ANNEX A – S-4xx Feature Encoding Guide

Annex A contains a complete list of all features and their attributes defined for use within the S-412 Product Specification. This list has been defined within the IHO Registry WMO Weather Domain and is visualised in the S-412 Application Schema (see section XX). Listings for each allowable attribute (and subsequent dataType) and any associations between feature or information types are provided for each feature. Additionally, specific restrictions and/or use cases for each feature are outlined in each feature's remarks section.

As described in Section XX of this product specification, real world meteorological and oceanographic elements are realized through both InformationType and FeatureType classes (features), complex and primitive data types (complex and simple attributes), code lists, and associations. Additional feature constraints, behaviors, relationships or use cases are provided in each feature's remarks section.

In addition to S-100 Edition 3.0.0, the below tables should be referenced to identify the labels used in this Annex.

Data Types	Abbreviation
Real	(S) RE
Date Time	(S) DT
Integer	(S) IN
Enumerated	(S) EN
Text	(S) TE
Boolean	(S) BO
Complex	C
Uniform	
Resource Name	URN

Code List Types	Abbreviation
Open Enumeration	(CL) OE

S-412 reuses datatypes and will often list the camel case encoding as the data type the below sections. An example is that the pictureCaption attribute uses the languageText datatype. Additional information, including descriptions and definitions of all attributes listed in this Annex and defined within the IHO Registry WMO Weather domain can be found in Annex B. ISO specific data types are specified in the appropriate ISO document.

Feature Number	Feature Name	Camel Case Identifier
1.01	S-412_FeatureType	S412_FeatureType
1.02	S-412_InformationType	S412_InformationType
1.03	Atmospheric Pressure	AtmosphericPressure
1.04	Cone of Uncertainty	ConeOfUncertainty
1.05	Convergent Boundary	ConvergentBoundary
1.06	Cyclone Track	CycloneTrack
1.07	Data Provider	DataProvider
1.08	Freezing Spray	FreezingSpray
1.09	Freezing Spray Message	FreezingSprayMessage
1.10	Front	Front
1.11	High (Anticyclone)	High
1.12	High Wind Message	HighWindMessage
1.13	Land Weather Observation	LandWeatherObservation
1.14	Large Seas Message	LargeSeasMessage
1.15	Low (Cyclone)	Low
1.16	Marine Weather Observation	MarineWeatherObservation
1.17	Maximum Temperature	MaximumTemperature
1.18	Minimum Temperature	MinimumTemperature
1.19	Observation	Observation
1.20	Observation Information	ObservationInformation
1.21	Precipitation	Precipitation
1.22	Precipitation Message	PrecipitationMessage
1.23	Primary Swell	PrimarySwell
1.24	Reduced Visibility	ReducedVisibility
1.25	Reduced Visibility Message	ReducedVisibilityMessage
1.26	Ridge	Ridge
1.27	Secondary Swell	SecondarySwell
1.28	Significant Wave	SignificantWave
1.29	Squall	Squall
1.30	Swell	Swell
1.31	Temperature	Temperature
1.32	Temperature Message	TemperatureMessage
1.33	Thunderstorm	Thunderstorm
1.34	Thunderstorm Message	ThunderstormMessage
1.35	Tropical Cyclone	TropicalCyclone
1.36	Tropical Cyclone Message	TropicalCycloneMessage
1.37	Weather Condition	WeatherCondition
1.38	Weather Hazard Message	WeatherHazardMessage
1.39	Weather Hazard Message Information	WeatherHazardMessageInformation
1.40	Weather System	WeatherSystem
1.41	Wind	Wind
1.42	Wind Gust	WindGust
1.43	Wind Wave	WindWave

1.01 S-4xx_FeatureType

Description: S-4xx_FeatureType is the base abstract class for all S-4xx FeatureTypes. All attributes within and associations to and from S-4xx_FeatuerType are inherited by all features within an S-4xx dataset.
Definition: An S-4xx specific type for an abstract representation of a real world phenomenon. (S-100)
Geo Feature:
Camel Case: S4xx_FeatureType
Spatial Primitives: point, curve, surface, coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- All but two S412_FeatureType sub-features have geometry.

1.02 S-4xx_InformationType

Description: S-4xx_InformationType is the base abstract class for all S-4xx InformationTypes. All attributes within and associations to and from S-4xx_InformationType are inherited by all InformationTypes within an S-4xx dataset.
Definition: An S-4xx specific type for identifiable object carrying supplementary information for other objects. (S-100)
Geo Feature:
Camel Case: S4xx_InformationType
Spatial Primitives: none

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Associations		

Additional References:

Remarks:

-

1.03 Atmospheric Pressure

Description: AtmosphericPressure is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by AtmosphericPressure.
Definition: Pressure (force per unit area) exerted by the atmosphere on any surface by virtue of its weight; it is equivalent to the weight of a vertical column of air extending above a surface of unit area to the outer limit of the atmosphere. (WMO-No. 182, A2930)
Geo Feature: Atmospheric Pressure
Camel Case: AtmosphericPressure
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
valueOfAtmosphericPressure		(S) RE	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- The language attribute is required if the written language is in anything but English.

