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Sense and Extensibility

Towards Weather Objects Modelling Language (WOML)

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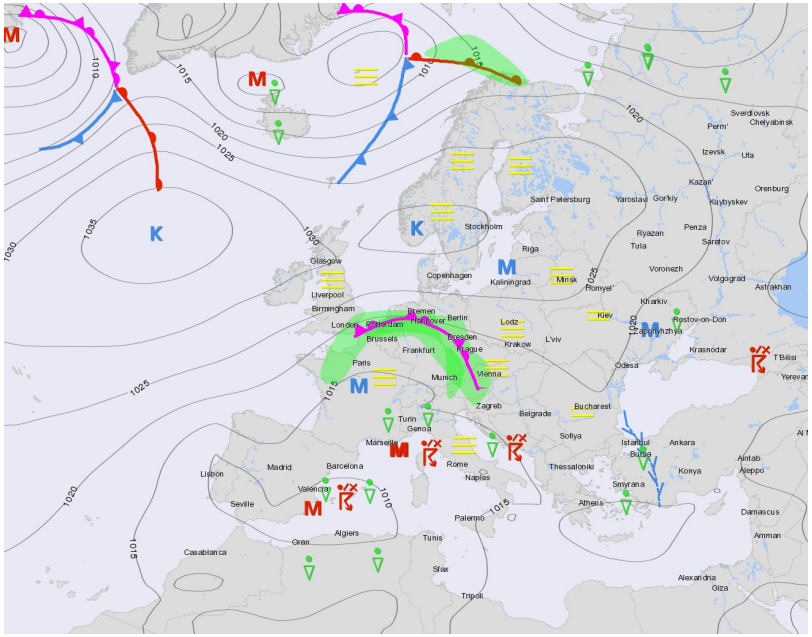
Modelling Scope: Meteorological Objects

- **(Weather) conceptual models, sensible weather objects, synoptic features, areas for specific type of weather conditions, severe weather warnings, ...**
- **Semantically rich *abstractions* of the observed and predicted weather phenomena and their development in time.**



A map (stationary image,animation) is only one type of presentation of the modelled objects.

- **For different audiences: meteorologists, flight personnel, public safety and rescue officials, common people,...**

Meteorological Objects as GML Features

- **GML Feature is a good implementation model for identifiable weather abstraction entities:**
  - Geospatial location and shape is crucial.
  - Extensibility enables semantic-rich descriptions.
  - Standard base language, standard access protocol (WFS).
- **An open XML-based format is ideal for post-processing:**
  - Transformations into different text and XML based formats using XSLT.
  - Machine validatable, still human-readable (in theory, at least).

