   <qualifier group="index" name="coordinate_index" uom="unitless" value="4" />
   <element group="geospatial" name="node_latitude" uom="°" value="48.71666666666667" />
   <element group="geospatial" name="node_longitude" uom="°" value="-76.91666666666667" />
   <element group="geospatial" name="distance_from_aviation_reference_site" uom="n.mi" value="60" />
   <element group="geospatial" name="direction_from_aviation_reference_site" uom="unitless" value="NE" />
   <element group="geospatial" name="aviation_reference_site" uom="unitless" value="CYVO" />
 </element>
```

The last block of coordinates is simply a repeat of the first coordinates to “close” the polygon.

IWXXM Output

```
<aixm:horizontalProjection>
 <aixm:Surface gml:id="uuid.d07b7779-9174-47d4-81d1-bf5fdd495be5" srsDimension="2"
    axisLabels="Lat Long" srsName="http://www.opengis.net/def/crs/EPSG/0/4326" >
  <gml:polygonPatches>
   <gml:PolygonPatch>
    <gml:exterior>
     <gml:LinearRing>
      <gml:posList>48.71666666666667 -76.91666666666667 51.93333333333333 -
        76.33333333333333 52.516666666666666 -70.36666666666666 48.71666666666667 -
        76.91666666666667</gml:posList>
     </gml:LinearRing>
    </gml:exterior>
   </gml:PolygonPatch>
  </gml:polygonPatches>
 </aixm:Surface>
</aixm:horizontalProjection>
```

16.4 Equivalent location with respect to an aviation reference point

As seen in this section, every coordinate point is associated with an equivalent location with respect to an aviation reference point (ex: airport) using distances in nautical miles and direction to the eight points of compass. These elements are not directly supported by the WMO IWWXM AIRMET schema. However, the schema offers an extension block (at the very end of the complexType: AIRMETType) which will carry the following:

WMO IWXXM AIRMET schema

This extension block should look like this:

<iwxxm:extension>

<iwxxm-ca:humanReadableText> *text-text-text-text* </iwxxm-ca:humanReadableText>

</iwxxm:extension>

Applied to the Line-corridor example, the extension block would look like this:

WACN25 CWAO 191304

CZUL AIRMET A1 VALID 191300/191700 CWUL-

CZUL MONTREAL FIR MOD ICE OBS AT 1300Z **WI 40NM WID LINE BTN** /N4825 W07708/**30 NE CYVO** -

/N5043 W07308/**75 W CRB4** SFC/FL020 MOV E 15KT WKN

RMK GFACN33=

<iwxxm:extension>

<iwxxm-ca:humanReadableText> **WI 40NM WID LINE BTN 30 NE CYVO – 75 W CRB4** </iwxxm-ca:humanReadableText>

</iwxxm:extension>

Applied to the Circle example, the extension block would look like this:

WACN25 CWAO 191524 CZUL
AIRMET B1 VALID 191520/191920 CWUL-
CZUL MONTREAL FIR MOD TURB FCST **WI 25NM OF** /N4545 W07343/**15 N CYUL** SFC/FL010 STNR NC
RMK GFACN33=

<iwxxm:extension>
<iwxxm-ca:humanReadableText> WI 25NM OF 15 N CYUL </iwxxm- ca:humanReadableText>
</iwxxm:extension>

Applied to the Polygon example, the extension block would look like this:

WACN25 CWAO 191731
CZUL AIRMET C2 VALID 191730/192130 CWUL-
CZUL MONTREAL FIR MOD TURB FCST **WI** /N4843 W07655/**60 NE CYVO** - /N5156 W07620/**15 NW CYHH** - /N5231 W07022/**120 N CRB4** - /N4843 W07655/**60 NE CYVO** FL240/300 MOV NE 15KT WKN
RMK GFACN34 GFACN33=

<iwxxm:extension>
<iwxxm-ca:humanReadableText> WI 60 NE CYVO - 15 NW CYHH - 120 N CRB4 - 60 NE CYVO
</iwxxm- ca:humanReadableText>
</iwxxm:extension>

17 AIRMET Level

In the TAC AIRMET bulletin, this is elements #6. The generic form being:

1	2	3	4	5
Location indicator of the FIR	Name of the FIR	Description of the phenomenon	Observed or forecast	Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

6	7	8	9
Level	Movement or expected movement	Change in intensity	Remark
FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	MOV <direction, speed>KT STNR	INTSFYG or WKNG or NC	RMK

The extent of the phenomenon in the vertical is given by one or more of the above abbreviations, as follows:

- A layer FL<nnn/nnn>, where the lower level is reported first; this is used particularly in reporting turbulence and icing
- A layer with reference to one FL using SFC/FL
- The level of the tops of the TS clouds using the abbreviation TOP

The IWXXM output provides the “level” value and unit of measurement (UOM) but also the applicable reference which are either STD (for standard) when UOM is FL and GND (for ground) when UOM is FT.

Ex:
WACN25 CWAO 191731
CZUL AIRMET C2 VALID 191730/192130 CWUL-
CZUL MONTREAL FIR MOD TURB FCST WI /N4843 W07655/60 NE CYVO - /N5156 W07620/15 NW CYHH - /N5231 W07022/120 N CRB4 - /N4843 W07655/60 NE CYVO **FL240/300** MOV NE 15KT WKN
RMK GFACN34 GFACN33=

Input from AIRMET source