1.04 Cone of Uncertainty

Description: ConeOfUncertainty is a FeatureType that is a composition of CycloneTrack.
Definition: A representation of the probable track of the center of a tropical cyclone.
Geo Feature: ConeOfUncertainty
Camel Case: ConeOfUncertainty
Spatial Primitives: surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True
TrackComposition	Label: ConeOfUncertainty Role: polygonArea Multiplicity: 0, 1 Ordered: True	Label: CycloneTrack Role: Multiplicity: 1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- dateTimeEnd must equal the validDateTime of the final feature in time, of the composition between CycloneTrack and ConeOfUncertainty.
- Geometry represents the cone of uncertainty at the given validDateTime
- A TropicalCyclone utilizing TimeAssociation to associate the same real world event through time, may only have one ConeOfUncertainty per dataset.

1.05 Convergent Boundary

Description: ConvergentBoundary is a FeatureType that is a subType of the WeatherSystem abstract FeatureType. All attributes within and associations to/from WeatherSystem are inherited by ConvergentBoundary.
Definition: The interface or transition zone between air masses of similar densities (temperature, humidity).
Geo Feature: Convergent Boundary
Camel Case: ConvergentBoundary
Spatial Primitives: Curve

Attribute Name	Allowable Encoding Value	Type	Multiplicity
categoryOfConvergentBoundary	1: convergence line 2: intertropical convergence zone 3: monsoon trough 4: shear line 5: squall line 6: tropical wave 7: trough	(S) EN	1
categoryOfPrecipitation	1: rain 2: drizzle 3: freezing rain 4: freezing drizzle 5: hail 6: snow 7: sleet 8: other/unknown precipitation	(S) EN	0,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*

speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 182, International Meteorological Vocabulary
- NOAA National Weather Service Instruction 10-604, June 2012, Operations and Services, Tropical Cyclone Weather Services Program, NWSPD 10-6

Remarks:

- Duplication of categoryOfPrecipitation values is not permitted.

1.06 Cyclone Track

Description: CycloneTrack is a FeatureType that is an aggregation of various TropicalCyclone types.
Definition:
Geo Feature: Cyclone Track
Camel Case: CycloneTrack
Spatial Primitives: Curve

Attribute Name	Allowable Encoding Value	Type	Multiplicity
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
issuedDateTime	YYYYMMDDTHHMMSS	(S) DT	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True
TropicalCycloneTrack	Label: TropicalCyclone (source) Role: movingFeature Multiplicity: 1 Ordered: True	Label: CycloneTrack (target) Role: polygonTrack Multiplicity: 0,1 Ordered: False

TrackComposition	Label: ConeOfUncertainty Role: polygonArea Multiplicity: 0, 1 Ordered: True	Label: FeatureTrack Role: Multiplicity: 1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- dateTimeEnd must equal the validDateTime of the final feature in time, of the composition between CycloneTrack and ConeOfUncertainty.
- dateTimeRange is not encoded at the root level of this feature if the inherited attribution from S-4xx_FeatureType is used.
- Geometry attribute encodes a line connecting TropicalCyclone positions over the dateTimeRanage. Represents tracing the movement of TropicalCyclone through time.

1.07 Data Provider

Description: DataProvider is an InformationType that contains an association to S412_FeatureType called DataProviderAssociation.
Definition: An organization or entity providing a data in an official capacity.
Geo Feature:
Camel Case: DataProvider
Spatial Primitives: none

Attribute Name	Allowable Encoding Value	Type	Multiplicity
country	ISO 3166-1	(S) TE	1
contactInformation		C	1
mailingAddress	Maximum of 300 Characters	(S) TE	0,1
telephoneNumber	Maximum of 300 Characters	(S) TE	0,*
emailAddress	Maximum of 300 Characters	(S) TE	0,*
agencyName	Maximum of 300 Characters	(S) TE	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity

Associations		
DataProviderAssociation	Label: DataProvider Role: dataProviderInformation Multiplicity: 1 Ordered: False	Label: S412_FeatureType Role: Multiplicity: 1 Ordered: False

Additional References :

Remarks:

- Exactly one instance of this information type per dataset

1.08 Freezing Spray

Description: FreezingSpray is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by FreezingSpray.
Definition: Sea spray transported through the air at temperatures below 0° C. (WMO-No. 182, F1170)
Geo Feature: Freezing Spray
Camel Case: FreezingSpray
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
icingRate		(S) IN	1,1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- icingRate is in cm/hour

1.09 Freezing Spray Message

Description: FreezingSprayMessage is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by FreezingSprayMessage.
Definition: A written communication about a specific freezing spray scenario, event or hazard.
Geo Feature: Freezing Spray Message
Camel Case: FreezingSprayMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch 3: advisory 4: outlook 5: statement	(S) EN	1
messageType	1: new 2: cancellation	(S) EN	1

	3: repetition 4: update		
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

1.10 Front

Description: Front is a FeatureType that is a subType of the WeatherSystem abstract FeatureType. All attributes within and associations to/from WeatherSystem are inherited by Front.
Definition: The interface or transition zone between air masses of different densities (temperature, humidity). (WMO-No. 182, F1290 (1))
Geo Feature: Front
Camel Case: Front
Spatial Primitives:

Attribute Name	Allowable Encoding Value	Type	Multiplicity
categoryOfFront	1: cold front 2: dry line 3: occluded front 4: quasi-stationary front 5: warm front	(S) EN	1
categoryOfPrecipitation	1: rain 2: drizzle 3: freezing rain 4: freezing drizzle 5: hail 6: snow 7: sleet 8: other/unknown precipitation	(S) EN	0,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*
speed		(S) IN	1
speedUnits	1: metres per second (mps)	(S) EN	1

	2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)		
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- Duplication of categoryOfPrecipitation values is not permitted.

