

Deutscher Wetterdienst

Abteilung Systeme und Betrieb



Observation Metadata and its Use in the DWD Weather Data Request Broker

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Questions

- What kind of metadata is needed for the discovery of observation data?
- What are the observation data products?
- How to structure the product descriptions?
- How to store the metadata descriptions?



What kind of metadata is needed for data discovery?

- What ?
- Where ?
- When ?
- Who ?
- other information
 - keywords
 - abstract



What ?

- meteorological parameter, e.g. **air temperature at 2m**
- climate parameter, e.g. **daily mean air temperature**
- difficult to describe with WMO Core Metadata Profile
- use of a self-developed **XML schema**
- each parameter description is a proper **XML document**
- each description is stored in an **XML table**

→ parameter catalogue



Example: parameter description

monthly mean of daily minimum of air temperature

```
<parameter id="TAMMDN">
  <element>
    <elementId>31</elementId>
    <elementName>air temperature</elementName>
    <elementShortName>TA</elementShortName>
    <unitOfMeasure>degree C</unitOfMeasure>
  </element>
  <aggregation>
    <aggregateFunction>mean</aggregateFunction>
    <interval>monthly</interval>
    <subAggregation>
      <aggregateFunction>minimum</aggregateFunction>
      <interval>daily</interval>
    </subAggregation>
  </aggregation>
</parameter>
```



Where ?

- list of stations described in one `<dataExtent>` tag
- one `<geographicElement>` tag per station
- describes **geographic location** and more
- each station description is a proper **XML document**
- each description is stored in an **XML table**

→ **station catalogue**



Example: station description

Station Aachen in Germany

```
<geographicElement>
  <geographicIdentifier name="land">Germany</geographicIdentifier>
  <geographicIdentifier name="WMO-Region">RA VI: Europe</geographicIdentifier>
  <geographicIdentifier name="stationname">Aachen</geographicIdentifier>
  <geographicIdentifier name="WMO-No">10501</geographicIdentifier>
  <point>
    <latitude>50.7839</latitude>
    <longitude>6.095</longitude>
    <elevation type="HA in metres">205</elevation>
  </point>
</geographicElement>
```



When ?

- one <temporalElement> tag per station
- explicit end date for closed data sets
- end date is missing for open data sets
- further temporal types are possible
 - recurring time intervals
 - time range specified with begin date and duration



Example: `<dataExtent>` description

monthly values between January 1891 and December 2003

```
<dataExtent xmlns:xi="http://www.w3.org/2001/XInclude">
  <description>
    Geographic and temporal information about the station Aachen
  </description>
  <xi:include href="/metadata/stations/RA VI: Europe/Germany/Aachen.xml"/>
  <temporalElement>
    <beginDateTime>1891-01-01</beginDateTime>
    <endDateTime>2003-12-01</endDateTime>
    <dataFrequency>monthly</dataFrequency>
  </temporalElement>
</dataExtent>
```



Who ?

- contact information, e.g. names, addresses, telephone numbers, web site URLs, ...
- each contact description is a proper XML document
- each description is stored in an XML table

→ contact data catalogue



Example: contact data description

contact information for the distributor role at DWD

```
<pointOfContact>
  <organisationName>Deutscher Wetterdienst</organisationName>
  <role>distributor</role>
  <individualName>Walter Koelschitzky</individualName>
  <positionName>Datenservice</positionName>
  <contactInfo>
    <phone>
      <voice>+49 (0) 69 8062-4400</voice>
      <facsimile>+49 (0) 69 8062-4499</facsimile>
    </phone>
    <address>
      <deliveryPoint>Kaiserleistrasse 29/35</deliveryPoint>
      <city>Offenbach</city>
      <postalCode>63067</postalCode>
      <country>Germany</country>
      <electronicMailAddress>datenservice@dwd.de</electronicMailAddress>
    </address>
    <onlineAddress>http://www.dwd.de</onlineAddress>
  </contactInfo>
</pointOfContact>
```



Questions

- What kind of metadata is needed for the discovery of observation data?
- **What are the observation data products?**
- How to structure the product descriptions?
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What are the observation data products?

- product \cong data set
- should be provider specific
- describe data of only one meteorological parameter
- describe the complete data set
- Example: air temperature observations from DWD
- product instance \cong
result of a predefined query for a product



Questions

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Implementation

- one central metadata database
- use of Oracle XML DB to store this database
- one main catalogue
 - product catalogue
- three auxiliary catalogues
 - parameter catalogue
 - station catalogue
 - contact data catalogue
- each catalogue is stored in one XML table

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Abteilung Systeme und Betrieb



VGISC-Prototype (RA VI) – Weather Data Request Broker Version 0.2

Home Introduction Connect as:

EUMETNET
The Network of European Meteorological Services

NCAR UCAR

European Centre for Medium-Range Weather Forecasts

DWD

UniDaRt

Help

Lokales Intranet



Summary

- WMO Core Metadata Profile can be successfully used for the description of climate time series
- extensions are needed for station descriptions, national language support, recurring time intervals, ...
- The Weather Data Request Broker uses metadata only for data discovery purposes
- metadata is described with XML and stored in a central XML database
- effective database updating will be a challenge