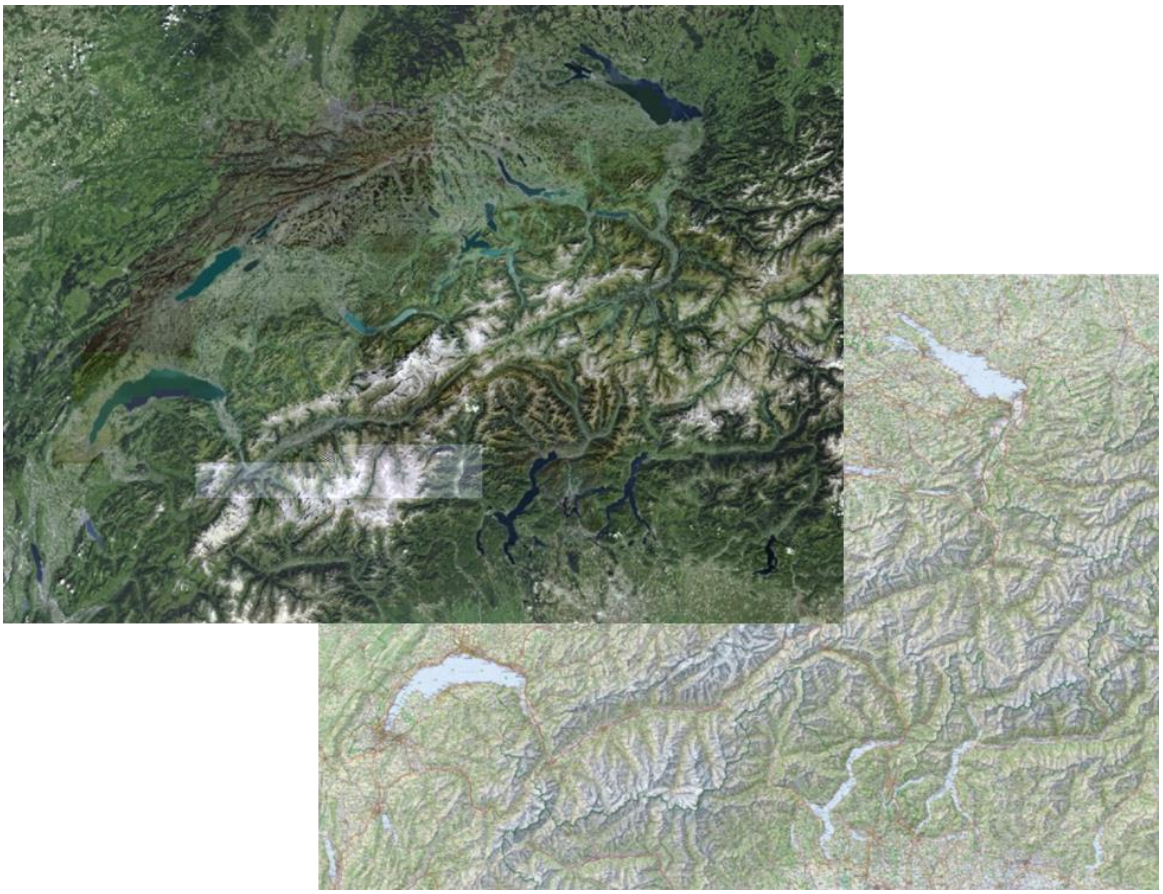
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Home Affairs FDHA
Swiss Federal Archives SFA

— *Information sheet Specification for an archivable geoformat for image and graphic raster data*

TIFF + Extended World File (EWF.XML)



Last update: 19 August 2015

Contents

1 The format: TIFF + EWF.XML 1
1.1 Attributes of the EWF.XML file 2
1.2 Properties of the TIFF files 3
1.3 The EWF.XML files 4
2 XSD file 4
3 Sample EWF.XML file 5

1 The format: TIFF + EWF.XML

The combination TIFF + EWF.XML[1] provides an archiving geoformat with a minimum catalogue of attributes that permits the simple description of image and graphic raster data with regard to space, time and content. This format also applies to height and thematic raster data if these two format classes are filed as image or graphic raster data.

The geoformat allows an individual image or graphic raster file to be used as a partial geodata set. The TIFF + EWF.XML format provides a core[2] in the context of a geodata fonds comprising a number of image or graphic raster data.

The format consists of a raster data file in the standard TIFF format[3] and an associated XML file with 10 attributes. The XML file consists of the 6 attributes of a world file,[4] which is extended in XML notation to include the following 4 attributes:

- ReferenceSystem
- TemporalExtent with BeginTemporalExtent and EndTemporalExtent
- ImageDescription

The extended world file in XML notation is referred to as EWF.XML (**E**xtended **W**orld **F**ile).