1.11 High (Anticyclone)

Description: High is a FeatureType that is a subType of the WeatherSystem abstract FeatureType. All attributes within and associations to/from WeatherSystem are inherited by High.
Definition: Region of the atmosphere where the pressures are high relative to those in the surrounding region at the same level. Point of the highest pressure in the area of high pressure. (WMO-No. 182, A2090)
Geo Feature: High
Camel Case: High
Spatial Primitives: Point

Attribute Name	Allowable Encoding Value	Type	Multiplicity
maximumPressureValue		(S) RE	1
pressureChangeRate		C	0,1
valueOfAtmosphericPressure		(S) RE	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*
speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour	(S) EN	1

	(knots)		
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 558, Appendix I.4

Remarks:

- The language attribute is required if the written language is in anything but English.
- Alias value for High is Anticyclone

1.12 High Wind Message

Description: High Wind Message is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by HighWindMessage.
Definition: A written communication about a specific high wind scenario, event or hazard.
Geo Feature: High Wind Message
Camel Case: HighWindMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity
beaufortForce	1: light air 2: light breeze 3: gentle breeze 4: moderate breeze 5: fresh breeze 6: strong breeze 7: near gale 8: gale 9: strong gale 10: storm 11: violent storm 12: hurricane 13: calm	(S) EN	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1

definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch 3: advisory 4: outlook 5: statement	(S) EN	1
messageType	1: new 2: cancellation 3: repetition 4: update	(S) EN	1
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

1.13 Land Weather Observation

Description: LandWeatherObservation is a FeatureType that is a subType of the Observation abstract FeatureType. All attributes within and associations to/from Observation are inherited by LandWeatherObservation.
Definition: An observation of current meteorological conditions from a land-based meteorological station.
Geo Feature: Land Weather Observation
Camel Case: LandWeatherObservation
Spatial Primitives: Point

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
meteorologicalObservation		C	1
horizontalVisibilityRange		C	0,1
visibilityRange		(S) RE	1
distanceUnitOfMeasurement	3: kilometres 5: nautical miles	(S) EN	1
icingRate		(S) IN	0,1
temperature		C	0,2
temperatureParameter	2: air temperature 3: dew-point temperature	(S) EN	1
valueOfTemperature		(S) RE	1
gustVelocity		airVelocity	0,1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW)	(S) EN	0,1

	11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)		
windSpeed		C	1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
valueOfAtmosphericPressure		(S) RE	0,1
windVelocity		airVelocity	0,1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
windSpeed		C	0,1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph)	(S) EN	1

	4: nautical miles per hour (knots)		
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
thicknessOfIceAccretion		(S) IN	0,1
featureName		C	0,1
displayName		(S) BO	1
language		ISO 639-3	0,1
name		(S) TE	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
AdditionalObservationInformation	Label: Observation (target) Role: theObservation Multiplicity: 1 Ordered: False	Label: ObservationInformation (source) Role: information Multiplicity: 1 Ordered: False
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- Observation times are restricted to -6 to 0 hours.
- Multiple instances of the temperature complex attribute cannot exist if temperatureParameter values between the instances are equal. valueOfTemperature units

are in Celsius • thicknessOfIceAccretion units are centimetres

1.14 Large Seas Message

Description: LargeSeasMessage is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by LargeSeasMessage.
Definition: A written communication about a specific large seas scenario, event or hazard.
Geo Feature: Large Seas Message
Camel Case: LargeSeasMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch	(S) EN	1

	3: advisory 4: outlook 5: statement		
messageType	1: new 2: cancellation 3: repetition 4: update	(S) EN	1
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

1.15 Low (Cyclone)

Description: Low is a FeatureType that is a subType of the WeatherSystem abstract FeatureType. All attributes within and associations to/from WeatherSystem are inherited by Low.
Definition: Region of the atmosphere in which the pressures are lower than those of the surrounding region at the same level. Point of the lowest pressure in the low pressure area. Represents non-tropical lows. (WMO-No. 182, D0230)
Geo Feature: Low
Camel Case: Low
Spatial Primitives: Point

Attribute Name	Allowable Encoding Value	Type	Multiplicity
categoryOfLow	1: extra-tropical cyclone 2: post-tropical cyclone 3: thermal low 4: polar low	(S) EN	1
categoryOfPrecipitation	1: rain 2: drizzle 3: freezing rain 4: freezing drizzle 5: hail 6: snow 7: sleet 8: other/unknown precipitation	(S) EN	0,*
pressureChangeRate		C	0,1
valueOfAtmosphericPressure		(S) RE	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
maximumSustainedWindSpeed		windSpeed	0,1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph)	(S) EN	1

	4: nautical miles per hour (knots)		
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
featureName		C	0,1
displayName		(S) BO	1
language		ISO 639-3	0,1
name		(S) TE	1
minimumPressureValue		(S) RE	1
displayTrack		(S) BO	0,1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*
speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW)	(S) EN	0,1

	13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)		
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 558, Appendix I.4

Remarks:

- featureName attribute should only be used if the low pressure system was a previously named tropical cyclone.
- Alias value for Low is Cyclone
- Low (Cyclone) shall only be used for low pressure systems that are not tropical cyclones.
- Duplication of categoryOfPrecipitation values is not permitted.