```
<element code-src="airmet_sigmet" code-type="vertical_extent" group="geospatial
  name="vertical_extent_bottom" uom="code" value="FL240" />
<element code-src="airmet_sigmet" code-type="vertical_extent" group="geospatial
  name="vertical_extent_top" uom="code" value="FL300" />
```

IWXXM Output

```
<iwxxm:geometry>
  <iwxxm:AirspaceVolume gml:id="uuid.a6554514-210a-44c6-b6a0-e2824047a865" >
    <aixm:upperLimit uom="FL" >300</aixm:upperLimit>
    <aixm:upperLimitReference>STD</aixm:upperLimitReference>
    <aixm:lowerLimit uom="FL" >240</aixm:lowerLimit>
    <aixm:lowerLimitReference>STD</aixm:lowerLimitReference>
```

Ex:
WACN24 CWAO 191845
CZYZ AIRMET D1 VALID 191845/192245 CWUL-
CZYZ TORONTO FIR FRQ TCU – ISOL TS OBS WI 40NM WID LINE BTN /N4258 W08007/15 SW CYHM - /N4423 W08035/30 SE CYVV - /N4546 W08154/30 E CYZE **TOP FL320** MOV SE 15KT WKN
RMK GFACN33=

Input from AIRMET source

```
<element code-src="airmet_sigmet" code-type="vertical_extent"
  group="geospatial" name="vertical extent top" uom="code" value="FL320" />
```

IWXXM Output

```
<iwxxm:geometry>
  <iwxxm:AirspaceVolume gml:id="uuid.c4e597a5-950e-4977-992a-d0c9c06c42f5" >
    <aixm:upperLimit uom="FL" >320</aixm:upperLimit>
    <aixm:upperLimitReference>STD</aixm:upperLimitReference>
```

Ex:
WACN25 CWAO 191859
CWUL AIRMET E1 VALID 191855/192255 CWUL-
CZUL MONTREAL FIR MOD ICE OBS WI 40NM WID LINE BTN /N4537 W07410/20 NW CYUL - /N4614 W07308/20 W CYRQ - /N4612 W07124/30 S CYQB **SFC/FL015** STNR NC
RMK GFACN33=

Input from SIGMET source

```
<element code-src="airmet_sigmet" code-type="vertical_extent"
  group="geospatial" name="vertical_extent_bottom" uom="code" value="SFC" />
<element code-src="airmet_sigmet" code-type="vertical_extent"
  group="geospatial" name="vertical extent top" uom="code" value="FL015" />
```

IWXXM Output

```
<iwxxm:geometry>
 <iwxxm:AirspaceVolume gml:id="uuid.2805cd48-3917-46cb-b90d-6ba7b07b4a7b" >
   <aixm:upperLimit uom="FL" >015</aixm:upperLimit>
   <aixm:upperLimitReference>STD</aixm:upperLimitReference>
```

18 AIRMET movement or expected movement

In the TAC AIRMET bulletin, this is elements #7. The generic form being:

1	2	3	4	5
Location indicator of the FIR	Name of the FIR	Description of the phenomenon	Observed or forecast	Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

6	7	8	9
Level	**Movement or expected movement**	Change in intensity	Remark
FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	MOV <direction, speed>KT Or STNR	INTSFYG or WKNG or NC	RMK

Direction of movement is given with reference to one of the sixteen points of compass.
Speed is given in knots (KT).

Input from AIRMET source

