

Use of the ISO 19100 Quality standards at the NMCAs

Results from questionnaires taken in 2004, 2011 and 2017

Eurogeographics Quality Knowledge Exchange Network



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Abstract	Report of the use of quality related ISO 19100 standards and the guideline document at the NMCAs and the change in use since 2004. Most of the NMCAs in QKEN are now utilizing the standards.		
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1 Executive Summary

EuroGeographics mission is to maintain a network which helps each member to improve their capabilities and role; to facilitate access to our members' data, services and expertise; and to provide a strong voice for our members. As part of its organisation, EuroGeographics has several Knowledge Exchange Networks that are designed to identify and spread knowledge and best practice. This report, into the use of the ISO 19100 series of standards, is the output from one of these groups, the Quality Knowledge Exchange Network (QKEN).

This report builds on two previous surveys that were carried out in 2004 and 2011. Previous surveys were restricted to those member organisations that were involved directly with the QKEN. Over the past few years the EuroGeographics membership has grown significantly and, for the first time, the questionnaire was sent to all members. This has increased the number of responses when compared with previous surveys but also made comparisons difficult.

Analysis of the raw data would appear to show that use of the ISO standards is falling but this is clearly not the case. The introduction of the INSPIRE directive has had a direct effect on the results and when analysis of those organisations that have previously responded is carried out it is clear to see that more and more organisations are using more and more standards.

2 Table of contents

1	Executive Summary	2
2	Table of contents	3
3	Background	4
4	The ISO 19100 Geographic information family of standards.....	4
4.1	EN ISO 19157 Data quality	4
4.2	ISO 19113 Quality principles.....	4
4.3	ISO 19114 Quality evaluation procedures.....	5
4.4	ISO 19138 Quality measures	5
4.5	EN ISO 19115 Metadata - Part 1: Fundamentals.....	5
4.6	ISO 19115 Metadata	5
4.7	EN ISO 19115-2 Metadata - Part 2: Extensions for imagery and gridded data.....	5
4.8	EN ISO 19119:2005 Services	5
4.9	EN ISO 19131 Data product specifications	5
4.10	ISO/TS 19158 Quality assurance of data supply.....	6
4.11	Guidelines for Implementing the ISO 19100 Geographic Quality Standards.....	6
5	Results from the 2017 questionnaire	6
5.1	Introduction.....	6
5.2	Using Quality principles.....	8
5.3	Using Quality evaluation procedures.....	9
5.4	Using Quality measures	11
5.5	Using ISO 19115 – Metadata	12
5.6	Using ISO 19115-2 - Metadata - Part 2: Extensions for imagery and gridded data	14
5.7	Using Metadata for Services	15
5.8	Using ISO 19131 - Data product specifications.....	16
5.9	Using Guidelines for Implementing the ISO 19100 Geographic Quality Standards	17
5.10	ISO/TS 19158 Quality assurance of data supply.....	18
5.11	Documentations of work with implementation of standards.....	19
5.12	Reference documents for work with implementation of standards	20
5.13	Contact persons for issues concerning ISO 19100	21
6	Comparison with previous questionnaires	22
6.1	Introduction.....	22
6.2	Comparison: Use of Quality principles	23
6.3	Comparison: Use of Quality evaluation procedures	24
6.4	Comparison: Use of Metadata.....	25
6.5	Comparison: Quality measures	26
6.6	Comparison: Metadata -- Extensions for imagery and gridded data	27
6.7	Comparison: Data product specifications.....	28
6.8	Comparison: Guidelines for Implementing the ISO 19100 Geographic Quality Standards.....	29
6.9	Comparison: Using Metadata for Services.....	30
6.10	Comparison Summary	31
	Appendix A - Questionnaire 2017	32

3 Background

At a plenary meeting of the QKEN in 2015 it was decided that it would be beneficial to re-run the questionnaire on the use of ISO 19100 standards within Europe to see whether their use had increased or not. Part of the work of the QKEN is to spread best practice and it is widely acknowledged that the standards represent best practice.

At this early stage, it was known that any comparison with previous surveys would be difficult as the ISO standards had undergone a major revamp with the introduction of ISO19157 and the withdrawal of ISO19113, 19114 and others. The questionnaire was therefore developed in such a way that comparisons could be drawn.

The questionnaire was sent to all member organisations of EuroGeographics. This was a change from previous surveys which had only been distributed to QKEN members. As a result, more responses were received than in previous surveys.

4 The ISO 19100 Geographic information family of standards

One of the main objectives of this family of standards is to enable digital geographic data to be shared and made available. The quality part makes it possible for the user to determine whether or not the geographic data is of sufficient quality for their application.

4.1 EN ISO 19157 Data quality

This standard establishes the principles for describing the quality of geographic data. It

- defines components for describing data quality
- specifies components and content structure of a register for data quality measures
- describes general procedures for evaluating the quality of geographic data
- establishes principles for reporting data quality

ISO 19157:2013 also defines a set of data quality measures for use in evaluating and reporting data quality. It is applicable to data producers providing quality information to describe and assess how well a data set conforms to its product specification and to data users attempting to determine whether or not specific geographic data are of sufficient quality for their particular application

This standard includes the components from the standards ISO 19113 Quality principles (except the quality overview elements that now are defined in the Metadata standard), ISO 19114 Quality evaluation procedures and ISO 19138 Quality measures.

4.2 ISO 19113 Quality principles

This standard is now replaced by ISO 19157, but is still used. It establishes the guidelines to describe the quality of the geographic data and specifies components for reporting quality information. It is also applicable to data users attempting to determine whether or not specific geographic data is of sufficient quality for their particular application.

4.3 ISO 19114 Quality evaluation procedures

This standard is now replaced by ISO 19157, but is still used. It provides a framework of procedures for determining and evaluating the quality for geographic data, consistent with the data quality principles defined in ISO 19113. It also establishes a framework for evaluating and reporting data quality results, either as part of data quality metadata only, or as an evaluation report.

4.4 ISO 19138 Quality measures

This Technical Specification is now included in ISO 19157, but is still used as reference. It defines a set of data quality measures for the data quality sub-elements identified in ISO 19113 Quality principles. Multiple measures are defined for each data quality sub-element, and the choice of which to use will depend on the type of data and its intended purpose.

4.5 EN ISO 19115 Metadata - Part 1: Fundamentals

This standard defines the schema required for describing geographic information and services by means of metadata. It provides information about the identification, the extent, the quality, the spatial and temporal aspects, the content, the spatial reference, the portrayal, distribution, and other properties of digital geographic data and services.

It includes the definitions of the quality overview elements from ISO 19113 and the metadata part from ISO 19119:2005.

4.6 ISO 19115 Metadata

This standard is now replaced by ISO 19115-1, but is still used. It defines a procedure for the description of datasets so that users will be able to determine whether the data will be of use to them. It facilitates the organization and management of geographic data and provides information about an organization's databases to others. It includes the model for reporting the data quality described in ISO 19113.

4.7 EN ISO 19115-2 Metadata - Part 2: Extensions for imagery and gridded data

This standard extends the existing ISO 19115 Metadata standard by defining the metadata required to describe imagery, gridded and coverage data.

4.8 EN ISO 19119:2005 Services

This International Standard provides a framework for developers to create software that enables users to access and process geographic data. It defines a metadata model to support service discovery through a service catalogue. In the 2016 version of the standard this part is moved to ISO 19115-1 Metadata.

4.9 EN ISO 19131 Data product specifications

This International Standard describes the requirements to specify the geographic data products based upon the concepts of other ISO 19100 International Standards. It also provides help in the creation of data product specifications, so that they are easily understood and fit for their intended purpose.

4.10 ISO/TS 19158 Quality assurance of data supply

This International Standard provides a framework for quality assurance specific to geographic information. It is based upon the quality principles and quality evaluation procedures of geographic information identified in ISO 19157 and the general quality management principles defined in ISO 9000.

4.11 Guidelines for Implementing the ISO 19100 Geographic Quality Standards

These guidelines describe why it is important to implement the ISO 19100 data quality standards for geographic information datasets in the National Mapping and Cadastral Agencies (NMCAs). It gives practical suggestions on how to read and understand the standards and how to carry out the actual implementation process.

5 Results from the 2017 questionnaire

5.1 Introduction

The EuroGeographics expert group of quality had, at the time of the first investigation (May 2004), seventeen member countries. The following members answered the questionnaire; Austria, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany The Netherlands, Hungary, Lithuania, Slovakia, Slovenia, Spain, and Sweden. Only answers from two members, at that time, were missing.

The main reason for the questionnaire was to get a hint of if, and which, NMCA's were using the quality standards so that the expert group could go on with the next step; to spread good practices amongst the members on how to implement standards. Therefore, the questionnaire had a rather simple design. There was a choice to answer *yes* or *no*. Beside the *yes* or *no* answer, there was also an opportunity to add some comments. When reading the comments, it was obvious that several answers were somewhere "in between". Therefore, some of the answers have been adjusted; these answers were moved from the *yes* and *no* categories to a new category called *partly*.

In Spring 2011 a follow-up was made, to make it possible to look at what has happened. The structure of the questionnaire remained the same but it was enlarged with questions about the new standards that include data quality parts and the guidelines document that was a result of the previous questionnaire. The questionnaire was sent to all participants in QKEN, and 18 members answered this time. Ten of them had answered the first time; Austria, Czech Republic, Finland, France, Great Britain, Germany, Hungary, Lithuania, Spain, and Sweden. In addition, this time Belgium, Croatia, Greece, Latvia, Malta, Norway, Poland and Portugal also responded.