1.16 Marine Weather Observation

Description: MarineWeatherObservation is a FeatureType that is a subType of the Observation abstract FeatureType. All attributes within and associations to/from Observation are inherited by MarineWeatherObservation.
Definition: An observation of current meteorological and/or oceanographic conditions at a position located within a body of water.
Geo Feature: Marine Weather Observation
Camel Case: MarineWeatherObservation
Spatial Primitives: Point

Attribute Name	Allowable Encoding Value	Type	Multiplicity
oceanographicObservation		C	1
windWavePeriod		period	0,1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
windWaveHeight		waveHeight	0,1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
windWaveDirection		directionFrom	0,1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW)	(S) EN	0,1

	16: north-northwest (NNW)		
primarySwellWaveDirection		directionFrom	0,1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
primarySwellWaveHeight		waveHeight	0,1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
primarySwellWavePeriod		period	0,1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
secondarySwellWaveDirection		directionFrom	0,1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W)	(S) EN	0,1

	14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)		
secondarySwellWaveHeight		waveHeight	0,1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
secondarySwellWavePeriod		period	0,1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
temperature		C	0,1
temperatureParameter	1: sea surface temperature	(S) EN	1
valueOfTemperature		(S) RE	1
significantWaveHeight		waveHeight	0,1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
meteorologicalObservation		C	1
horizontalVisibilityRange		C	0,1
visibilityRange		(S) RE	1
distanceUnitOfMeasurement	3: kilometres 5: nautical miles	(S) EN	1
icingRate		(S) IN	0,1
temperature		C	0,1
temperatureParameter	2: air temperature 3: dew-point temperature	(S) EN	1
valueOfTemperature		(S) RE	1
gustVelocity		airVelocity	1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E)	(S) EN	0,1

	6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)		
windSpeed		C	1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
valueOfAtmosphericPressure		(S) RE	1
windVelocity		airVelocity	0,1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1

windSpeed		C	0,1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
thicknessOfIceAccretion		(S) IN	0,1
featureName		C	0,1
displayName		(S) BO	1
language		ISO 639-3	0,1
name		(S) TE	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
AdditionalObservationInformation	Label: Observation (target) Role: theObservation Multiplicity: 1 Ordered: False	Label: ObservationInformation (source) Role: information Multiplicity: 1 Ordered: False
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

Remarks:

- The language attribute is required if the written language is in anything but English.
- Duplication of causeOfIceAccretion values is not permitted.

1.17 Maximum Temperature

Description: MaximumTemperature is a FeatureType that is a subType of the Temperature abstract FeatureType. All attributes within and associations to/from Temperature are inherited by MaximumTemperature.
Definition: Temperature maximum within a 24 hour period.
Geo Feature: Maximum Temperature
Camel Case: MaximumTemperature
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
temperature		C	1
temperatureParameter	1: sea surface temperature 2: air temperature 3: dew-point temperature	(S) EN	1
valueOfTemperature		(S) RE	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- valueOfTemperature shall be in degrees celisus.

1.18 Minimum Temperature

Description: MinimumTemperature is a FeatureType that is a subType of the Temperature abstract FeatureType. All attributes within and associations to/from Temperature are inherited by MinimumTemperature.
Definition: The minimum temperature within a 24 hour period.
Geo Feature: Minimum Temperature
Camel Case: MinimumTemperature
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
temperature		C	1
temperatureParameter	1: sea surface temperature 2: air temperature 3: dew-point temperature	(S) EN	1
valueOfTemperature		(S) RE	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- valueOfTemperature shall be in degrees celisus.

1.19 Observation

Description: Observation is an abstract FeatureType that contains an association to ObservationInformation called AdditionalObservationInformation.
Definition: Evaluation of one or more meteorological elements. (WMO-No. 182, O0040)
Geo Feature: Observation
Camel Case: Observation
Spatial Primitives:

Attribute Name	Allowable Encoding Value	Type	Multiplicity
meteorologicalObservation		C	1
horizontalVisibilityRange		C	0,1
visibilityRange		(S) RE	1
distanceUnitOfMeasurement	3: kilometres 5: nautical miles	(S) EN	1
icingRate		(S) IN	0,1
temperature		C	0,1
temperatureParameter	1: sea surface temperature 2: air temperature 3: dew-point temperature	(S) EN	1
valueOfTemperature		(S) RE	1
gustVelocity		airVelocity	1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW)	(S) EN	0,1

	13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)		
windSpeed		C	1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
valueOfAtmosphericPressure		(S) RE	1
windVelocity		airVelocity	0,1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
windSpeed		C	0,1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1

windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
thicknessOfIceAccretion		(S) IN	0,1
featureName		C	0,1
displayName		(S) BO	1
language		ISO 639-3	0,1
name		(S) TE	1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
AdditionalObservationInformation	Label: Observation (target) Role: theObservation Multiplicity: 1 Ordered: False	Label: ObservationInformation (source) Role: information Multiplicity: 1 Ordered: False
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 182, International Meteorological Vocabulary

Remarks:

- Observation times are restricted to -6 to 0 hours.
-

1.20 Observation Information

Description: ObservationInformation is an InformationType that has a defined association to the Observation FeatureType
Definition: Supplemental information accompanying a meteorological or oceanographic observation.
Geo Feature: Observation
Camel Case: ObservationInformation
Spatial Primitives:

Attribute Name	Allowable Encoding Value	Type	Multiplicity
stationIdentifier		(S) TE	1
validDateTime		(S) DT	1
observationSource	1: floating observation station 2: marine vessel 3: satellite 4: upper air 5: land-based station 6: tide gauge 7: other observation source	(S) EN	1
status	29: fully operational 30: partially operational 31: drifting 32: broken 33: offline 34: discontinued 35: manual observation 36: unknown status	(S) EN	1, *
causeOfIceAccretion	1: icing from freezing spray 2: icing from fog 3: icing from rain 4: icing from drizzle 5: icing from freezing rain 6: icing from freezing drizzle	(S) EN	0,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity

Associations		
AdditionalObservationInformation	Label: Observation (source)	Label:

	Role: theObservation Multiplicity: 1 Ordered: False	ObservationInformation (target) Role: information Multiplicity: 1 Ordered: False

Additional References:

Remarks:

- Duplication of causeOfIceAccretion and status values is not permitted.