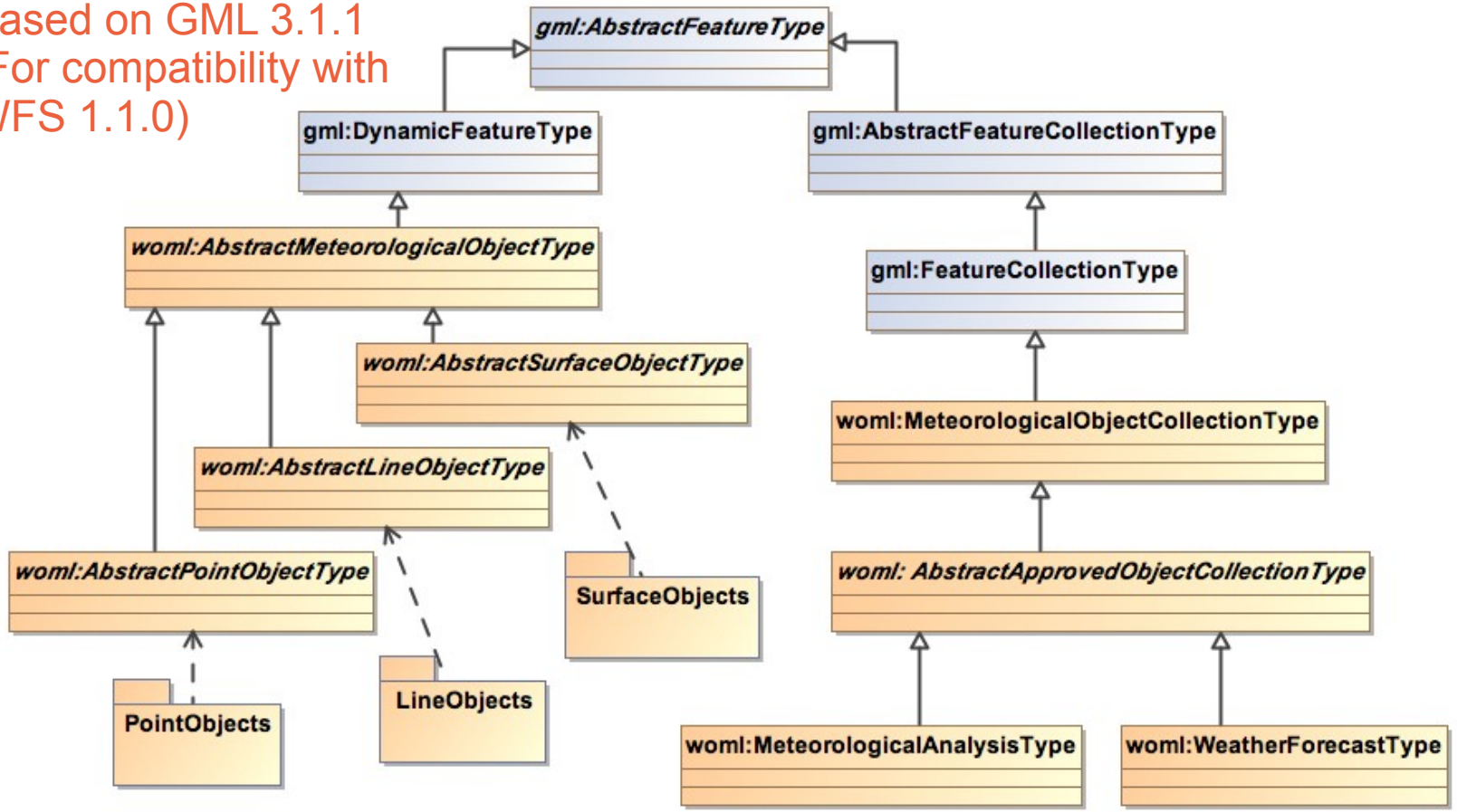
Background: FMI MetObjects (and beyond)

- **Early work in defining properties for a common set of Meteorological Objects within European Met Workstation community (EGOWS) in 1998-2003:**
  - Working Group on Meteorological Objects in Interaction with Gridded Fields (wgMO) founded in 1998.
  - A paper on Meteorological Objects presented at WMO CBS Expert Teams ET-DR&C, Arusha, Tanzania, Feb. 2003, and ET-IDM, Geneva, Dec. 2003.
- **An independent modelling task for the Meteorological Objects as GML Application Schema was started at FMI in late 2008.**

  → The current FMI Meteorological Objects GML Application Schema.

Meteorological Object Core Types

Based on GML 3.1.1
(For compatibility with
WFS 1.1.0)