When the questionnaire was sent out 2017 it was sent to all member organisations in Eurogeographics. A list of the members that answered the questionnaire is found in table 1.

Table 1. Participating organisations 2017

Cartographic and Geological Institute of Catalonia
 Czech Office for Surveying, Mapping and Cadastre (CUZK)
 Direcção-Geral do Território, Portugal
 Estonian Land Board
 Federal Agency for Cartography and Geodesy (BKG)
 Federal Office of Topography Swisstopo
 General Administration of Patrimonial Documentation - SPF Finances - Belgium
 General Command of Mapping (GCM) Turkey
 Geodesy, Cartography and Cadastre Authority of the Slovak Republic
 Geodetska uprava Republike Slovenije / Surveying and Mapping Authority of the Republic Slovenia
 Government Office of the Capital City Budapest Hungary
 IGN France
 IGN Spain
 Italian Geographic Military Institute (IGMI)
 Land & Property Services - Northern Ireland
 Lantmäteriet, Sweden
 Latvian Geospatial Information Agency
 National land Survey of Finland
 National Land Survey of Iceland
 NCMA SA Greece
 NGI Belgium
 Norwegian Mapping Authority
 Ordnance Survey Great Britain
 Ordnance Survey Ireland
 Planning Authority Malta
 Republic Geodetic Authority Serbia
 State Enterprise Centre of Registers, Lithuania
 State Land Service of the Republic of Latvia

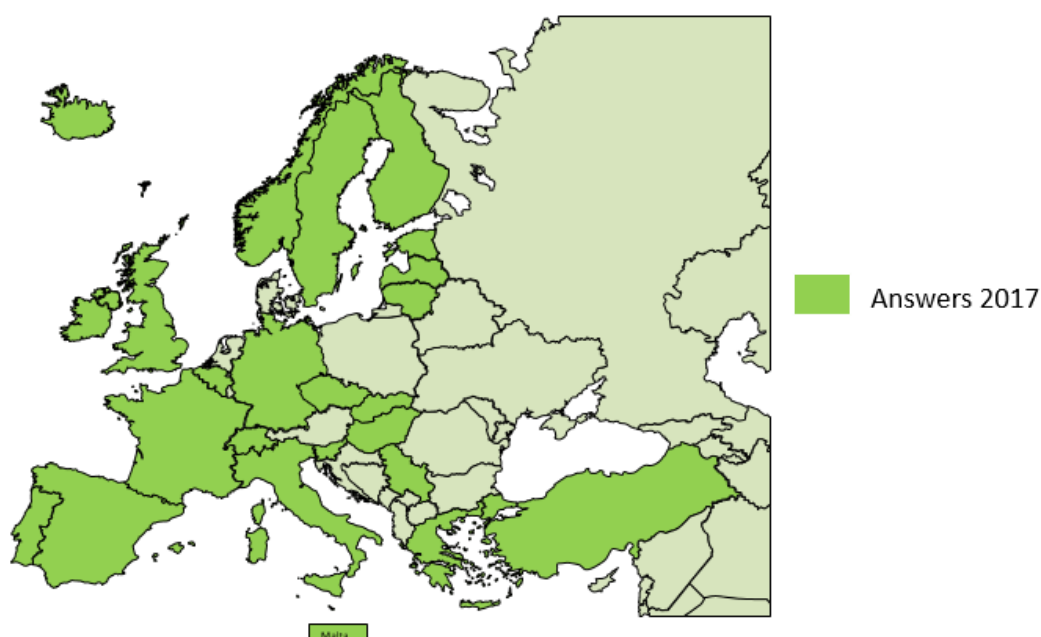


Figure 1. Nations with members answering the questionnaire 2017

The result is clear, the organisations that have members in the Q-KEN and those involved in Inspire are users of the ISO 19100 quality standards (or the NATO standards)

Some general comments:

- Please be informed that the State Enterprise Centre of Registers, Lithuania, is not using standards of the ISO19100 series. There could be some cases when we look at them; however, the use is not regulated or formally declared
- We know the ISO Standards. We orientate ourselves towards these standards but we do not implement them specifically. Switzerland knows its own suite of standards for E-Government, called e-ch (<https://www.ech.ch/vechweb/page>)
- We have made a national standard (Geodatakvalitet) based upon ISO 19157, where the ISO quality elements and measures have been translated, explained and examples are added. This is a standard closely related to the Norwegian standard •SOSI Produktspesifikasjoner - Krav og godkjenning 5.0 which is a standard that is based upon ISO 19131 Data product specification, and where quality requirements are an important part.
- NCMA's Quality Model formed using ISO 19113, 19114 & 19138. Working on implementation of the ISO 19157 standard

When the answer no included a comment that they use Inspire, NATO STANAG-s or another version of the standard, the no has been changed to partly. That is because both INSPIRE and NATO STANAG-s use the ISO standards and there was no intention to look for what versions are used. The comments also give the view that most members still use the previous versions of the standards as Inspire currently does.

5.2 Using Quality principles

5.2.1 Result

The result for the first question; "Are your NMA using Quality principles?" is that more the half of members say that they use the standard.

Comments on the question included:

- It is not still included in our legal regulation
- YES, Quality Principles described in ISO 19157 have been implemented by CUZK for various data products
- Mostly based on 19113
- Uses components for describing data quality
- Only for DB at scale 1:25.000. Reference document completed in 2016; practical implementation still under development.

Table A. Use of Quality principles (original)

Standard	Yes %	No %	Year
ISO 19113 or ISO 19157	61	39	2017

5.2.2 Adjusted result

When the comments were analysed, it was obvious that the number of members which had answered *no* could be reduced. Here are some examples of comments that changed some of the original answers to yes or *partly*. The original answers are in brackets;

- We implement NATO STANAG 2215 (*no*)
- Partly. No direct use, but the principles of are taken into account (*yes*)
- ISO 19157 is not implemented yet. We still use ISO 19113.*(no)*

Table B. Use of Quality principles (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19113 Or 19157	54	14	32	2017

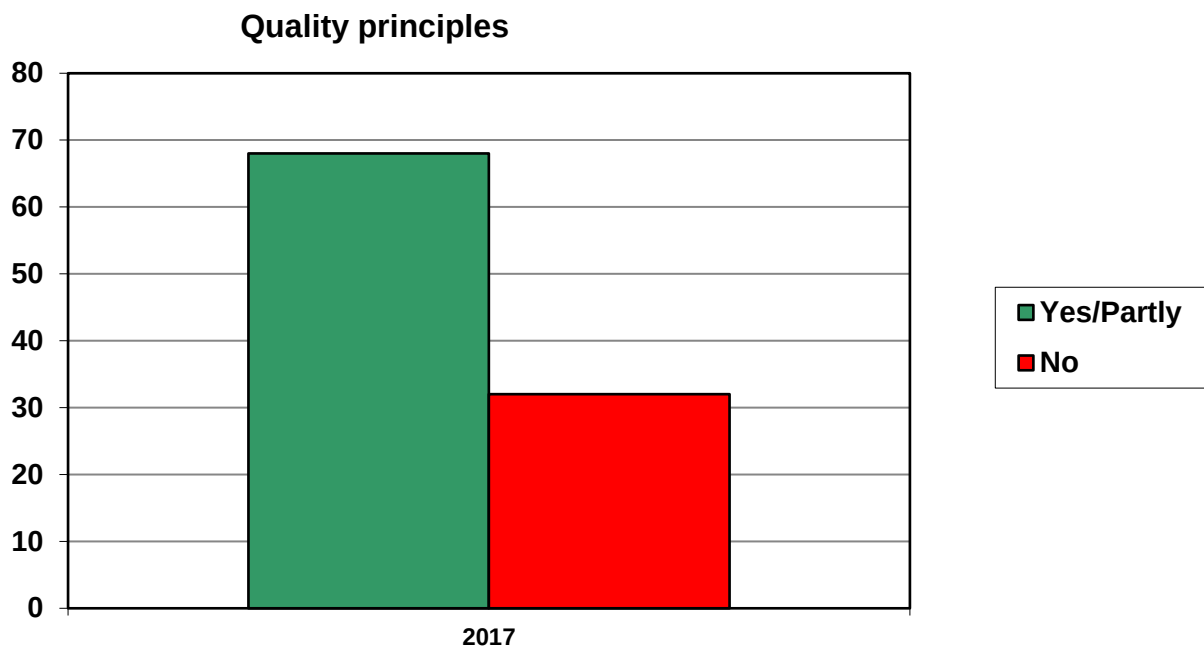


Figure 2. Result from question related to ISO 19113 and ISO 19157

5.3 Using Quality evaluation procedures

5.3.1 Result

Comments on the question included:

- YES, quality evaluation is an integral part of internal processes (data gathering, maintenance, publishing). Quality parameters have been set up and quality testing tools realized/available, testing results are documented.
- Only for a certain set of reference data
- Mostly in renewed data sets (digital topographic database)
- it is not still included in our legal regulation
- Partly
- We implement NATO STANAG 2215.
- SLS uses some criteria from ISO 19157 for quality evaluation of building data (Cadastral map).

- Only for DB at scale 1:25.000. Reference document completed in 2016; practical implementation still under development.
- Partly. No direct use, but the principles of are taken into account
- ISO 19157 is not implemented yet. We still use ISO 19114
- Not for all products.
- Mostly based on 19114
- Parts of evaluation process are being used.