---

[1] EWF = extended world file

[2] Cf. also specifications on Geo-SIPs where the context of the core in relation to the data fonds as a whole is explained

[3] See SFA – Archivable File Formats. Chapter 2.5 / 3.5 TIFF – Tagged Image File Format
http://www.bar.admin.ch/themen/00876/00877/index.html?lang=en&download=NHzLpZeg7t,lnp6I0NTU042l2Z6ln1ad1IZn4Z2qZpnO2Yuq2Z6gpJCDdIJ9hGym162epYbg2c_JjKbNoKSn6A--
Current versions: TIFF Revision 6.0 of 1992-06-03 and Revision 6.0.1 of 1995-10-15, extensions are disregarded

[4] A world file is a simple, six-line text file that can be opened using any text editor and contains the geospatial referencing of an image. The format was introduced by ESRI and is now widely used. See also: https://en.wikipedia.org/wiki/World_file

1.1 Attributes of the EWF.XML file

Mandatory attributes are shown in **bold**. The letters A to F refer to the illustration below.

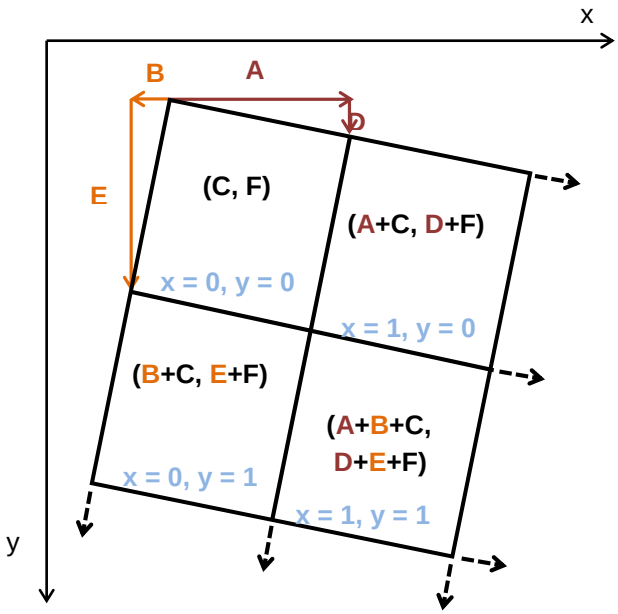
Attribute	Description / comments
x-scale	Pixel size in the x-axis (in map unit[5]) or x component of the pixel width (**A**) in a rotation
y-skew	0 or y component of the pixel width (**D**) in a rotation
x-skew	0 or x component of the pixel height (**B**) in a rotation
y-scale	Pixel size in the y-axis (in map unit) or y component of the pixel height (mostly negative) (**E**) in a rotation
x-coordinate	x-coordinate of the centre of the upper-left pixel (**C**)
y-coordinate	y-coordinate of the centre of the upper-left pixel (**F**)
ReferenceSystem	Indicates the geographic reference system used in the form of a text reference in accordance with EPSG[6], for Switzerland “CH1903 / LV03” or “CH1903+ / LV95”.
BeginTemporalExtent	Temporal extent of the content of the geodata or best possible approximation of the period (*BeginTemporalExtent* to *EndTemporalExtent*) or point in time (*BeginTemporalExtent* identical to *EndTemporalExtent*) at which an image was taken or created e.g. flight year or time at which a photo was taken in ISO 8601 format.[7] *BeginTemporalExtent* and *EndTemporalExtent* designate the same method of representing a date, which may be either an exact date or an imprecise indication (e.g. YYYY-MM). The valid date formats for archiving are: **YYYY** (XML datatype gYear) **YYYY-MM** (XML datatype gYearMonth) **YYYY-MM-DD** (XML datatype date) **YYYY-MM-DDThh:mm:ss** (XML datatype dateTime) Examples: - Land use statistics 1979/1985: BeginTemporalExtent = 1979 EndTemporalExtent = 1985 - Alpine Convention: BeginTemporalExtent = 2009 EndTemporalExtent = 2009
EndTemporalExtent	
ImageDescription	Optional description of the image content

[5] In the reference system “CH1903 / LV03” or “CH1903+ / LV95” the map unit is [metre]

[6] https://en.wikipedia.org/wiki/International_Association_of_Oil_%26_Gas_Producers#European_Petroleum_Survey_Group and http://www.epsg-registry.org/

[7] http://www.iso.org/iso/home/standards/iso8601.htm

Illustration of the attributes of a world file



1.2 Properties of the TIFF files

Based on, and supplementing, the restrictions set out by the Swiss Federal Archives SFA in the "Standards for Archiving Digital Records– Archivable File Formats",[8] the following rules apply to the use of the TIFF file format for image and graphic raster data in connection with geodata:

- One image is stored per TIFF file
- On principle, the SFA disregard proprietary expansions
- If image or graphic raster data are in GeoTIFF format, tags/keys specific to GeoTIFFs are disregarded

The following are permitted:

- images with more than one channel

The following are not permitted:

- multi-page TIFFs as image pyramids
- BigTIFFs
- compressed TIFFs (exception: black and white images).

The file names need not be meaningful in themselves, but the file name must establish an unambiguous link to the associated EWF.XML file.

