Information note

Recommendation for DQO e-Reporting from air quality models

EEA/ETC-ACM and FAIRMODE are working together to find best solutions for e-Reporting of data from air quality models. The recent outcome from our discussions is decision to recommend harmonised methodology based on FAIRMODE's Delta Tool for e-Reporting on data quality objectives for AQ models (data flow E1b).

FAIRMODE's Delta Tool generates:

- ASCII and/or csv file with data quality check results summarized per measurement location,
- pdf (or PNG) files with graphic representation of the results (summary diagram) including the overall quality score called 'Modelling Quality Indicator' (MQI, <1 for modelling results of good quality).

More details on the outputs of the Delta Tool can be found in "Delta User Guide".

In general there are two options for including information in the AQ e-Reporting:

- Encoding in the XML, i.e. incorporating the data directly into the XML report (here: into E1b data flow XML),
- Linking in the XML report to external file(s), i.e. using xlink to the files (here: generated by the Delta Tool).

EEA/ETC-ACM and FAIRMODE agreed that the optimal solution in the case of Delta Tool output(s) would be a combination of encoding and xlink such as:

- Encoding MQI value in the XML, which delivers the final and most important information about data quality to the AQ e-Reporting system (even in absence of additional, linked files),
- Linking in the XML report to external file(s) generated by the Delta Tool, using relative path, which gives more detailed information about data quality and allows generating summary diagram.

EEA/ETC-ACM investigated how to report encoded MQI and how to xlink to external files in E1b reports. Proposed XML structure consists of two main parts:

- *gmd:DQ_DomainConsistency*: static, descriptive part with basic information about e.g.: Delta Tool version, methodology, etc.:

```
<om:resultQuality>
    <gmd:DQ_DomainConsistency>
        <gmd:result>
            <gmd:DQ_ConformanceResult>
                <gmd:specification>
                    <gmd:CI_Citation>
                        <gmd:title>
                            <gco:CharacterString>FAIRMODE Model Quality Objective (MQO) - annual frequency</gco:CharacterString>
                        </gmd:title>
                        <gmd:date>
                            <gmd:CI_Date>
                                <gmd:date>
                                    <gco:Date>2018</gco:Date>
                                </gmd:date>
                                <gmd:dateType>
                                    <gmd:CI_DateTypeCode codeListValue="revision" codeList="eng">revision date</gmd:CI_DateTypeCode>
                                </gmd:dateType>
                            </gmd:CI_Date>
                        </gmd:date>
                        <gmd:edition>
                            <gco:CharacterString>FAIRMODE Delta Tool version 5.4</gco:CharacterString>
                        </gmd:edition>
                    </gmd:CI_Citation>
                </gmd:specification>
                <gmd:explanation>
                    <gco:CharacterString>
Estimate of model quality based on the model quality indicator (MQI) derived from the FAIRMODE Delta Tool for hourly model observations. For e-Reporting, the MQI-hourly shall be less than 1.
                    </gco:CharacterString>
                </gmd:explanation>
                <gmd:pass>
                    <gco:Boolean>true</gco:Boolean>
                </gmd:pass>
            </gmd:DQ_ConformanceResult>
        </gmd:result>
    </gmd:DQ_DomainConsistency>
</om:resultQuality>
```
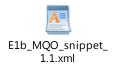
- *gmd:DQ_QuantitativeAttributeAccuracy*: where the actual MQI value is reported as well as where the relative path to external files (other Delta Tool outputs) is given; it also includes modelling time resolution for which the MQI has been calculated (concept from extended *resultquality* code list):

```
<om:resultQuality>
    <gmd:DQ_QuantitativeAttributeAccuracy>
        <gmd:result xlink:href="./myDeltaToolOutputs.csv" xlink:title="FAIRMODE Delta Tool outputs on modelling uncertainty - location is relative to that of the XML instance document).">
            <gmd:DQ_QuantitativeResult>
                <gmd:valueUnit>
                    <gml:BaseUnit gml:id="BaseUnit_2">
                        <gml:identifier codeSpace="FAIRMODE">MQI-annual</gml:identifier>
                        <gml:catalogSymbol codeSpace="FAIRMODE">none</gml:catalogSymbol>
                        <gml:unitsSystem xlink:href="http://dd.eionet.europa.eu/vocabularies"/>
                    </gml:BaseUnit>
                </gmd:valueUnit>
                <gmd:value>
                    <gco:Record>1</gco:Record>
                </gmd:value>
            </gmd:DQ_QuantitativeResult>
        </gmd:result>
    </gmd:DQ_QuantitativeAttributeAccuracy>
</om:resultQuality>
```

The first test example XML is attached.

E1b_MQO_snippet_
1.1.xml

The next actions for EEA/ETC-ACM to complete the process are:

- adding section on E1b XML structure for recommended DQO reporting using Delta Tool to the User Guide on XML,
- providing link to the FAIRMODE's Delta Tool on AQ Portal,
- work on processing concept for the recommended DQO reporting.

There may be further recommendations in the future related to the DQO, e.g. on using sampling points reported in AQ e-Reporting (D and E1a) for E1b quality checks.