Table C. Use of Quality evaluation procedures (original)

Standard	Yes %	No %	Year
ISO 19114 or ISO 19157	61	39	2017

5.3.2 Adjusted result

Here are some examples of comments that changed some of the original answer to *yes* or *partly*. The original answers are in brackets;

- No more. In our institution quality standards are not more necessary. Only STANAG-s.(No)
- ISO 19157 is not implemented yet. We still use ISO 19114 (no)

Table D. Use of Quality evaluation procedures (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19114 or ISO 19157	46	25	29	2017

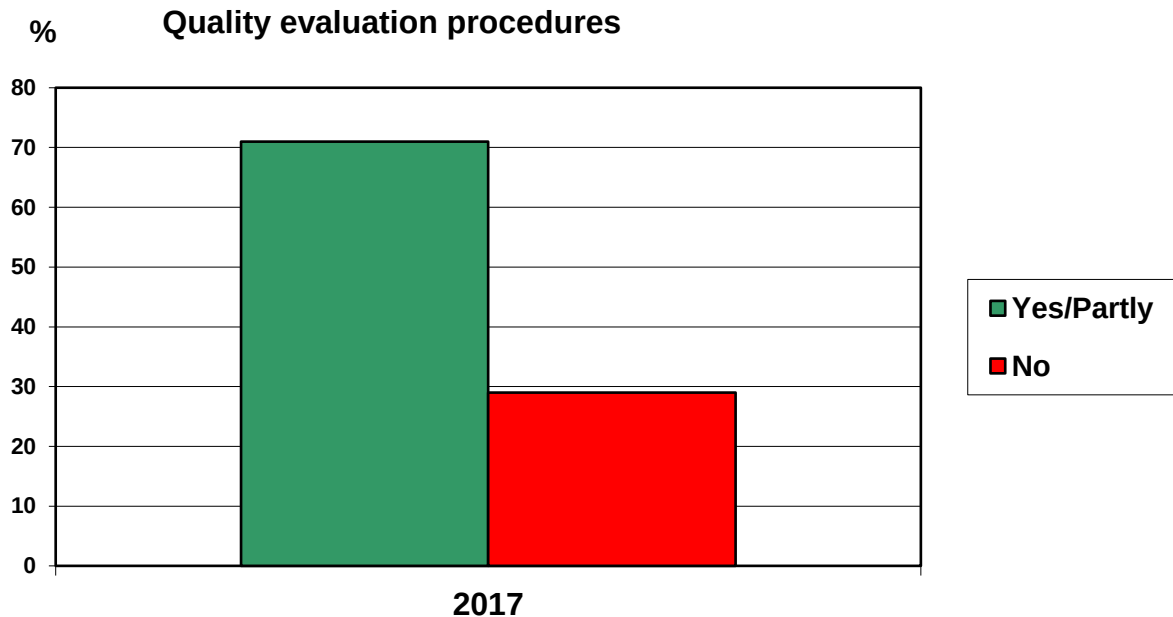


Figure 3. Result from question related to ISO 19114 and ISO 19157

5.4 Using Quality measures

5.4.1 Result

Comments on the question included:

- Only for a certain set of reference data. For thematic data, the usability element is more applicable
- it is not still included in our legal regulation
- We implement NATO STANAG 2215.
- In general terms, yes. We add information about the tested rules in the measure description.
- IGNF does not refer to this section, however de facto the measures used by IGNF are identical to the measures described in this section.
- Based on 19138
- No more. In our institution quality standards are not more necessary. Only NATO STANAG-S.

Table E. Use of Quality measures (original).

Standard	Yes %	No %	Year
ISO/TR 19138 or ISO 19157	50	50	2017

5.4.2 Adjusted result

Here are some examples of comments that changed some of the original answer to *yes* or *partly*. The original answers are in brackets;

- Partially (yes)
- We implement NATO STANAG 2215 (*no*)
- Only for DB at scale 1:25.000. Reference document completed in 2016; practical implementation still under development. (*yes*)

Table F. Use of Quality measures (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19138 or ISO 19157	39	18	43	2017

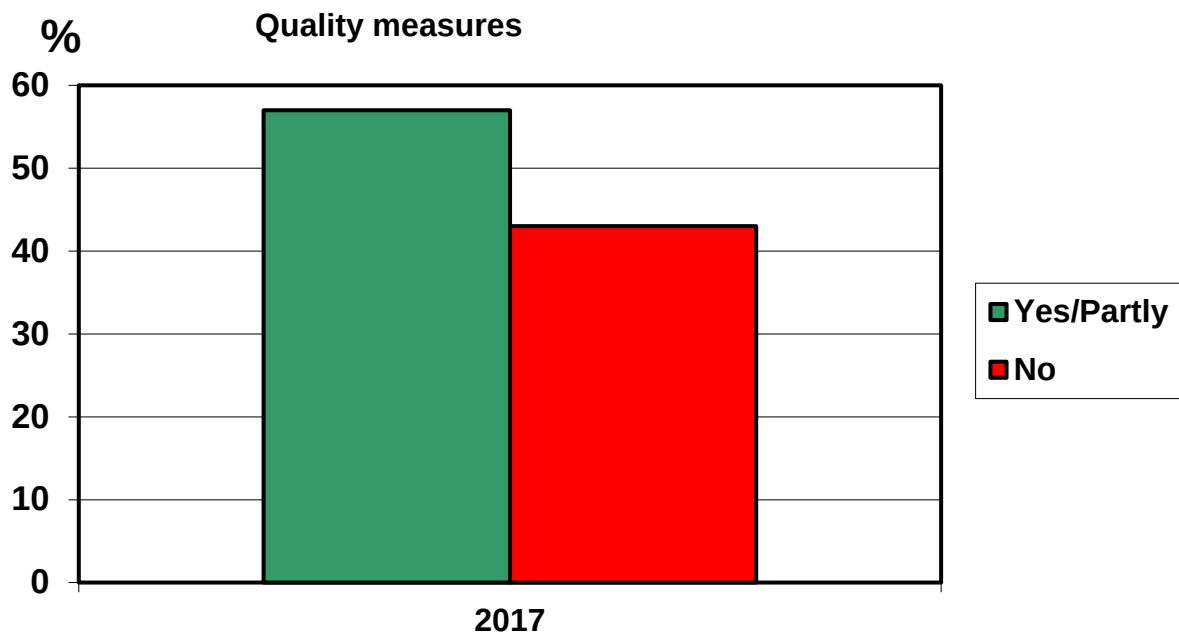


Figure 4. Result from question related to ISO 19138 and ISO 19157

5.5 Using ISO 19115 – Metadata

5.5.1 Result

Comments on the question included:

- YES, Metadata are created and published for CUZK data sets and their series; for webservice, applications and map compositions.
- Switzerland has its own profile of ISO 19115 for Geometadata, called “GM03”, which is also a Swiss norm (SN612050)
- Mostly the elements required according to INSPIRE with the addition of some quality elements.
- INSPIRE metadata system
- It is included in our National metadata profile
- The national geodataportal* still uses the 2003 version. * website with metadata from several authorities
- Reference document completed in 2016; practical implementation still under development.
- Not yet, we use the previous version.
- We use INSPIRE metadata implementation rules. The INSPIRE technical guideline has adopted ISO19115 version from 2003
- Under review. IGN-F uses ISO 19115.
- For metadata linked to INSPIRE datasets, series and services (coupled with ISO 19139)
- We are using Geonetwork metadata editor that support ISO19115/119/110 standards
- Still using 19115:2003 following the lead from Inspire
- We also use the INSPIRE guidelines

Table G. Use of Metadata (original).

Standard	Yes %	No %	Year
ISO 19115 or 19115-1	57	43	2017

5.5.2 Adjusted result

When the comments were analysed, the number of *no*-answers could be reduced to more than a half. Here are some examples of comments that changed some of the original answer to yes or partly. The original answers are in brackets;

- The metadata profile is based on the requirements of the INSPIRE Metadata regulation. (*no*)
- We use INSPIRE metadata implementation rules. (*no*)
- At the moment we are using ISO 19115 from 2003/Cor.1:2006 (*no*)

Table H. Use of Metadata (analysed).

Standard	Yes %	No %	Year
ISO 19115 or 19115-1	82	18	2017

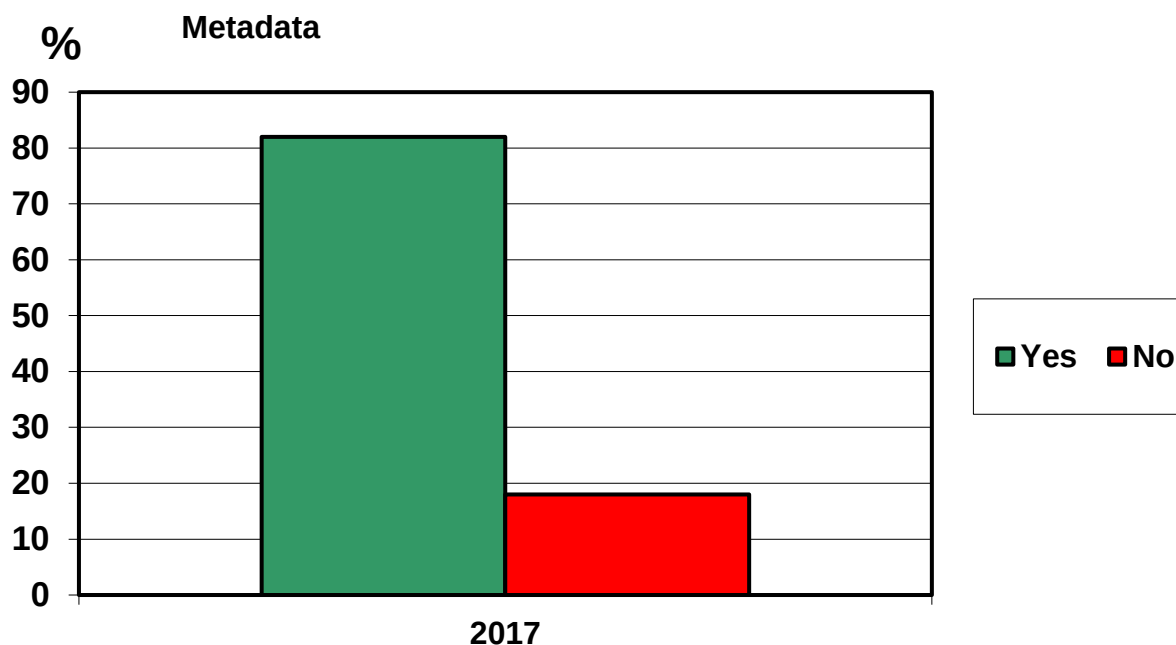


Figure 5. Result from question related to ISO 19115 and 19115-1

5.6 Using ISO 19115-2 - Metadata - Part 2: Extensions for imagery and gridded data

5.6.1 Result

Comments on the question included:

- Not sure, probably not
- We have intention, but still it is not in use
- We use INSPIRE metadata implementation rules. The INSPIRE technical guideline has adopted ISO19115 version from 2003
- We don't produce raster datasets
- We are using Geonetwork metadata editor that support ISO19115/119/110 standards
- We use INSPIRE metadata implementation rules
- Not for the moment
- The state metadata profile is based on the requirements of the INSPIRE Metadata regulation.
- Our new imagery product (Orthoimagery, DEM and aerial photos) has metadata in compliance with the INSPIRE Directive

Table I. Use of ISO 19115-2 (original).

Standard	Yes %	No %	Year
ISO 19115-2	39	61	2017

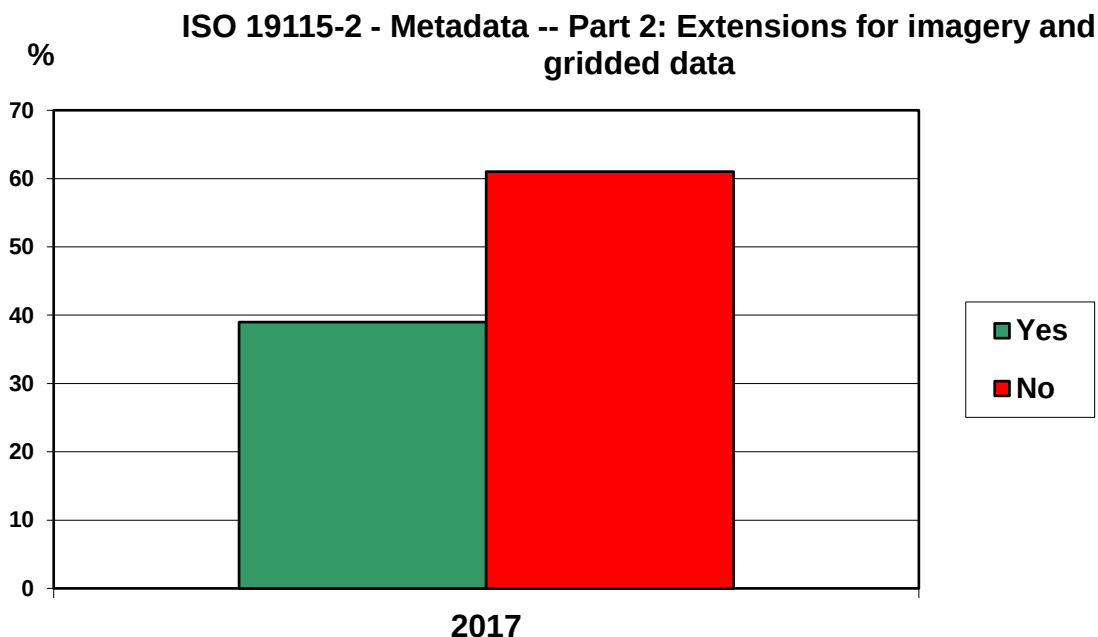


Figure 6. Result from question related to ISO 19115-2

5.6.2 Adjusted result

The comments made no change in the result.

5.7 Using Metadata for Services

5.7.1 Result

Comments on the question included:

- YES, in compliance with the INSPIRE requirements
- geoservices: <https://www.ech.ch/vechweb/page?p=dossier&documentNumber=eCH-0056&documentVersion=3.0>
- The metadata has been removed from ISO 19119 and added to ISO 19115-1. And yes, we have metadata on services
- partly (as they are part of OGC standards)
- Partly
- Yes, in INSPIRE services' metadata. The INSPIRE technical guideline is based on version 2005
- For mapping services (wms/wfs)
- We are using Geonetwork metadata editor that support ISO19115/119/110 standards
- As part of Inspire
- We use INSPIRE metadata implementation rules.
- We also use the INSPIRE guidelines
- The state metadata profile is based on the requirements of the INSPIRE Metadata regulation.

Table J. Use of Metadata for Services

Standard	Yes %	No %	Year
ISO 19119	64	36	2017

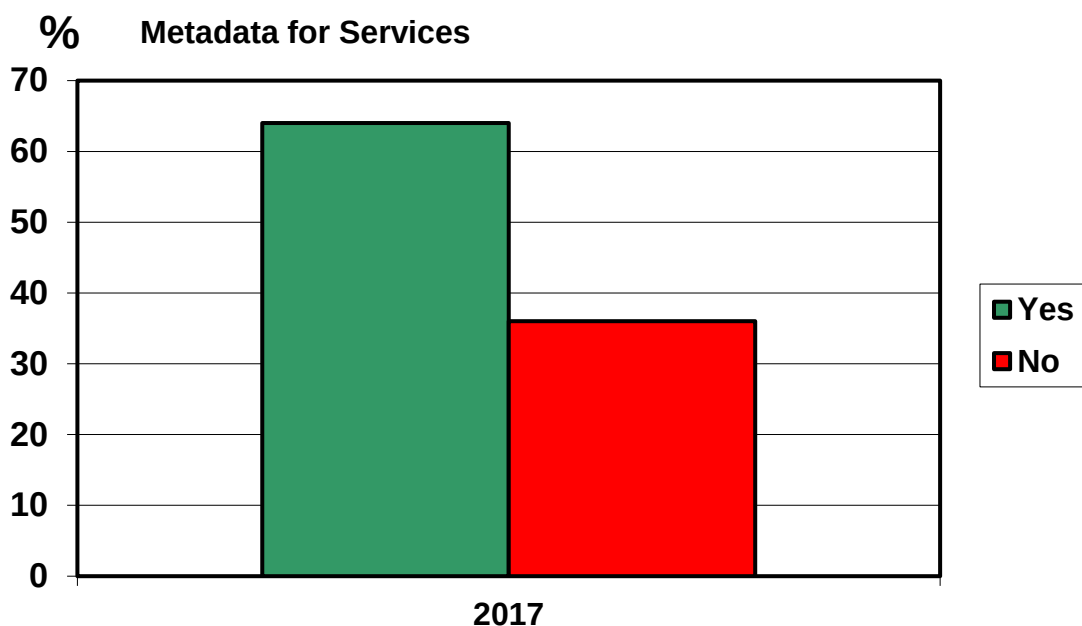


Figure 7. Result from question related to ISO 19119

5.7.2 Adjusted result

The comments made no change in the result.

5.8 Using ISO 19131 - Data product specifications

5.8.1 Result

Comments on the question included:

- We have made a national standard (see previous comment) that is based upon ISO 19131. We are working on creating product specifications for all products that constitutes the essential part of the infrastructure.
- Specification of contents basic topographic model has been produced in line with 19100.
- Documentation for internal use and for external specifications in the social structure area
- Under review

Table K. Use of ISO 19131 (original).

Standard	Yes %	No %	Year
ISO 19131	32	68	2017

5.8.2 Adjusted result

- No more. In our institution quality standards are not more necessary. Only NATO STANAG-s. (no)
- Partially (yes)

Table L. Use of ISO 19131 (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19131	29	7	64	2017