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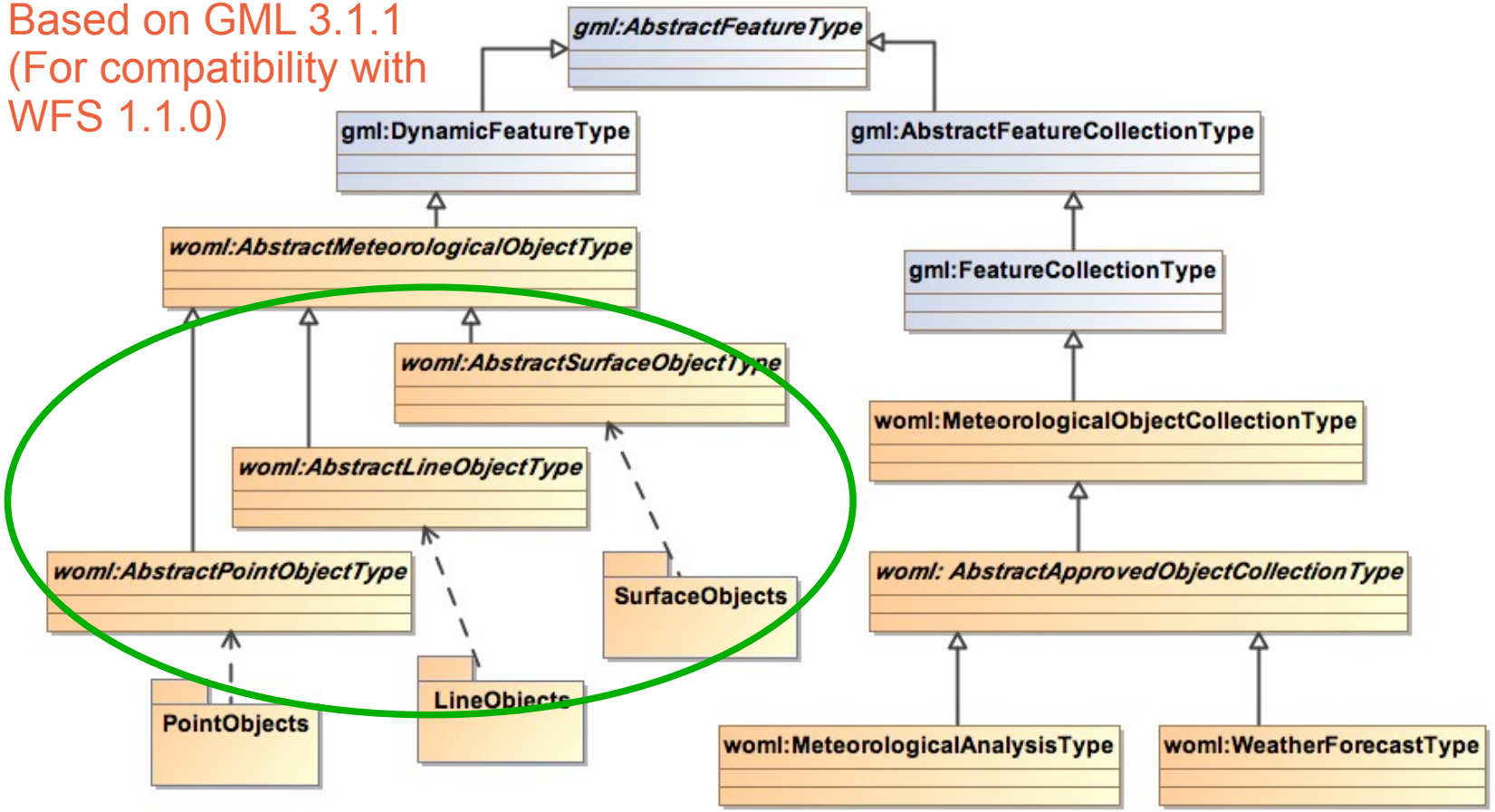

