

Paper for Consideration by NIPWG

Tests on S-1xx compliant NPUB ProdSpecs (NTOU)

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Executive Summary:	NTOU has conducted tests on S-122 and S-123 product specs. This paper describes the results and findings related to the GML encoding.
Related Documents:	S-100 and S-122, S-123, S-127 product specifications
Related Projects:	

Introduction / Background

NTOU has conducted tests on S-1xx compliant product specifications, to support the overall planning of S-100 based data products covering Taiwan. One S-122 dataset has been created for a marine national park, which has three areas with different regulations provided in two languages (eng and zho). The S-123 test dataset produced contains features of RadioStation, RadioServiceArea, GMDSSArea, NavtexStationArea. It was found that for the produced S-122 and S-123 GML files to be displayed correctly in CARIS S-57 Composer (Fig.1 and Fig.2) and QGIS, the axis order has to be swapped sometimes, between Lat/Long and Long/Lat. After comparing all the sample GML datasets available from IHO website, the situations are even more confusing, due to the differences in GML encoding, especially the Spatial Reference System (SRS) and the axis order. This paper reports the findings from the trial production as well as the comparison with and experiments on sample datasets.

Analysis/Discussion

According to S-100 Part 10b-9.8, for S-100 datasets, SRS can be specified in one of two ways: (1) using srsName for the gml:Envelope or (2) using the srsName and srsDimension attributes for individual geometry elements. "Application data formats shall ensure that the SRS of every instance of geometry in a dataset can be determined by application software, using one method or another." S-100 10b-9.8 also states that standard SRS shall be identified using the URI convention specified by OGC. For example, <http://www.opengis.net/def/crs/EPSSG/0/4326>. The axis order in the formal definition of EPSG4326 is Lat./Long. instead of Long./Lat.. Application software might try to accommodate differences in axis order, but the way of doing this or the outcome varies.

In the S-122 sample dataset, the axis order of coordinates is Long/Lat and srsName="EPSG:4326" is added to the gml:Envelope and one of the geometries. In CARIS, most geometries in that dataset are displayed correctly, but the one with EPSG:4326 specified appears in Antarctica. Similarly, in NL's S-123 test dataset, RadioStation and NavtexStationArea features which have srsName="EPSG:4326" specified, appear near Antarctica. (Fig.3)

In the S-123 sample dataset, the axis order is Long/Lat and srsName="EPSG:4326" is added only to the envelope. S-127 sample dataset has srsName="urn:ogc:def:crs:EPSSG::4326" added to all elements, and the axis order is Lat/Long. Both datasets can be correctly displayed in CARIS and QGIS. Replacing the URN form with URI form to the srsName attribute of all elements in the S-127 dataset the displayed locations remain correct (Fig.4). However, if only the gml:Envelope has srsName attribute specified (in URI or URN form), both CARIS and QGIS treat the axis ordering as Long/Lat (perhaps the internal default) and have the geometries displayed at the wrong hemisphere.

Conclusions

To reduce the risk of inconsistency in GML encodings, SRS shall be identified using the URI convention specified by OGC, which is "<http://www.opengis.net/def/crs/EPSSG/0/4326>" for S-1xx compliant NPUB data products, and the axis order shall be Lat/Long, strictly following the definition of EPSG4326. For the application software to correctly determine the SRS of every instance of geometry in a dataset, using the srsName and srsDimension attributes for individual geometry elements is safer than using srsName for the gml:Envelope only.

Action required of NIPWG

The NIPWG is invited to:

- a) Note this report.
- b) Provide input if appropriate.