1.21 Precipitation

Description: Precipitation is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by Precipitation.
Definition: Hydrometeor consisting of a fall of an ensemble of particles. (WMO-No. 182, P1360)
Geo Feature: Precipitation
Camel Case: Precipitation
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
coverage	0-100	(S) IN	0,1
precipitationRate	1: light precipitation 2: moderate precipitation 3: heavy precipitation 4: unknown precipitation rate	(S) EN	0,*
probabilityPercentage	0-100	(S) IN	0,1
categoryOfPrecipitation	1: rain 2: drizzle 3: freezing rain 4: freezing drizzle 5: hail 6: snow 7: sleet 8: other/unknown precipitation	(S) EN	1,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1

dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- Duplication of precipitationRate values is not permitted.

1.22 Precipitation Message

Description: PrecipitationMessage is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by PrecipitationMessage.
Definition: A written communication about a specific precipitation scenario, event or hazard.
Geo Feature: Precipitation Message
Camel Case: PrecipitationMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity
categoryOfPrecipitation	1: rain 2: drizzle 3: freezing rain 4: freezing drizzle 5: hail 6: snow 7: sleet 8: other/unknown precipitation	(S) EN	0,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*

text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch 3: advisory 4: outlook 5: statement	(S) EN	1
messageType	1: new 2: cancellation 3: repetition 4: update	(S) EN	1
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

- Duplication of categoryOfPrecipitation values is not permitted.

1.23 Primary Swell

Description: PrimarySwell is a FeatureType that is a subType of the Swell and WeatherCondition abstract FeatureTypes. All attributes within and associations to/from Swell and WeatherCondition are inherited by PrimarySwell.
Definition: The dominant wave system of water waves which has left its generating area. (WMO-No.182, S3900)
Geo Feature: Primary Swell
Camel Case: PrimarySwell
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
wavePeriod		period	0,1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
waveDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
waveHeight		waveHeight	1

heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
waveHeightChange		generalChange	0,1
trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
wavePeriodChange		generalChange	0,1
trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
probabilityOfHeightsExceeding		C	0,1
probabilityThreshold		(S) RE	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
probabilityPercentage		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

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1.24 Reduced Visibility

Description: ReducedVisibility is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by ReducedVisibility.
Definition: Generic term for an atmospheric state where horizontal visibility has been degraded to less than 5 nautical miles.
Geo Feature: Reduced Visibility
Camel Case: ReducedVisibility
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
horizontalVisibilityRange		C	1
visibilityRange		(S) RE	1
distanceUnitOfMeasurement	3: kilometres 5: nautical miles	(S) EN	1
categoryOfReducedVisibility	1: dust 2: fog 3: haze 4: smoke 5: mist 6: other/unknown	(S) EN	1,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1	Label: S412_FeatureType Role: time2

	Multiplicity: 0,1 Ordered: True	Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Meteorological Services in Support of Maritime Search and Rescue

Remarks:

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1.25 Reduced Visibility Message

Description: ReducedVisibilityMessage is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by ReducedVisibilityMessage.
Definition: A written communication about a specific reduced visibility scenario, event or hazard.
Geo Feature: Reduced Visibility Message
Camel Case: ReducedVisibilityMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity
categoryOfReducedVisibility	1: dust 2: fog 3: haze 4: smoke 5: mist 6: other/unknown	(S) EN	0,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch	(S) EN	1

	3: advisory 4: outlook 5: statement		
messageType	1: new 2: cancellation 3: repetition 4: update	(S) EN	1
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.
- Duplication of categoryOfReducedVisibility values is not permitted.

1.26 Ridge

Description: Ridge is a FeatureType that is a subType of the WeatherSystem abstract FeatureType. All attributes within and associations to/from WeatherSystem are inherited by Ridge.
Definition: Region of the atmosphere in which the pressure is high relative to the surrounding region at the same level. It is represented on a synoptic chart by a system of nearly parallel isobars or contours, approximately U-shape, which are concave towards an anticyclone. A ridge line is where the curvature of the isobars or contours is maximum. (WMO-No. 182, R1790)
Geo Feature: Ridge
Camel Case: Ridge
Spatial Primitives: Curve

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*
speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S)	(S) EN	0,1

	10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)		
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 182, International Meteorological Vocabulary

Remarks:

- The language attribute is required if the written language is in anything but English.

1.27 Secondary Swell

Description: SecondarySwell is a FeatureType that is a subType of the Swell and WeatherCondition abstract FeatureType. All attributes within and associations to/from Swell and WeatherCondition are inherited by SecondarySwell.