Example (associated TIFF file for the example in 0): "***bsp_bild-grafikraster***.tif"

[8] Chapter 2.5 / 3.5 TIFF – Tagged Image File Format http://www.bar.admin.ch/themen/00876/00877/index.html?lang=en&download=NHzLpZeg7t,lnp6I0NTU042l2Z6ln1ad1IZn4Z2qZpnO2Yuq2Z6gpJCDdIJ9hGym162epYbg2c_JjKbNoKSn6A--

1.3 The EWF.XML files

The EWF.XML file is validated using the associated XSD file (see chapter 2 XSD file

). Validation can be carried out online (e.g. here: http://www.utilities-online.info/xsdvalidation/#.VRqXF-E4vGs) or using dedicated tools.

The file names need not be meaningful in themselves, but (as already required for the TIFF file) the file name must establish an unambiguous link to the associated TIFF fileExample (associated EWF.XML file for the example in 0): "***bsp_bild-grafikraster***.ewf.xml"

2 XSD file

The EWF.XML files are validated using the following XSD file:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <!-- Zweck   Formatspezifikation Extended World-File  -->
  <!-- Datei   ewf.xml_V0_05.xsd                        -->
  <!-- Author  Sigmaplan AG + BAR + swisstopo           -->
  <!-- Version 0_05                                     -->
  <!-- Datum   11.08.2015                               -->
  <!-- History                                          -->

  <!-- Typen: -->
  <xs:simpleType name="ReferenceSystemType">   <!-- verwendetes geograf. Bezugsystem -->
    <xs:restriction base="xs:string">
      <xs:enumeration value="CH1903 / LV03"/>
      <xs:enumeration value="CH1903+ / LV95"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="nonNegativeDecimal">   <!-- Dezimalzahl groesser gleich 0 -->
    <xs:restriction base="xs:decimal">
    <xs:minInclusive value="0"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="NegativeDecimal">      <!-- Dezimalzahl kleiner 0 -->
    <xs:restriction base="xs:decimal">
    <xs:maxExclusive value="0"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="PositiveDecimal">      <!-- Dezimalzahl groesser 0 -->
    <xs:restriction base="xs:decimal">
    <xs:minExclusive value="0"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="TemporalExtentType">
    <xs:union memberTypes="xs:gYear xs:gYearMonth xs:date xs:dateTime"/>
  </xs:simpleType>

  <!-- ImageAttributes: -->
  <xs:element name="ImageAttributes">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="x-scale" type="PositiveDecimal"/>                    <!--
Pixelgroesse in x-Aches > 0 -->
        <xs:element name="y-skew" type="nonNegativeDecimal"/>                  <!-- Ro-
tation der y-Achse >= 0-->
        <xs:element name="x-skew" type="nonNegativeDecimal"/>                  <!-- Ro-
tation der x-Achse >= 0 -->
        <xs:element name="y-scale" type="NegativeDecimal"/>                    <!-- Pi-
xelgroesse in y-Aches < 0-->
```

```
        <xs:element name="x-coordinate" type="PositiveDecimal"/>                <!--
x-Koordinate des Zentrums des Pixels oben links -->
        <xs:element name="y-coordinate" type="PositiveDecimal"/>                <!--
y-Koordinate des Zentrums des Pixels oben links -->
        <xs:element name="ReferenceSystem" type="ReferenceSystemType"/>         <!--
verwendetes geografisches Bezugssystem -->
        <xs:element name="BeginTemporalExtent" type="TemporalExtentType"/>         <!-
Beginn Datum/Uhrzeit der Aufnahme -->
        <xs:element name="EndTemporalExtent" type="TemporalExtentType"/>          <!-
Ende Datum/Uhrzeit der Aufnahme -->
        <xs:element name="ImageDescription" type="xs:string" minOc-curs="0"/>   <!-- Be-
schreibung des Bildinhalts -->
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

3 Sample EWF.XML file

The following is an example of a valid EWF.XML file:

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Zweck:   Gültige Beispieldatei 1 Format Extended World-File -->
<!-- Datei:   ValidExample1 V0 05.xml                           -->
<!-- Author:  Sigmaplan AG + BAR + swisstopo                    -->
<!-- Version: 0_05                                              -->
<!-- Datum:   11.08.2015                                        -->
<!-- History:                                                   -->
<ImageAttributes  xsi:noNamespaceSchemaLocation="ewf.xml_V0_05.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <x-scale>5.000000000000</x-scale>
  <y-skew>0.000000000000</y-skew>
  <x-skew>0.000000000000</x-skew>
  <y-scale>-5.000000000000</y-scale>
  <x-coordinate>600000.000</x-coordinate>
  <y-coordinate>200000.000</y-coordinate>
  <ReferenceSystem>CH1903 / LV03</ReferenceSystem>
  <BeginTemporalExtent>2015-03-12</BeginTemporalExtent>
  <EndTemporalExtent>2015-03-12</EndTemporalExtent>
  <ImageDescription>Beschreibung des Beispielbildes</ImageDescription>
</ImageAttributes>
```