Geometry-based typing:
Extended types can at least be properly geo-located

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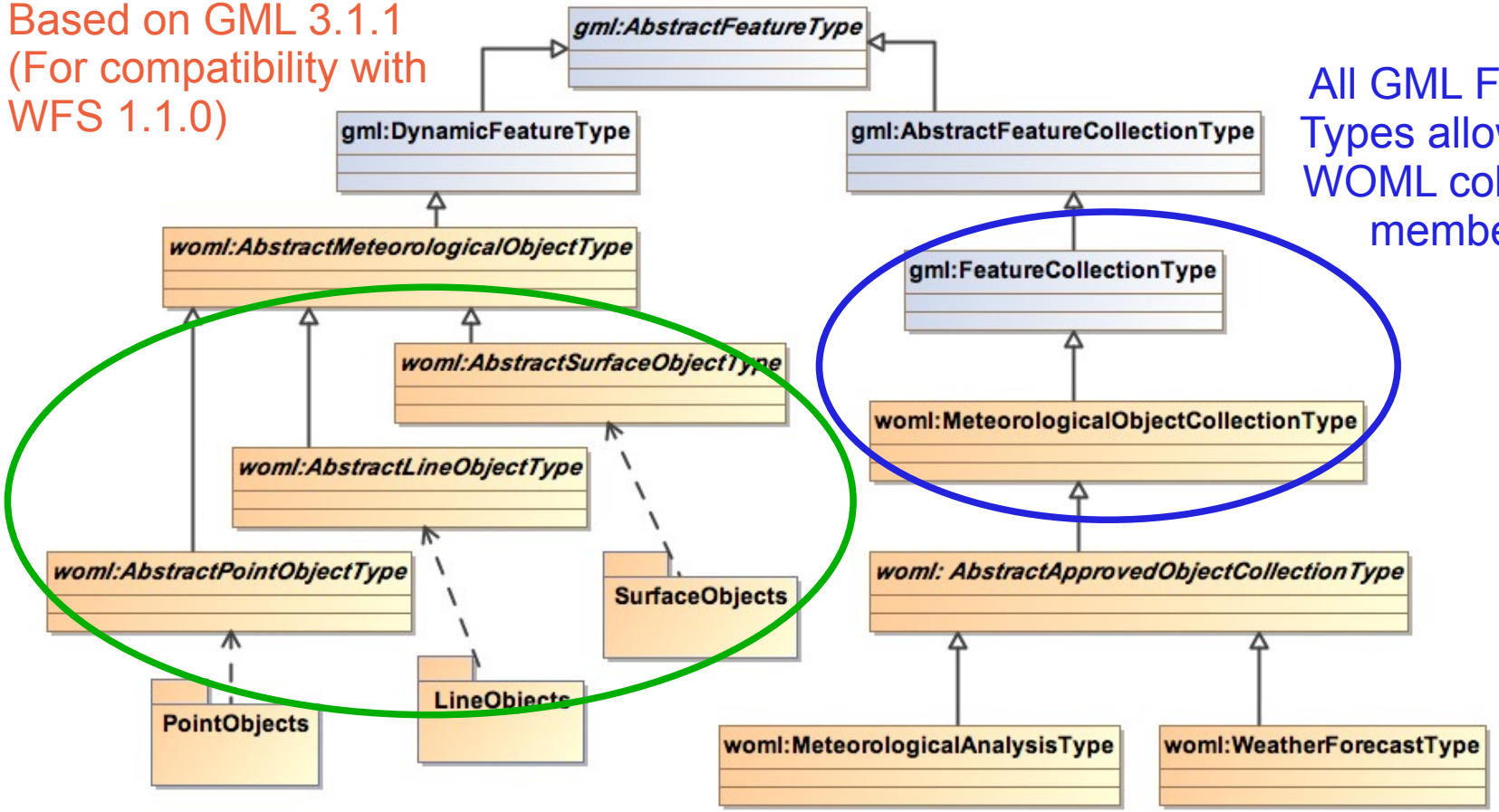