Definition: The less dominant wave system of water waves which has left its generating area. (WMO-No.182, S3900)
Geo Feature: Secondary Swell
Camel Case: SecondarySwell
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
wavePeriod		period	0,1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
waveDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
waveHeight		waveHeight	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
waveHeightChange		generalChange	0,1

trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
wavePeriodChange		generalChange	0,1
trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
probabilityOfHeightsExceeding		C	0,1
probabilityThreshold		(S) RE	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
probabilityPercentage		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1	Label: S412_FeatureType Role: time2 Multiplicity: 0,1

	Ordered: True	Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- SecondarySwell FeatureType can only exist if the PrimarySwell FeatureType exists in the same dataset.

1.28 Significant Wave

Description: SignificantWave is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by SignificantWave.
Definition: Average values of wave heights (combined swell and seas) from the highest one third of waves. (WMO-No. 702, p 9)
Geo Feature: Significant Wave
Camel Case: SignificantWave
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
waveHeight		waveHeight	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
waveHeightChange		generalChange	0,1
trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
probabilityOfHeightsExceeding		C	0,*
probabilityThreshold		(S) RE	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
probabilityPercentage		(S) IN	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1

dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- The language attribute is required if the written language is in anything but English.
-

1.29 Squall

Description: Squall is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by Squall.
Definition: Atmospheric phenomenon characterized by an abrupt and large increase of wind speed with the duration of the order of minutes which decreases rather suddenly. It is often accompanied by showers or thunderstorms. (WMO-No. 182, S2490)
Geo Feature: Squall
Camel Case: Squall
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
coverage	0-100	(S) IN	0,1
precipitationRate	1: light precipitation rate 2: moderate precipitation rate 3: heavy precipitation rate 4: unknown precipitation rate	(S) EN	0,*
categoryOfPrecipitation	1: rain 2: drizzle 3: freezing rain 4: freezing drizzle 5: hail 6: snow 7: sleet 8: other/unknown precipitation	(S) EN	0,*

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*

speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References :

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- Duplication of categoryOfPrecipitation values is not permitted.
- Duplication of precipitationRate values is not permitted.

1.30 Swell

Description: Swell is an abstract FeatureType that is a subtype of WeatherCondition. All attributes within and associations to/from WeatherCondition are inherited by Swell.
Definition: A wave system of water waves which has left its generating area (WMO-No. 182, S3900)
Geo Feature: Swell
Camel Case: Swell
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
wavePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
waveDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
waveHeight		waveHeight	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
waveHeightChange		generalChan	0,1

		ge	
trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
wavePeriodChange		generalChange	0,1
trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
probabilityOfHeightsExceeding		C	0,*
probabilityThreshold		(S) RE	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
probabilityPercentage		(S) IN	1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations

TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

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1.31 Temperature

Description: Temperature is an abstract FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by Temperature.
Definition: The physical quantity characterizigin the mean random motion of molescules.
Geo Feature: Temperature
Camel Case: Temperature
Spatial Primitives:

Attribute Name	Allowable Encoding Value	Type	Multiplicity
temperature		C	1
temperatureParameter	1: sea surface temperature 2: air temperature 3: dew-point temperature	(S) EN	1
valueOfTemperature		(S) RE	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- valueOfTemperature shall be in degrees celisus.

1.32 Temperature Message

Description: TemperatureMessage is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by TemperatureMessage.
Definition: A written communication about a temperature parameter.
Geo Feature: Temperature Message
Camel Case: TemperatureMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity
temperatureParameter	1: sea surface temperature 2: air temperature 3: dew-point temperature	(S) EN	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch 3: advisory 4: outlook 5: statement	(S) EN	1

messageType	1: new 2: cancellation 3: repetition 4: update	(S) EN	1
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

1.33 Thunderstorm

Description: Thunderstorm is a FeatureType that is a subType of the WeatherSystem abstract FeatureType. All attributes within and associations to/from WeatherSystem are inherited by Thunderstorm.
Definition: Sudden electrical discharges manifested by a flash of light (lightning) and a sharp or rumbling sound (thunder). Thunderstorms are associated with convective clouds (Cumulonimbus) and are, more often, accompanied by precipitation in the form of rain showers or hail, or occasionally snow, snow pellets, or ice pellets. (WMO-No. 182, T0940)
Geo Feature: Thunderstorm
Camel Case: Thunderstorm
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity
coverage	0-100	(S) IN	0,1
precipitationRate	1: light precipitation rate 2: moderate precipitation rate 3: heavy precipitation rate 4: unknown precipitation rate	(S) EN	0,*
categoryOfPrecipitation	1: rain 2: drizzle 3: freezing rain 4: freezing drizzle 5: hail 6: snow 7: sleet 8: other/unknown precipitation	(S) EN	0,*
probabilityPercentage	0-100	(S) IN	0,1
potentialTornadicActivity		(S) BO	0,1
displayTrack		(S) BO	0,1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed	(S) EN	0,1

	previously 7: undetermined intensity change		
movement		C	0,*
speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType	Label: S412_FeatureType

	Role: time1 Multiplicity: 0,1 Ordered: True	Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- Duplication of categoryOfPrecipitation values is not permitted.
- Duplication of precipitationRate values is not permitted.