```
<element group="geospatial" name="movement_direction" uom="unitless" value="NE" />
<element group="geospatial" name="movement speed" uom="kn" value="15" />
```

IWXXM Output

```
</iwxxm:geometry>
<iwxxm:directionOfMotion uom="deg" >45</iwxxm:directionOfMotion>
<iwxxm:speedOfMotion uom="[kn_i]" >15</iwxxm:speedOfMotion>
```

The abbreviation STNR is used if no significant movement is expected.

Input from AIRMET source

```
<element group="geospatial" name="movement_speed" uom="unitless" value="STNR" />
```

IWXXM Output

```
</iwxxm:geometry>
<iwxxm:directionOfMotion nilReason="http://www.opengis.net/def/nil/OGC/0/inapplicable" /
<iwxxm:speedOfMotion uom="[kn i]" >0</iwxxm:speedOfMotion>
```

19 AIRMET Change in intensity

In the TAC AIRMET bulletin, this is elements #8. The generic form being:

1	2	3	4	5
Location indicator of the FIR	Name of the FIR	Description of the phenomenon	Observed or forecast	Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

6	7	8	9
Level	Movement or expected movement	**Change in intensity**	Remark
FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	MOV <direction, speed>KT Or STNR	INTSFYG or WKNG or NC	RMK

The element can take one of the following three values: INTFYG, WKNG or NC.

Input from AIRMET source

```
<element code-src="airmet_sigmet" code-type="phenomenon_intensity" group="element
  name="phenomenon intensity trend" uom="code" value="NC" />
```

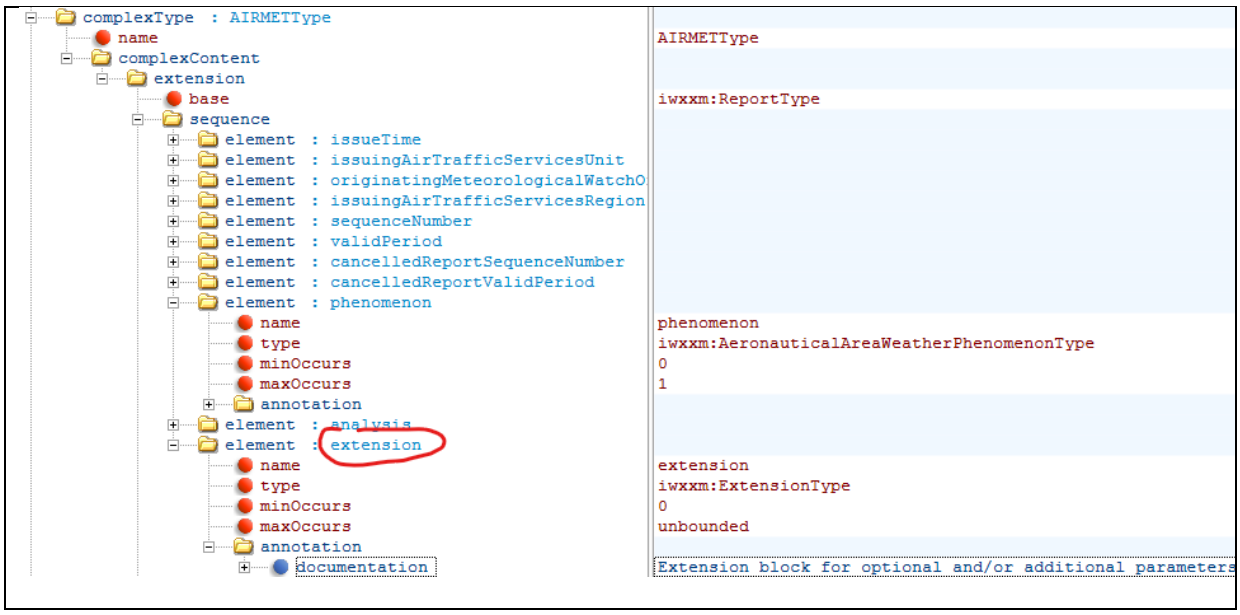
IWXXM Output