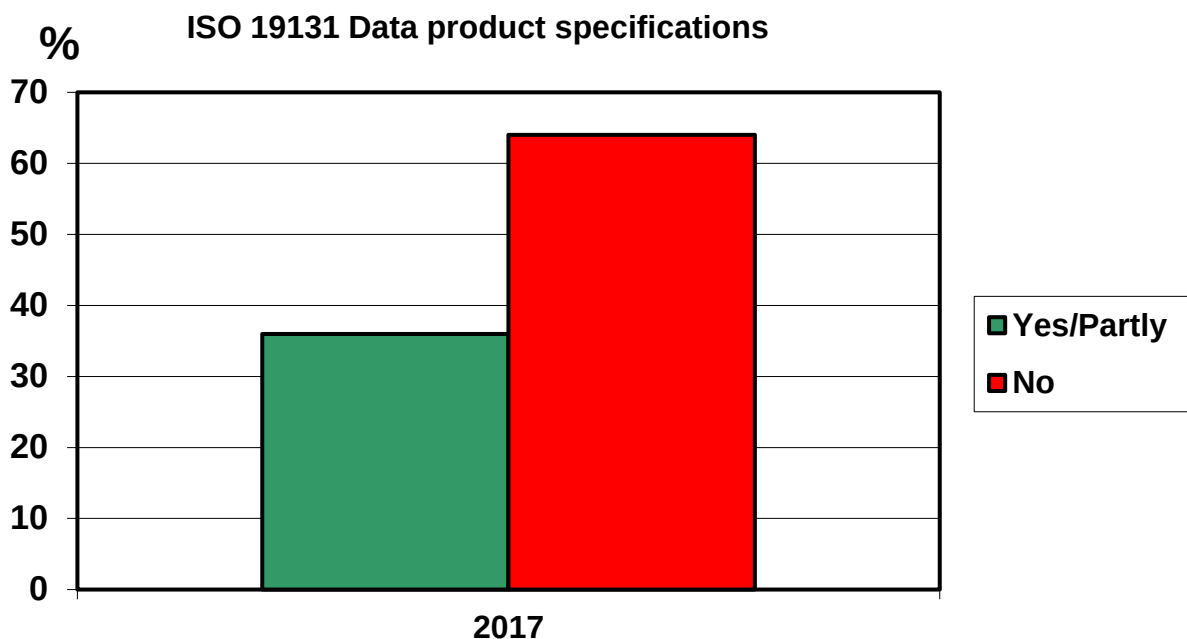


Figure 8. Result from question related to ISO 19131

5.9 Using Guidelines for Implementing the ISO 19100 Geographic Quality Standards

5.9.1 Result

Comments on the question included:

- Partially (yes)
- Only read
- We have used it only as part of EG-s production process.
- We haven't used it yet. But we plan to examine and benefit from it.
- Although the document has not been used specifically, we take into account the discussions and shared experiences about it in the QKEN.
- IGN-F helped in drafting this guide.

Table M. Use of Guidelines (original).

Standard	Yes %	No %	Year
ISO 19119	39	61	2017

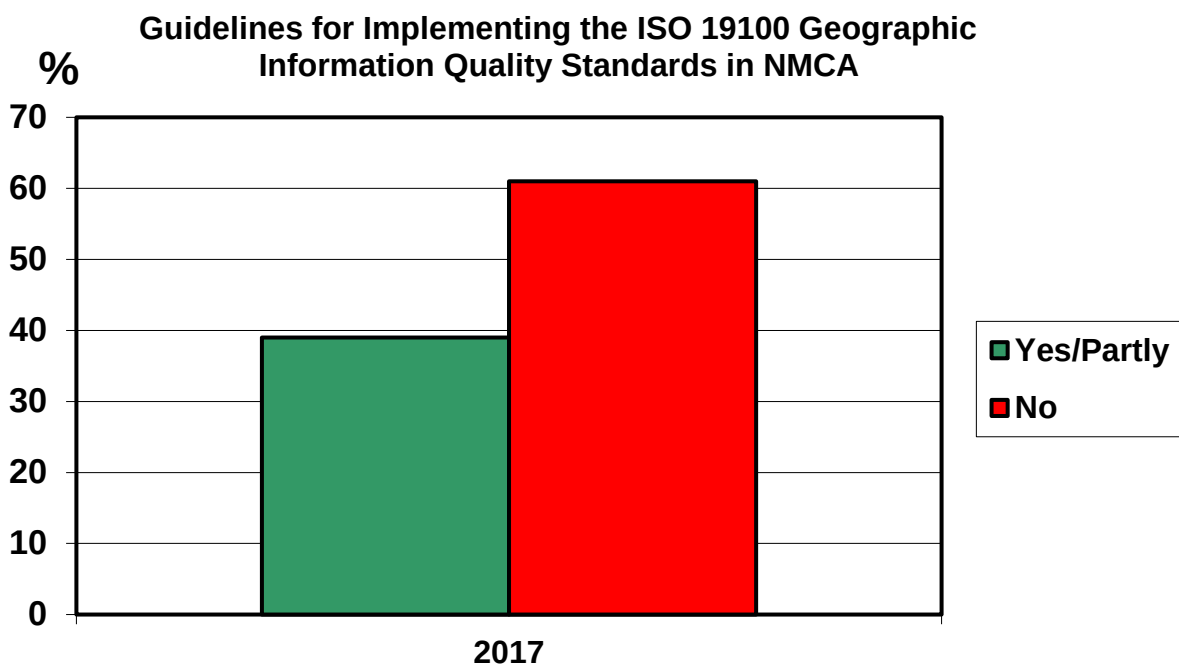


Figure 9. Result from question related to the Guidelines document

5.10 ISO/TS 19158 Quality assurance of data supply

5.10.1 Result

Comments on the question included:

- Partially.
- It is not still included in our legal regulation; we have used it only as part of EG-s production process.
- We use our own procedure, established before the ISO standard development.
- Recent standard not yet implemented in IGN-F.
- We are considering it for the near future
- No more. In our institution quality standards are not more necessary. Only NATO STANAG-s.

Table N. Use of Quality assurance of data supply (original)

Standard	Yes %	No %	Year
ISO/TS 19158	11	89	2017

5.10.2 Adjusted result

The comments:

- Partially. (yes)
- It is not still included in our legal regulation; We have used it only as part of EG-s production process. (no)

Table Q. Use of Quality assurance of data supply (analysed)

Standard	Yes %	Partly %	No %	Year
ISO/TS 19158	4	14	82	2017

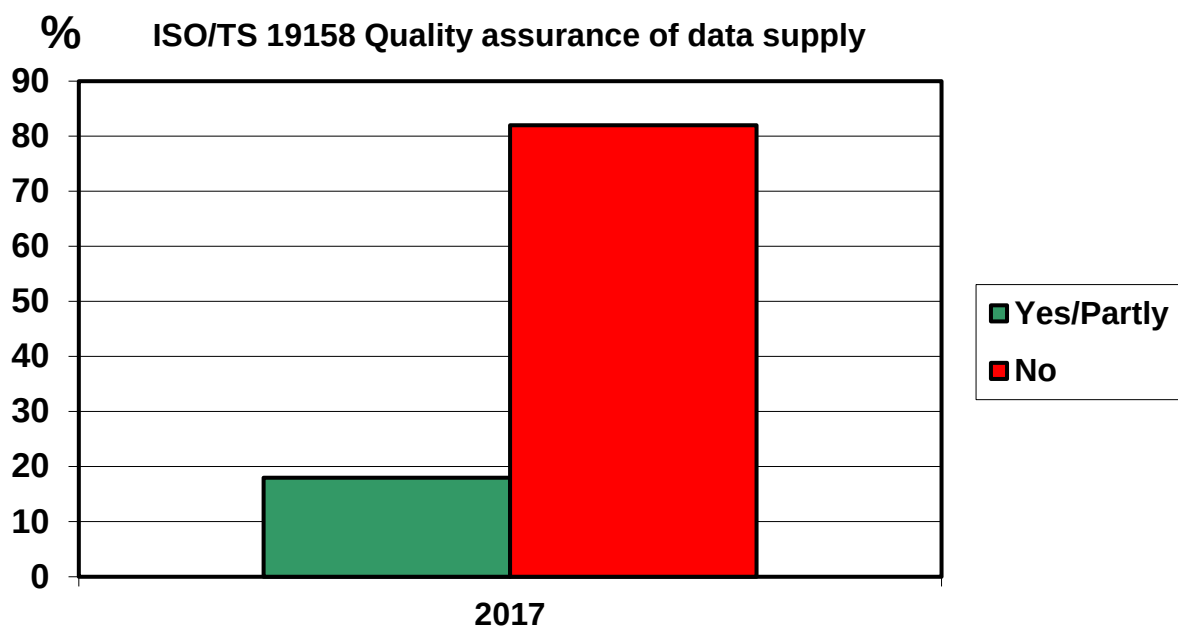


Figure 10. Result from question related to ISO/TS 19158

5.11 Documentations of work with implementation of standards

Table R. Implementation documents

Documentation	Yes %	No %	Year
	43	57	2017

- Not yet. The Q tests are described, but not specifically with focus on the standards. Nevertheless, such “mapping” is foreseen.
- Switzerland knows its own suite of standards for E-Government, called e-ch (<https://www.ech.ch/vechweb/page>) There you'll find standards for
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 - data exchange: <https://www.ech.ch/vechweb/page?p=dossier&documentNumber=eCH-0031&documentVersion=2.0>
 - geoservices: <https://www.ech.ch/vechweb/page?p=dossier&documentNumber=eCH-0056&documentVersion=3.0>
 - geocategories: <https://www.ech.ch/vechweb/page?p=dossier&documentNumber=eCH-0056&documentVersion=3.0>
 available in German and French.
- https://www.kartverket.no/globalassets/standard/sosi-standarden-del-1-og-2/sosi-standard-del-1/5.0/sosi-produktspesifikasjoner_krav_og_godkjenning_5.0.pdf We have a metadata profile with a template. Ongoing update for the 2014 version. Template for the specification

- Only for internal use.
- Mainly templates for metadata file and for the product specifications.
- "DC Metadonnees" describing how to implement metadata. "Guide d'implementation de la qualite pour les donnees vecteurs".
- Only on the implementation of 19158. Limited on others
- MSZ 7772-1 (Digital Base Map, Conceptual Model) it based by ISO and CEN standards. This data model is used in Land Administration Network Services for Cadastral maps.
- Creation of a quality management manual is in progress
- At the moment they're working documents. They change often.
- Includes i) Quality plan in compliance with ISO 10005, ii) Quality control procedures, iii) Quality Model for cadastral parcels (in compliance with ESDIN project), iv) Work Breakdown Structure (WBS), v) Workflows, vi) standardized checklists and quality reports, vi) Work Instructions