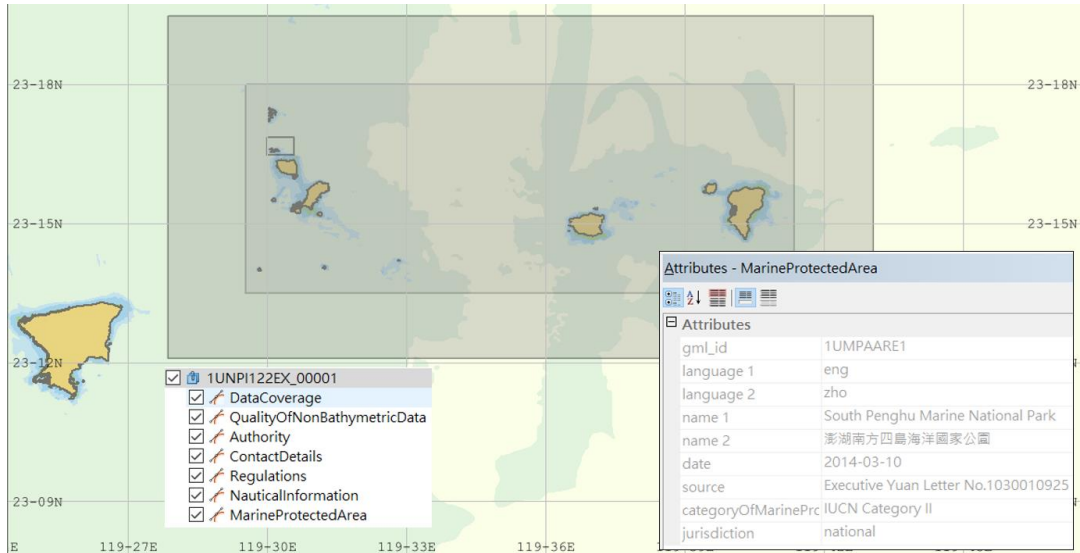


Fig.1 S-122 Test Dataset (1U)

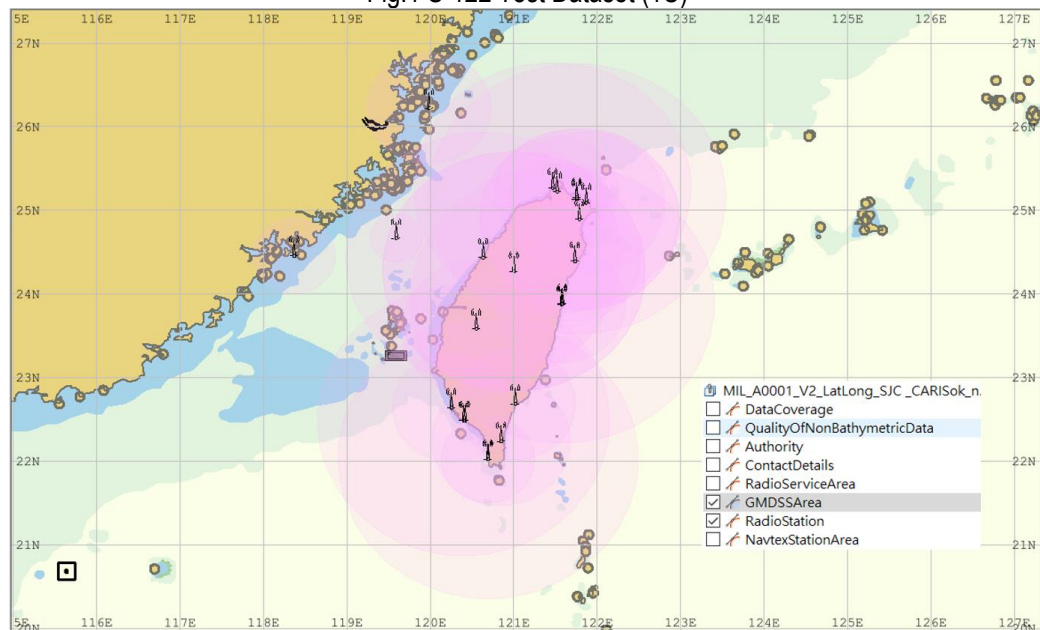


Fig.2 S-123 Test Dataset (1U)