```
<iwxxm:member>
  <iwxxm:SIGMETEvolvingCondition intensityChange="NO_CHANGE" >
```

20 RMK

Canadian AIRMET bulletins include a remark line to allow additional information of national interest to be conveyed in the AIRMET message.

WMO IWXXM AIRMET schema



The extension block (at the very end of the complexType: AIRMETType) will need to carry the following:

<iwxxm:extension>
  <iwxxm-ca:humanReadableText> *text-text-text-text* **</iwxxm-ca:humanReadableText>**
</iwxxm:extension>

Applied to the following example:

WACN23 CWAO 201510
CZWG AIRMET H1 VALID 201510/201910 CWEG-
CZWG WINNIPEG FIR MOD TURB FCST WI 90NM WID LINE BTN /N5131 W08849/45 SW CYLH - /N5316 W08131/45 NE CYAT - /N5214 W07157/90 N CRB4 - /N5304 W06556/30 E CYWK FL190/260 MOV NE 25KT NC
RMK GFACN34 GFACN33/CZUL MONTREAL FIR AIRMET F1 CZYZ TORONTO FIR AIRMET G1=

The extension block would look like this:

<iwxxm:extension>

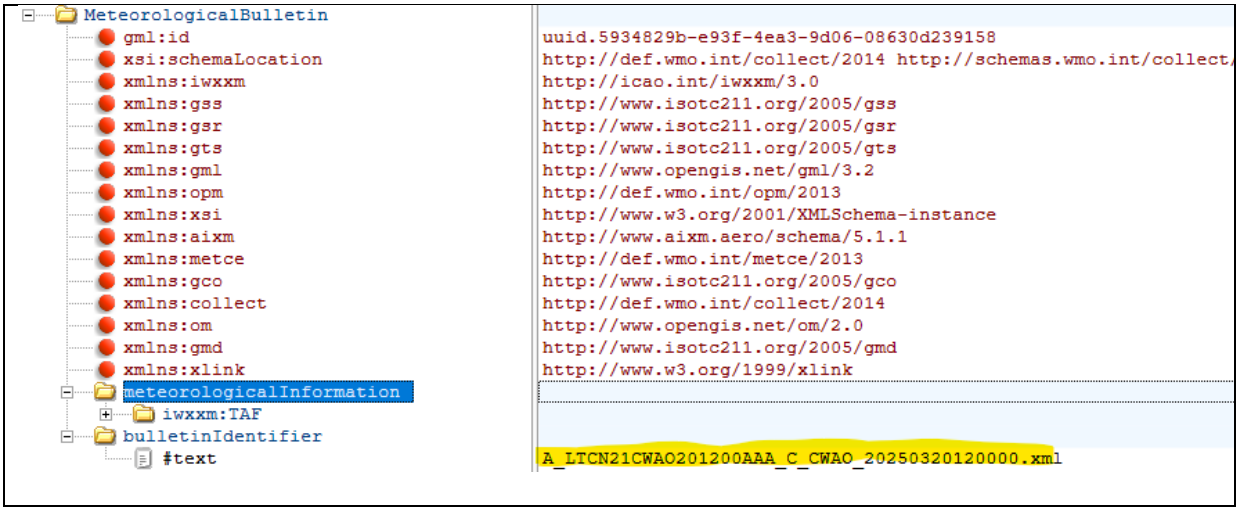
<iwxxm-ca:humanReadableText> GFACN34 GFACN33/CZUL MONTREAL FIR AIRMET F1 CZYZ TORONTO FIR AIRMET G1 </iwxxm-ca:humanReadableText>

</iwxxm:extension>

21 Bulletin Identifier

The IWXXM AIRMET file should close with a line that specifies the IWXXM bulletin identifier.

Example of the bulletin identifier for an IWXXM TAF file

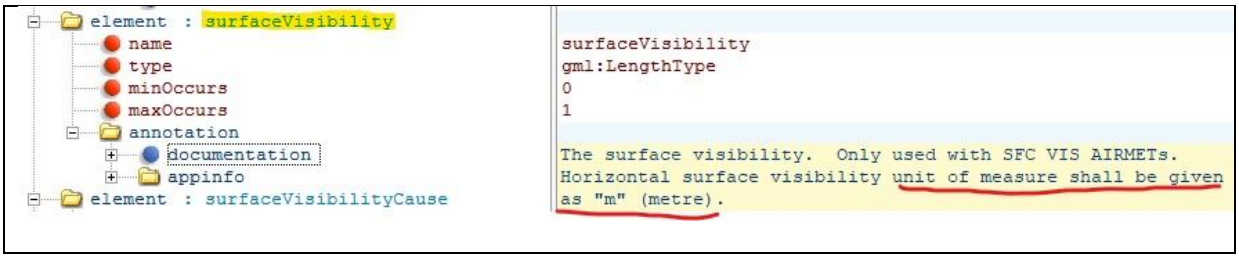


22 Special Cases

22.1 SFC VIS unit of measurement (UOM)

In the TAC AIRMET bulletin, SFC VIS has UOM in statute miles (SM) while the WMO IWXXM AIRMET schema only supports meters (M).

WMO IWXXM AIRMET schema



Conversion from statute miles (SM) to meters (M), prior to encoding in IWXXM, will need to be done according to the following table:

SM	M
0	0
1/8	200
1/4	400
3/8	600
1/2	800
5/8	1000
3/4	1200
1	1600
1 1/4	2000
1 1/2	2400
1 3/4	2800
2	3200
2 1/4	3600
2 1/2	4000
3	4800

22.2 SFC VIS range

In the TAC AIRMET bulletin, SFC VIS can be expressed with a range of values.

Ex:
WACN02 CWAO 041102
CZEG AIRMET H1 VALID 041100/041500 CWEG-
CZEG EDMONTON FIR **SFC VIS 1/4-1/2SM** FG OBS WI N5954 W10848 - N5543 W11132 - N5640 W09850 - N5953 W09948 - N5954 W10848 STNR INTSF=

This is not directly supported by the WMO IWWXM AIRMET schema. However, the schema offers an extension block for optional and/or additional parameters for the complex type AIRMETEvolvingConditionType.

The element “surfaceVisibility uom” will be omitted since if it is encoded as <**iwxxm:cloudBase uom="N/A" nilReason "withheld"**> the validation will fail.

The extension block will then carry the following:

<iwxxm:extension>
<iwxxm-ca:surfaceVisibility>
<iwxxm-ca:surfaceVisibilityLower uom="m">400</iwxxm-ca:surfaceVisibilityLower>
<iwxxm-ca:surfaceVisibilityHigher uom="m">800</iwxxm-ca:surfaceVisibilityHigher>
<iwxxm-ca:surfaceVisibility>
</iwxxm:extension>

The numbers in red represent the converted values of ¼ SM (i.e. 400 meters) and ½ SM (i.e. 800 meters) from the above AIRMET example.

22.3 BKN/OVC CLD range

In the TAC AIRMET bulletin, BKN or OVC CLD can be expressed with a range of values.

Ex:
WACN23 CWAO 011921
CZWG AIRMET F1 VALID 011920/012320 CWEG-
CZWG WINNIPEG FIR **BKN CLD 100-300**/800FT OBS WI /N5125 W10704/45 S CYXE - /N5051 W10318/45 SW CYQV - /N4955 W10541/25 S CYMJ - /N5125 W10704/45 S CYXE STNR NC
RMK GFACN32=

This is not directly supported by the WMO IWWXM AIRMET schema. However, the schema offers an extension block for optional and/or additional parameters for the complex type AIRMETEvolvingConditionType.

The element “cloudBase uom” will be omitted since if it is encoded as **<iwxxm:cloudBase uom="N/A" nilReason "withheld">** the validation will fail.

The extension block will then carry the following:

```
<iwxxm:extension>
      <iwxxm-ca:cloudBase>
            <iwxxm-ca:cloudBaseLower uom="[ft_i]">100</iwxxm-ca:cloudBaseLower>
           <iwxxm-ca:cloudBaseHigher uom="[ft_i]">300</iwxxm-ca:cloudBaseHigher>
       <iwxxm-ca:cloudBase>
</iwxxm:extension>
```

The numbers in red represent the values from the above AIRMET example.

22.4 SFC WIND range

In the TAC AIRMET bulletin, SFC WIND can be expressed with a range of values.

Ex:
WACN24 CWAO 011953
CZYZ AIRMET A1 VALID 011950/012350 CWUL-
CZYZ TORONTO FIR **SFC WIND 30-45KT** FCST WI 30NM WID LINE BTN /N4747 W08401/25 W CYLD - /N4803 W07957/20 N CYXR MOV S 5KT WKN
RMK GFACN33= =

This is not directly supported by the WMO IWWXM AIRMET schema. However, the schema offers an extension block for optional and/or additional parameters for the complex type AIRMETEvolvingConditionType.

The element “surfaceWindSpeed uom” will be omitted since if it is encoded as **<iwxxm:surfaceWindSpeed uom="N/A" nilReason "withheld">**, the validation will fail.

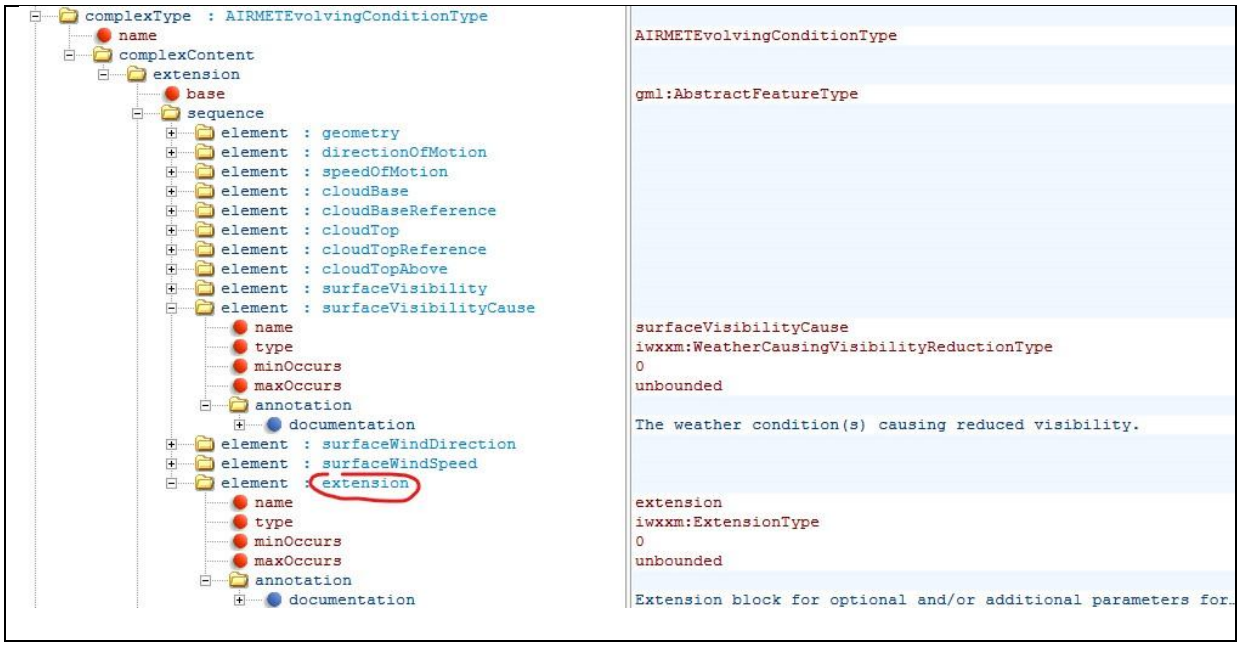
The extension block will then carry the following:

```
<iwxxm:extension>
        <iwxxm-ca:surfaceWindSpeed>
            <iwxxm-ca:surfaceWindSpeedLower uom="[kn_i]">30</iwxxm-ca:surfaceWindSpeedLower>
            <iwxxm-ca:surfaceWindSpeedHigher uom="[kn_i]">45</iwxxm-ca:SurfaceWindSpeedHigher>
    <iwxxm-ca:surfaceWindSpeed>
</iwxxm:extension>
```

The numbers in red represent the values from the above AIRMET example.

22.5 Ice Crystals (IC)

Canadian TAC AIRMET bulletin for SFC VIS may report and forecast ice crystals (IC) as the cause of the visibility restriction. Canada has filed a State difference against ICAO Annex 3 regarding the use of IC as a weather phenomenon. Since this weather phenomenon is not part of the WMO Codes Registry, the strategy will be to encode “unknow Precipitation” (UP) as the wx element in the core part of the IWXXM and use and extension to define IC and point to a Canadian Code Registry.



The element “surfaceVisibilityCause” will need to be encoded as:
<iwxxm:surfaceVisibilityCause xlink:href="http://codes.wmo.int/306/4678/UP"/>

The extension block will need to carry the following:

<iwxxm:extension>
<iwxxm-ca:SurfaceVisibilityCause xlink:href=https://dd.meteo.gc.ca/today/aviation/iwxxm/code-ca/present_and_forecast_weather/IC/>
</iwxxm:extension>