5.12 Reference documents for work with implementation of standards

Table S. Reference documents

Reference documents	Yes %	No %	Year
	32	68	2017

- Switzerland knows its own suite of standards for E-Government, called e-ch (<https://www.ech.ch/vechweb/page>)
- We are working on a mapping from Quality as described in ISO 19157 to quality dimensions as formalised in DQV (Data quality Vocabulary - W3C), with the intention of being an extension of DCAT.
- A user guide for implementing the specification standard, and it is available in English.
- Documentation test set for INSPIRE, for administrative units, addresses, geographical names. <http://professionnels.ign.fr/inspire-telechargement>
- Only an Icelandic feature catalogue, but I am not sure if that is interesting in this context.
- Specification of governmental acceptance about the quality control of aerial photos, orthoimageries and the connected work process
- Process management documents
- a) Orthoimagery and DEM quality control procedures b) Field measurements procedures (using FGDC Geospatial Positioning Accuracy Standards - Part 3: National Standard for Spatial Data Accuracy

Two members have information in English

- Sweden have a handbook for the use of ISO 19131 Data product specification: SIS-TR 40:2015 Geographic information – Technical framework – Manual for data product specification. It is available for free at <https://enav.sis.se/en/Standard/?std=STD-8017694>
- Norwegian Mapping Authority are working on a mapping from Quality as described in ISO 19157 to quality dimensions as formalized in DQV (Data quality Vocabulary - W3C), with the intention of being an extension of DCAT. There are English descriptions in the document, this work is intended to be finished before summer.

5.13 Contact persons for issues concerning ISO 19100

Only three organisations stated that they do not have a contact person in relation to the ISO TC 211 standards on geographic information.

Table T. Relevant contact person available

Contact person	Yes %	No %	Year
	89	11	2017

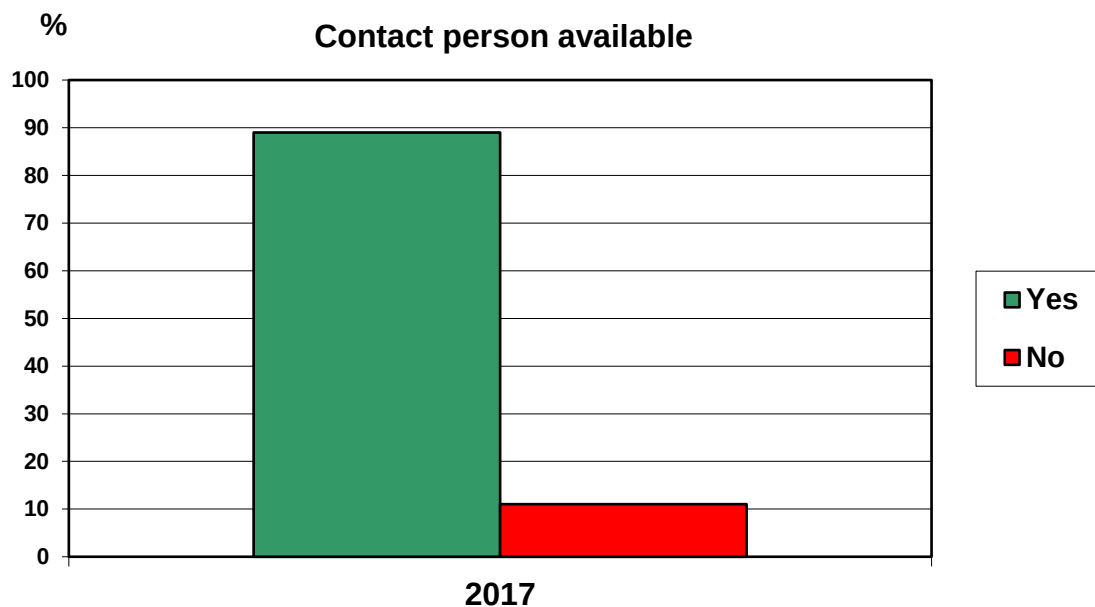


Figure 11

6 Comparison with previous questionnaires

6.1 Introduction

The comparison of the responses with previous surveys has been limited to those countries that responded in 2017 and also responded in either 2011 or 2004. Where countries responded to both previous surveys then their most recent survey has been used for analysis and comparison. In a very small number of instances, (Estonia, Slovakia and Slovenia) comparison has been made with the 2004 survey as they didn't respond to the survey in 2011.

The countries involved in these comparisons can be seen in the map below.

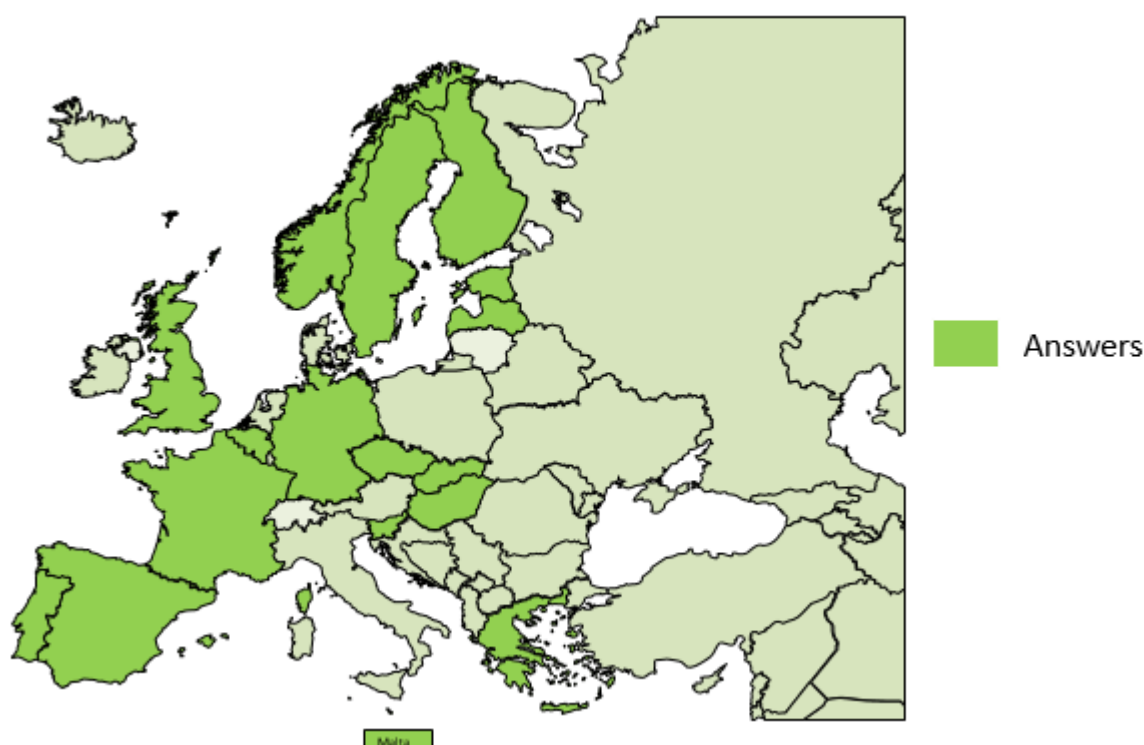


Figure 12. Nations with members included in the comparison

There are some differences in the questionnaires.

- The use of 19158 was new in the latest survey and therefore cannot be compared.
- The questions about the use of the guidelines document, metadata for coverage and quality measures was new in the questionnaire in 2011, so the three members whose comparisons come from 2004 have not answered them.
- The question about use of metadata for services was sent out separately to the questionnaire and the members answering that differ from the other responders.

6.2 Comparison: Use of Quality principles

In this group it is now evident that the majority of members use this standard than those that do it partly or not at all. There is still a small minority that don't use it at all.