All GML Feature Types allowed as WOML collection members

Geometry-based typing:
Extended types can at least be properly geo-located

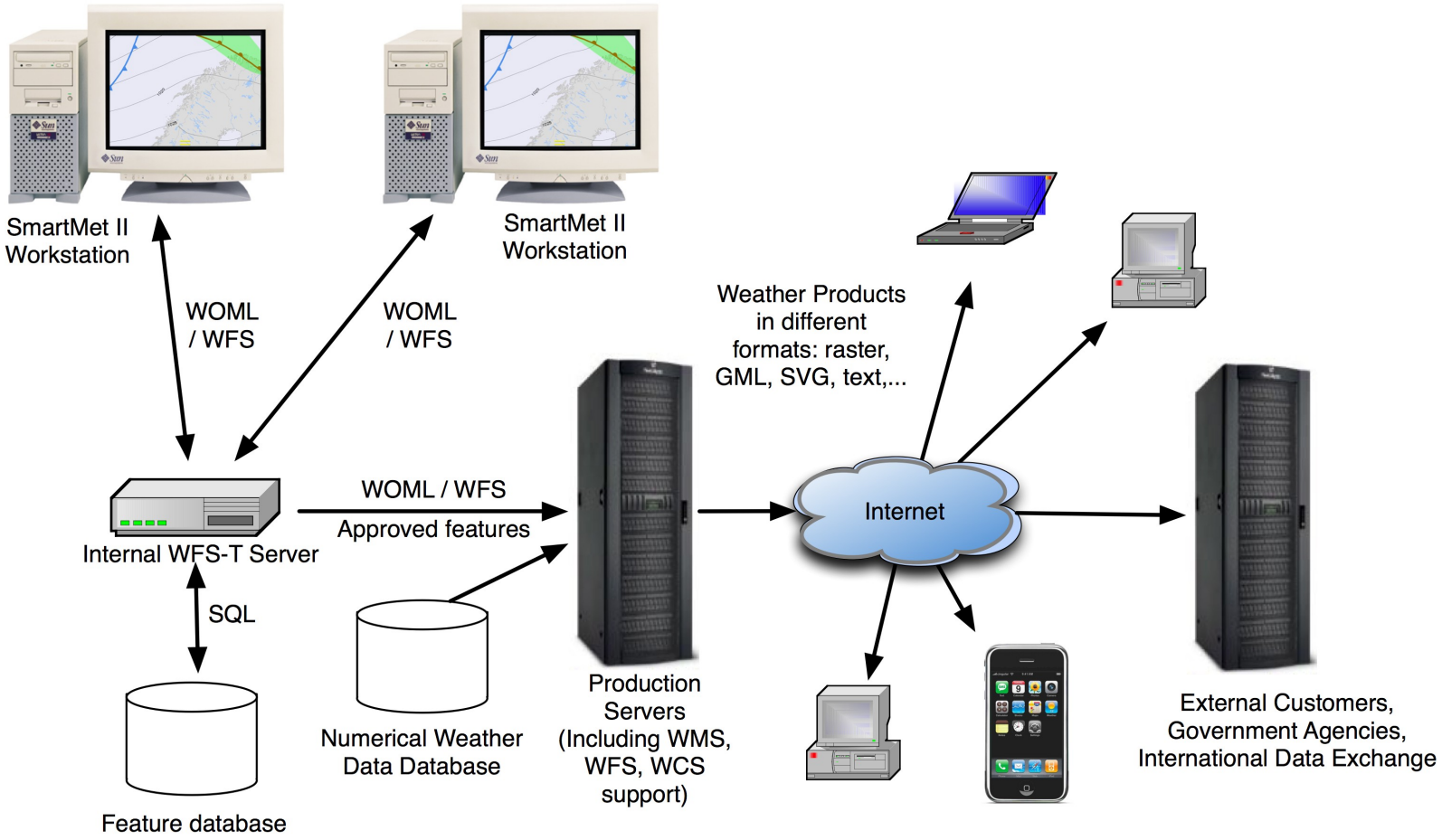
AbstractMeteorologicalObjectType

- **All Meteorological Objects may have:**
  - A history (or a future): a set of time-stamped geometry properties describe the observed or predicted movements and shape changes in time.
  - Uncertainty area of the feature's location in place and time (object is located within this area at the given time with the given certainty).
  - Language-specific textual descriptions.
  - Meta data fields including the Simple Dublin Core set.
  - Creation time, modification time, valid time.
- **Concrete WOML object types inherit these properties, add geometries and other feature-specifics.**

WOML Collection Types

- **MeteorologicalObjectCollectionType**
  - Shared connection points (weather front end and start points may be “glued”, for example).
- **AbstractApprovedObjectCollectionType**
  - This collection has been approved by a meteorological authority for specific use at specific time.
  - Language-specific textual descriptions.
  - Meta data fields including the Simple Dublin Core set.
  - Creation time, modification time, valid time.
- **Concrete types like MeteorologicalAnalysisType and WeatherForecastType inherit these.**

Goal: Publishing Forecasters' Weather Interpretation for Weather Product Production



Software: SmartMet II, Java libraries, WFS

- **First version of a WOML Editor in SmartMet II workstation currently being rolled out internally at FMI.**
- **Apache XMLBeans used for GML-Java object binding and XML processing.**
- **WOML-Java -library developed at FMI:**
  - Convenience methods for WOML data access & modification.
  - Support for object-specific undo/redo for any GML Feature including collections (Java Swing StateEditable).
  - Available for the interested upon request.
- **Geoserver 2.0 as the internal WFS-T server?**

It won't WOML Without Your Help

- **FMI: Will to share the current work with the OGC Met community: many essential Meteorological Objects still undefined**
  - Currently we have point symbols, point-specific parameter values, fronts, jets, troughs, cloud and precipitation areas and a couple other features.
- **Is the used modelling strategy sound, expressive enough, extensible enough and still as simple as possible? Modularisation & namespaces?**
- **Harmonisation & integration with other languages and GML Application Schemas: WXXM, CAP, CSML, …**
- **Development through OGC MetOcean DWG, IEs, Engineering reports, ...**

“Mrs. Dashwood: If you cannot think of anything appropriate to say you will please restrict your remarks to the weather.”

Quote: Emma Thompson: screenplay for Ang Lee's movie “Sense and Sensibility” (1995) according to The Internet Movie Database

Schemas, documentation and release notes for the latest FMI MetObjects / WOML release:
http://xml.fmi.fi/namespace/meteorology/conceptual-model/meteorological-objects/latest/