1.34 Thunderstorm Message

Description: Thunderstorm Message is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by ThunderstormMessage.
Definition: A written communication about a specific thunderstorm scenario, event or hazard.
Geo Feature: Thunderstorm Message
Camel Case: ThunderstormMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch 3: advisory 4: outlook 5: statement	(S) EN	1
messageType	1: new 2: cancellation	(S) EN	1

	3: repetition 4: update		
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

1.35 Tropical Cyclone

Description: TropicalCyclone is a FeatureType that is a subType of the WeatherSystem abstract FeatureType. All attributes within and associations to/from WeatherSystem are inherited by TropicalCyclone.
Definition: Generic term for a non-frontal synoptic scale cyclone originating over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation. (WMO-No. 182, T1510)
Geo Feature: Tropical Cyclone
Camel Case: TropicalCyclone
Spatial Primitives: Point

Attribute Name	Allowable Encoding Value	Type	Multiplicity
windSpeedRange	1: less than 34 knots 2: 34 – 63 knots 3: greater than or equal to 64 knots	(S) EN	1
maximumSustainedWindSpeed		windSpeed	1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
saffirSimpsonCategory	1: Saffir Simpson category 1 2: Saffir Simpson category 2 3: Saffir Simpson category 3 4: Saffir Simpson category 4 5: Saffir Simpson category 5	(S) EN	0,1
minimumPressureValue		(S) RE	1
pressureChangeRate		C	0,1
valueOfAtmosphericPressure		(S) RE	1
timeInterval		C	1

timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
featureName		C	0,1
displayName		(S) BO	1
language		ISO 639-3	0,1
name		(S) TE	1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*
speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1

azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 558, Appendix I.4

Remarks:

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1.36 Tropical Cyclone Message

Description: TropicalCycloneMessage is a FeatureType that is a subType of the WeatherHazardMessage abstract FeatureType. All attributes within and associations to/from WeatherHazardMessage are inherited by TropicalCycloneMessage.
Definition: A written communication about a specific tropical cyclone scenario, event or hazard.
Geo Feature: Tropical Cyclone Message
Camel Case: TropicalCycloneMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity
windSpeedRange	1: less than 34 knots 2: 34 – 63 knots 3: greater than or equal to 64 knots	(S) EN	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch 3: advisory 4: outlook	(S) EN	1

	5: statement		
messageType	1: new 2: cancellation 3: repetition 4: update	(S) EN	1
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

1.37 Weather Condition

Description: WeatherCondition is an abstract FeatureType that contains an association to WeatherSystem.
Definition: A condition, forced by a WeatherSystem, which could pose a risk to property or life.
Geo Feature: Weather Condition
Camel Case: WeatherCondition
Spatial Primitives:

Attribute Name	Allowable Encoding Value	Type	Multiplicity

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

Remarks:

- The language attribute is required if the written language is in anything but English.

1.38 Weather Hazard Message

Description: WeatherHazardMessage is an abstract FeatureType that contains an association to WeatherHazardMessageInformation.
Definition: A written communication about a specific weather scenario, event or hazard.
Geo Feature: Weather Hazard Message
Camel Case: WeatherHazardMessage
Spatial Primitives: Surface

Attribute Name	Allowable Encoding Value	Type	Multiplicity
weatherMessage		C	1
nameDefinition		C	1
name		(S) TE	1
definition		(S) TE	1
languageText		C	1,*
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
messageCategory	1: warning 2: watch 3: advisory 4: outlook 5: statement	(S) EN	1
messageType	1: new 2: cancellation 3: repetition 4: update	(S) EN	1
headline		(S) TE	0,1
graphic		C	0,*
pictorialRepresentation	Maximum of 300 Characters	(S) TE	1
sourceDate	YYYYMMDDTHHMMSS	(S) DT	1
pictureCaption		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
pictureInformation		languageText	0,1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False
TimeAssociation	Label: WeatherHazardMessage Role: time1 Multiplicity: 0,1 Ordered: False	Label: WeatherHazardMessage Role: time2 Multiplicity: 0,1 Ordered: False

Additional References:

Remarks:

- TimeAssociation needed to link feature types temporally.
- featureReference can be used to associate this feature to another feature within any S-100 product specifciation.

1.39 Weather Hazard Message Information

Description: WeatherHazardMessageInformation is an abstract InformationType that contains an association.
Definition: Supplementary information accompanying a weather message.
Geo Feature:
Camel Case: WeatherHazardMessageInformation
Spatial Primitives:

Attribute Name	Allowable Encoding Value	Type	Multiplicity
wmoHeaderIdentifier		(S) TE	0,1
messageIdentifier		(S) TE	1
information		C	0,1
languageText		C	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1
fileReference	Maximum of 300 Characters	(S) TE	0,1
headline	Maximum of 300 Characters	(S) TE	0,1
issuedDateTime	YYYYMMDDTHHMMSS	(S) DT	1
nextUpdateDateTime	YYYYMMDDTHHMMSS	(S) DT	0,1
issuingService		languageText	1
text	Maximum of 300 Characters	(S) TE	1
language		ISO 639-3	0,1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity

Associations		
AdditionalMessageInformation	Label: WeatherHazardMessage (source) Role: theMessage Multiplicity: 0,* Ordered: False	Label: WeatherHazardMessageInformation (target) Role: messageInformation Multiplicity: 1 Ordered: False

Additional References:

Remarks:
The language attribute is required if the written language is in anything but English.