Table T. Use of Quality principles, members answering several times

Standard	Yes %	Partly %	No %	Year
19113 or	53	41	6	2011
19157	76	18	6	2017

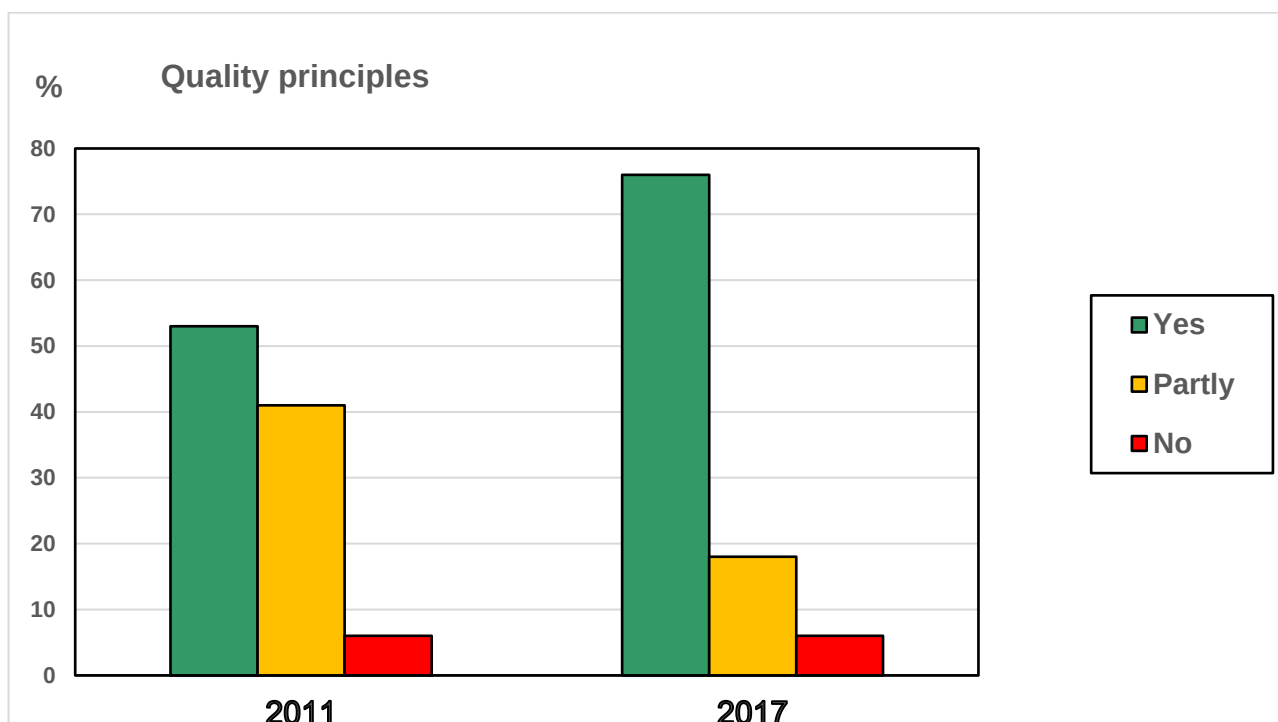


Figure 13. Result from question related to ISO 19113 and 19157.

6.3 Comparison: Use of Quality evaluation procedures

If we look at the change in use for those members that answered both times there is an increase in use but the members that use it partly are still approximately a third of the total

Table U. Use of ISO 19114 (analysed) members answering both times

Standard	Yes %	Partly %	No %	Year
ISO 19114 or 19157	47	35	18	2011
	59	35	6	2017

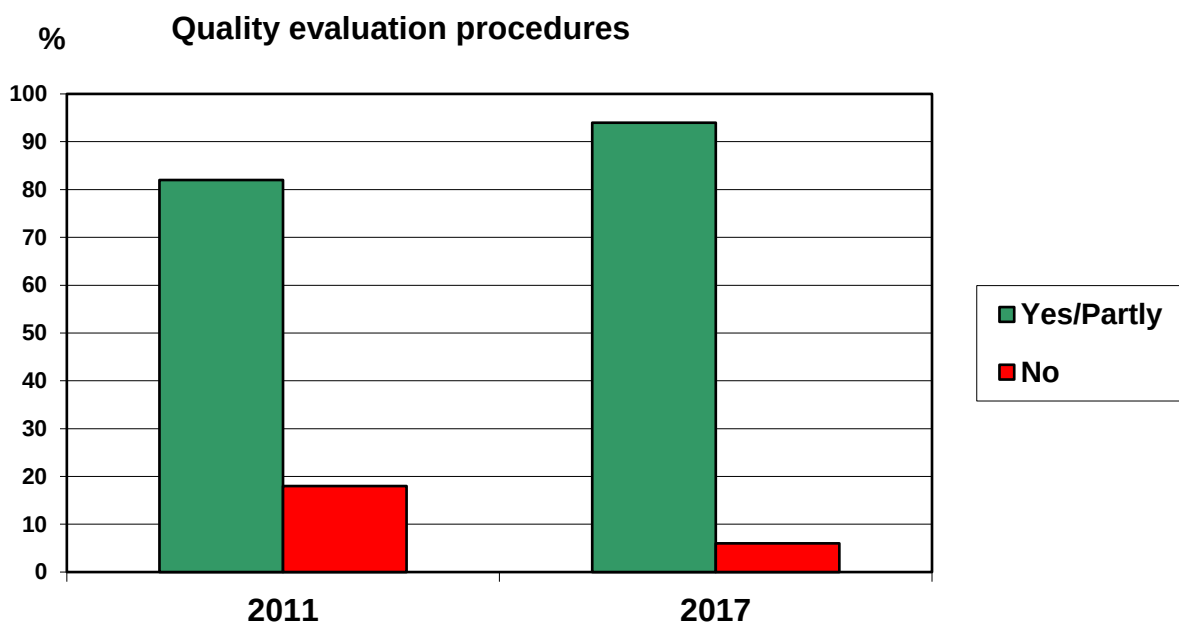


Figure 14. Result from question related to ISO 19114 and 19157.

6.4 Comparison: Use of Metadata

The number of countries that use this standard has increased with the majority now using it. A number of countries have now fully adopted the standard. This may be as a result of INSPIRE.

Table V. Use of Metadata (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19115	59	17	24	2011
or 19115-1	88	0	12	2017

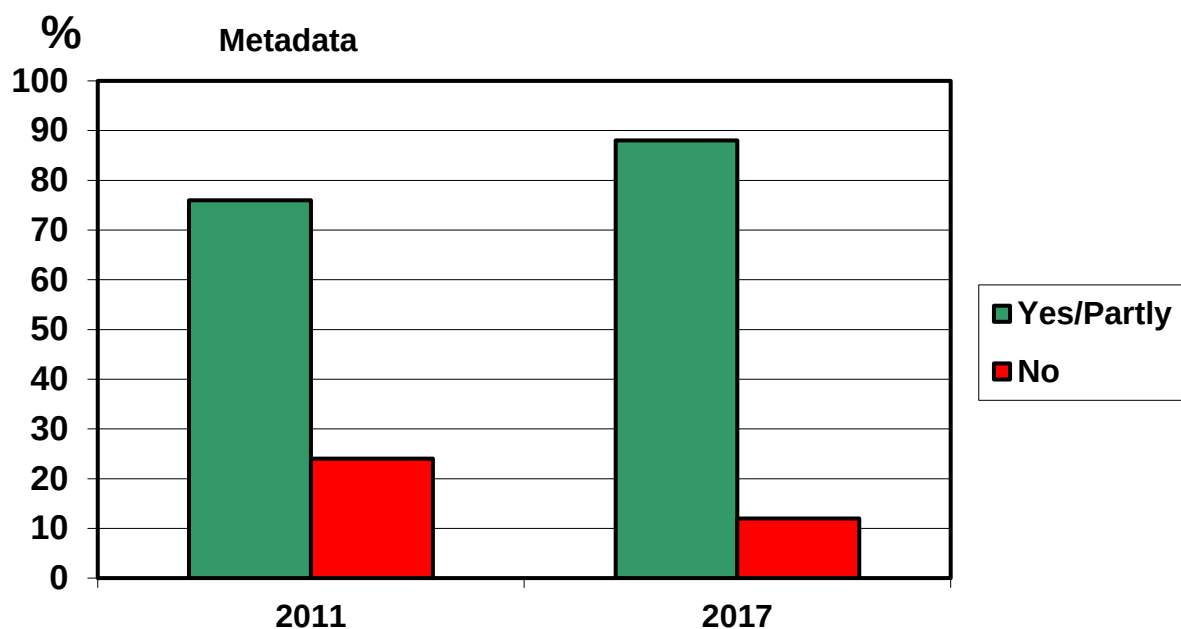


Figure 15. Result from question related to ISO 19115 or 19115-1.

6.5 Comparison: Quality measures

This question was not included in the 2004 questionnaire. The results show a very slight increase in use.

Table W. Use of Quality measures (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19138	50	21	29	2011
or 19157-1	65	21	14	2017

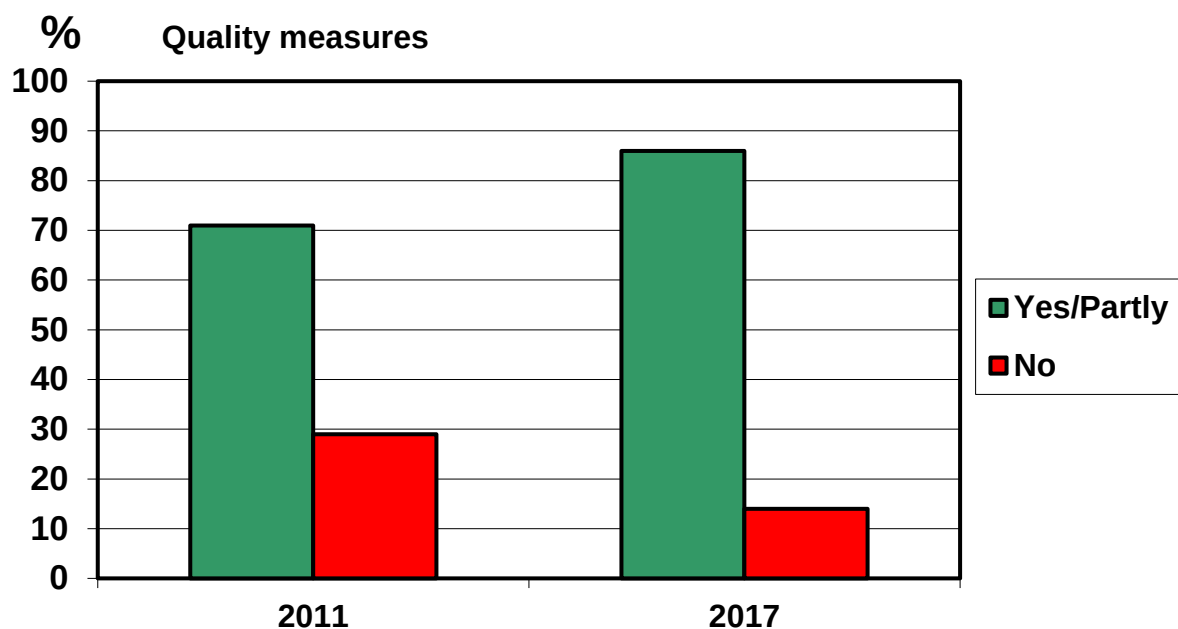


Figure 16. Result from question related to ISO 19138

6.6 Comparison: Metadata -- Extensions for imagery and gridded data

The results show that a greater percentage of countries are now using this standard.