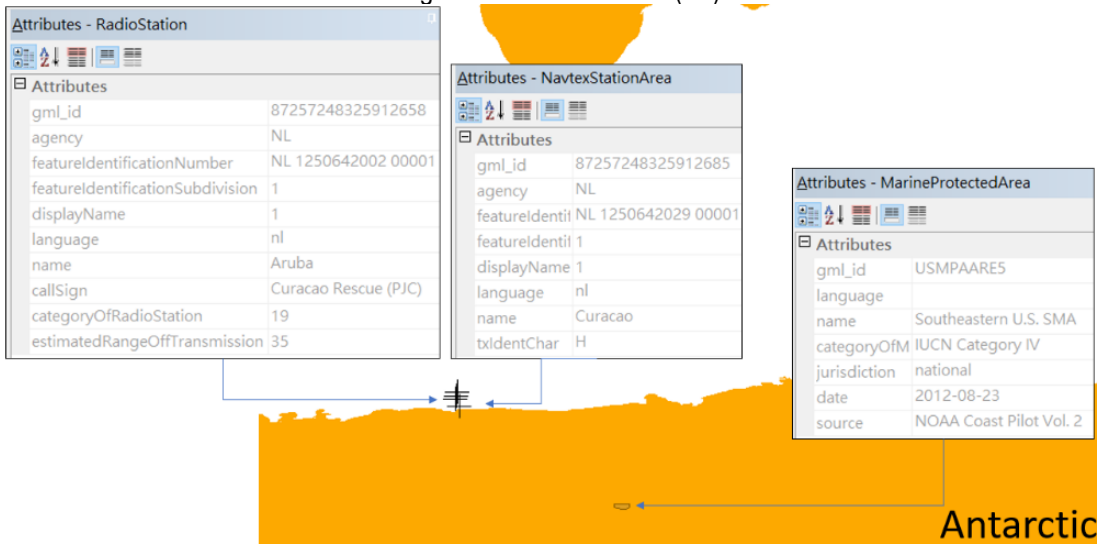
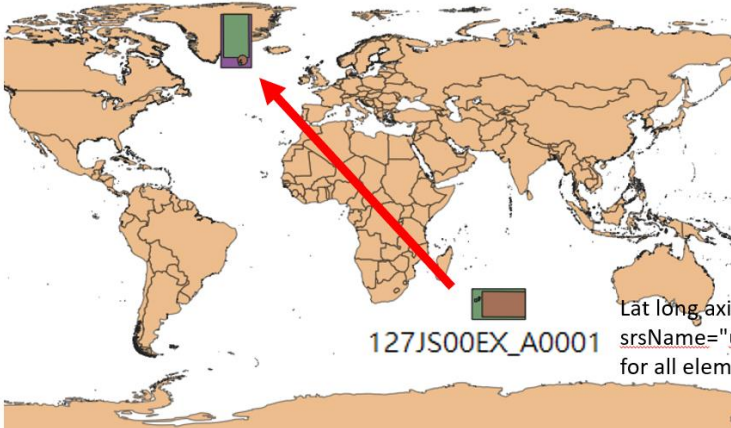


Fig.3 Misplaced features of datasets,S-122(US) and S-123(NL)

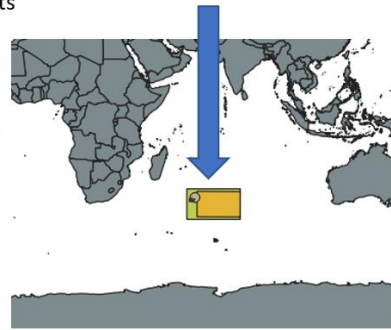
Antarctica

GML opened in QGIS

Lat long axis order
srsName="EPSG:4326" for all elements



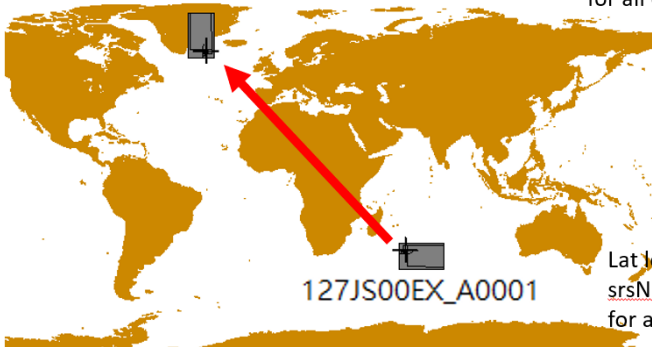
Lat long axis order
srsName="http://www.opengis.net/def/crs/EPSSG/0/4326"
for all elements



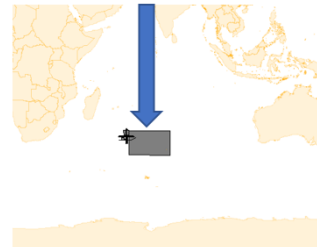
Lat long axis order
srsName="urn:ogc:def:crs:EPSSG::4326"
for all elements

GML opened in CARIS S-57 Composer

Lat long axis order
srsName="EPSG:4326"
for all elements



Lat long axis order
srsName="http://www.opengis.net/def/crs/EPSSG/0/4326"
for all elements



Lat long axis order
srsName="urn:ogc:def:crs:EPSSG::4326"
for all elements

Fig.4 Tests on the SRS and axis order encoding (S-127 sample dataset)