1.40 Weather System

Description: WeatherSystem is an abstract FeatureType that contains an association to WeatherCondition.
Definition: An atmospheric phenemena involving perturbations of the prevailing pressure and wind fields.
Geo Feature: WeatherSystem
Camel Case: WeatherSystem
Spatial Primitives:

Attribute Name	Allowable Encoding Value	Type	Multiplicity
forecastedChangeInIntensity	1: much weakening 2: weakening 3: no change In Intensity 4: intensification 5: strong intensification 6: intensity not observed previously 7: undetermined intensity change	(S) EN	0,1
movement		C	0,*
speed		(S) IN	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
directionTo		C	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW)	(S) EN	0,1

	15: northwest (NW) 16: north-northwest (NNW)		
azimuthDegrees	0-359	(S) IN	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

Remarks:

- The language attribute is required if the written language is in anything but English.

1.41 Wind

Description: Wind is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by Wind.
Definition: Air motion relative to the Earth's surface. Unless otherwise specified, only the horizontal component is considered. (WMO-No. 182, W0930)
Geo Feature: Wind
Camel Case: Wind
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
windVelocity		airVelocity	1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
windSpeed		C	1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds	(S) EN	1

	2: minutes 3: hours 4: days		
windDirectionChange		C	0,1
windDirectionTrend	1: wind shift 2: veering wind 3: backing wind 4: no change in wind direction	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
windSpeedChange		generalChange	0,1
trend	1: increasing 2: decreasing 3: no change	(S) IN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
probabilityOfSpeedExceeding		C	0,*
probabilityThreshold		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
probabilityPercentage		(S) IN	1
windWarningProbability		C	0,*
windWarningThreshold	1: near gale force wind warning 2: gale force wind warning 3: storm force wind warning 4: hurricane force wind warning	(S) EN	1
probabilityPercentage		(S) IN	1

Inherited Attribute Names	Allowable Encoding Value	Type	Multiplicity
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins
- WMO/TD-No. 850

Remarks:

- Note that Beaufort Force 0 is value 13 in the beaufortForce attribute.
- The language attribute is required if the written language is in anything but English.

1.42 Wind Gust

Description: Gust is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by Gust.
Definition: Sudden, brief increase in wind speed over its mean value (WMO-No.182, G0920)
Geo Feature: Gust
Camel Case: Gust
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
gustVelocity		airVelocity	1
windDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
windSpeed		C	1
valueOfWindSpeed		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
windAveragePeriod		period	1
periodValue		(S) IN	1
timeUnits	1: seconds	(S) EN	1

	2: minutes 3: hours 4: days		
probabilityOfSpeedExceeding		C	0,*
probabilityThreshold		(S) RE	1
speedUnits	1: metres per second (mps) 2: kilometres per hour (kph) 3: miles per hour (mph) 4: nautical miles per hour (knots)	(S) EN	1
probabilityPercentage	0-100	(S) IN	1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1 Multiplicity: 0,1 Ordered: True	Label: S412_FeatureType Role: time2 Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

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1.43 Wind Wave

Description: WindWave is a FeatureType that is a subType of the WeatherCondition abstract FeatureType. All attributes within and associations to/from WeatherCondition are inherited by

WindWave.
Definition: A wave resulting from the action of wind on a water surface. (IHO Hydrographic Dictionary, 5926)
Geo Feature: Wind Wave
Camel Case: WindWave
Spatial Primitives: Coverage

Attribute Name	Allowable Encoding Value	Type	Multiplicity
wavePeriod		period	0,1
periodValue		(S) IN	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
waveDirection		directionFrom	1
azimuthDegrees	0-359	(S) IN	1
cardinalDirection	1: north (N) 2: north-northeast (NNE) 3: northeast (NE) 4: east-northeast (ENE) 5: east (E) 6: east-southeast (ESE) 7: southeast (SE) 8: south-southeast (SSE) 9: south (S) 10: south-southwest (SSW) 11: southwest (SW) 12: west-southwest (WSW) 13: west (W) 14: west-northwest (WNW) 15: northwest (NW) 16: north-northwest (NNW)	(S) EN	0,1
waveHeight		waveHeight	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
waveHeightValue		(S) IN	1
waveHeightChange		generalChange	0,1
trend	1: increasing	(S) EN	1

	2: decreasing 3: no change		
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
wavePeriodChange		generalChange	0,1
trend	1: increasing 2: decreasing 3: no change	(S) EN	1
timeInterval		C	1
timeUnits	1: seconds 2: minutes 3: hours 4: days	(S) EN	1
intervalValue		(S) IN	1
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
probabilityOfHeightsExceeding		C	0,*
probabilityThreshold		(S) RE	1
heightLengthUnits	1: metres 2: feet	(S) EN	1
probabilityPercentage		(S) IN	1

Inherited Attribute Names	**Allowable Encoding Value**	**Type**	**Multiplicity**
validDateTime	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeRange		C	0,1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1
featureReference		C	0,*
featureIdentifier		URN	0,*
dateTimeRange		C	1
dateTimeStart	YYYYMMDDTHHMMSS	(S) DT	1
dateTimeEnd	YYYYMMDDTHHMMSS	(S) DT	1

Associations		
TimeAssociation	Label: S412_FeatureType Role: time1	Label: S412_FeatureType Role: time2

	Multiplicity: 0,1 Ordered: True	Multiplicity: 0,1 Ordered: True

Additional References:

- WMO-No. 471, Annex 2.B, Multilingual List of Terms used in Weather and Sea Bulletins
- WMO-No. 558, Appendix I.2, Multilingual List of terms used in Weather and Sea Bulletins

Remarks:

- The language attribute is required if the written language is in anything but English.