Table X. Use of ISO 19115-2 (analysed).

Standard	Yes %	Partly %	No %	Year
ISO 19115-2	29	0	71	2011
	50	7	43	2017

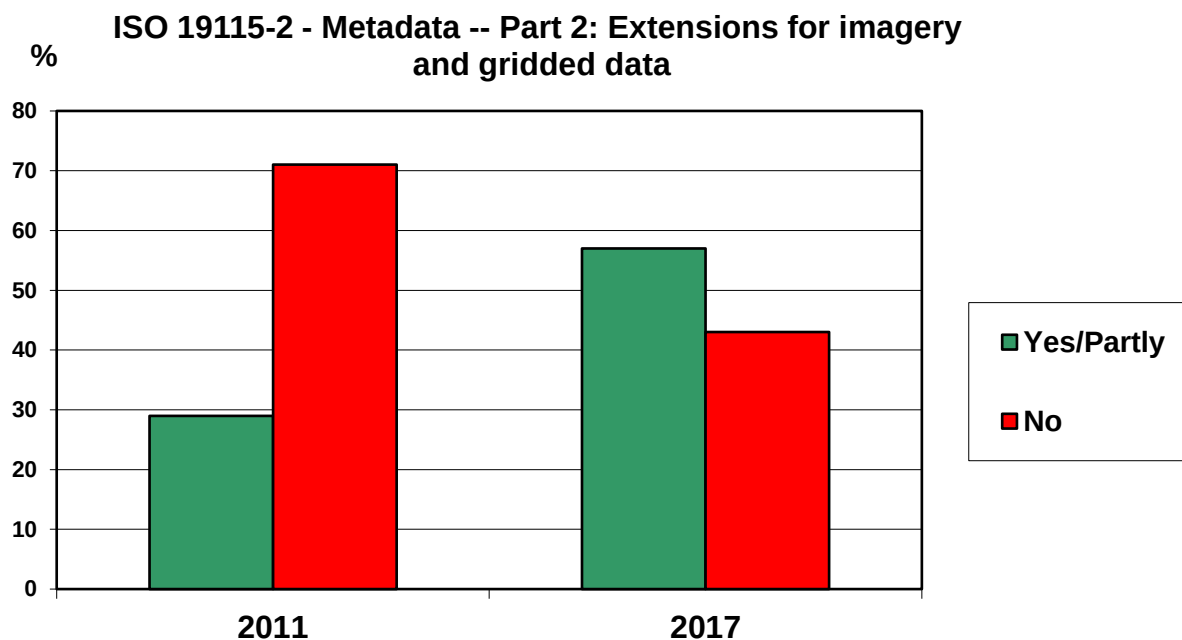


Figure 17. Result from question related to ISO 19115-2

6.7 Comparison: Data product specifications

The results here are quite interesting as it reveals one of the few standards where usage has decreased. It may be the case that the percentage decrease is down to more organisations replying and those new responses all being in the 'No' category.

Table Y. Use of Data product specifications (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19131	50	21	29	2011
	29	7	64	2017

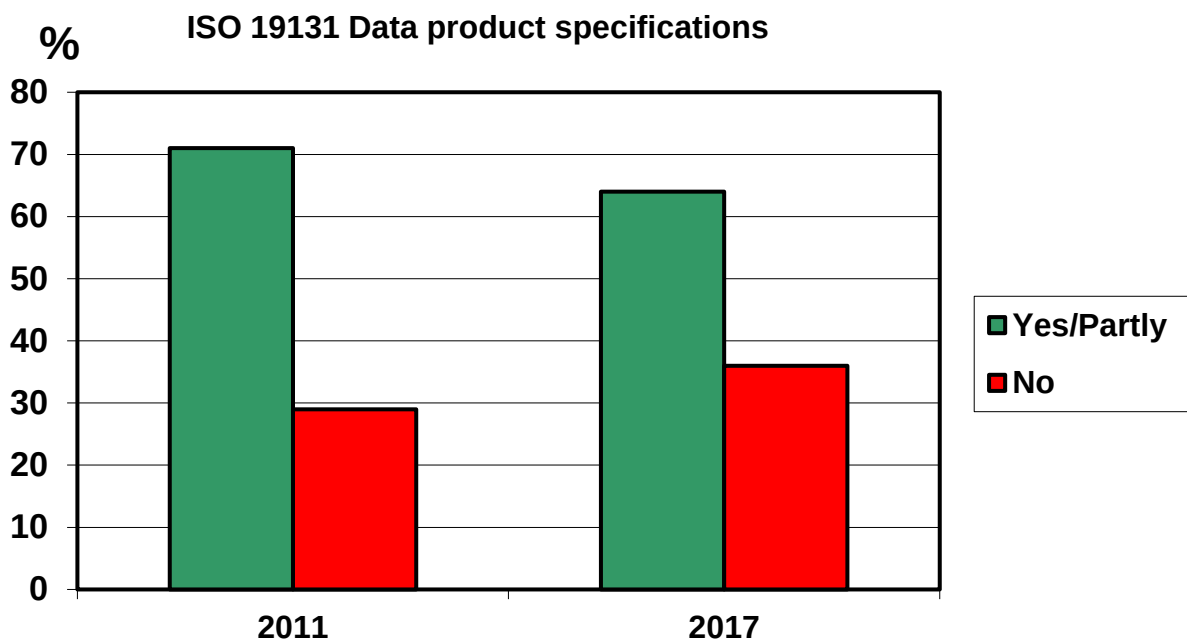


Figure 18. Result from question related to ISO 19131

6.8 Comparison: Guidelines for Implementing the ISO 19100 Geographic Quality Standards

This question shows no change from the previous survey. This is possibly an indication that the guidelines need updating (currently in progress).

Table Z. Use of Guidelines (analysed)

Handbook	Yes %	Partly %	No %	Year
Guidelines	57	7	36	2011
	57	7	36	2017

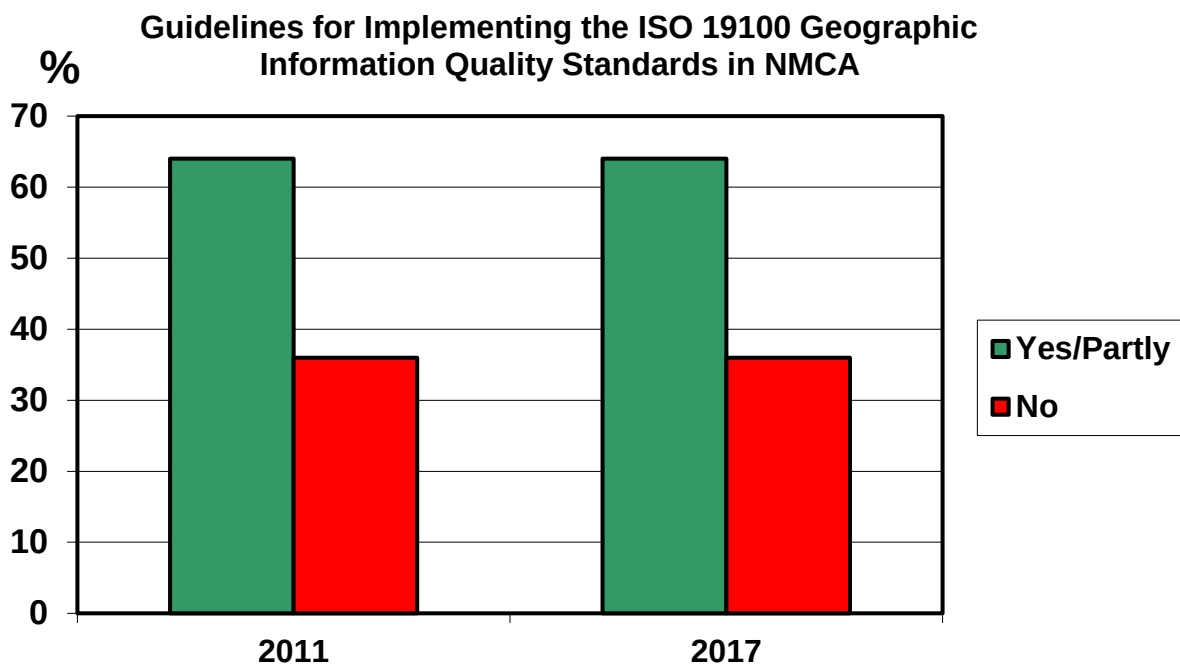


Figure 19. Result from question related to the Guidelines document

6.9 Comparison: Using Metadata for Services

This standard was introduced after the 2004 questionnaire and was not included in the questionnaire 2011 at first. For that reason, the question regarding the use of the metadata part of this standard was sent out by its own afterwards. That led to that the members that answered this question differ from the other questions, 15 members: Austria, Belgium, Czech Republic, Great Britain, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Norway, Poland, Portugal, Spain and Sweden answered.

The comments did not lead to any changes from 'no' to 'partly'. There is a significant increase in the use of the standards though which is almost certainly down to the adoption of the INSPIRE directive.

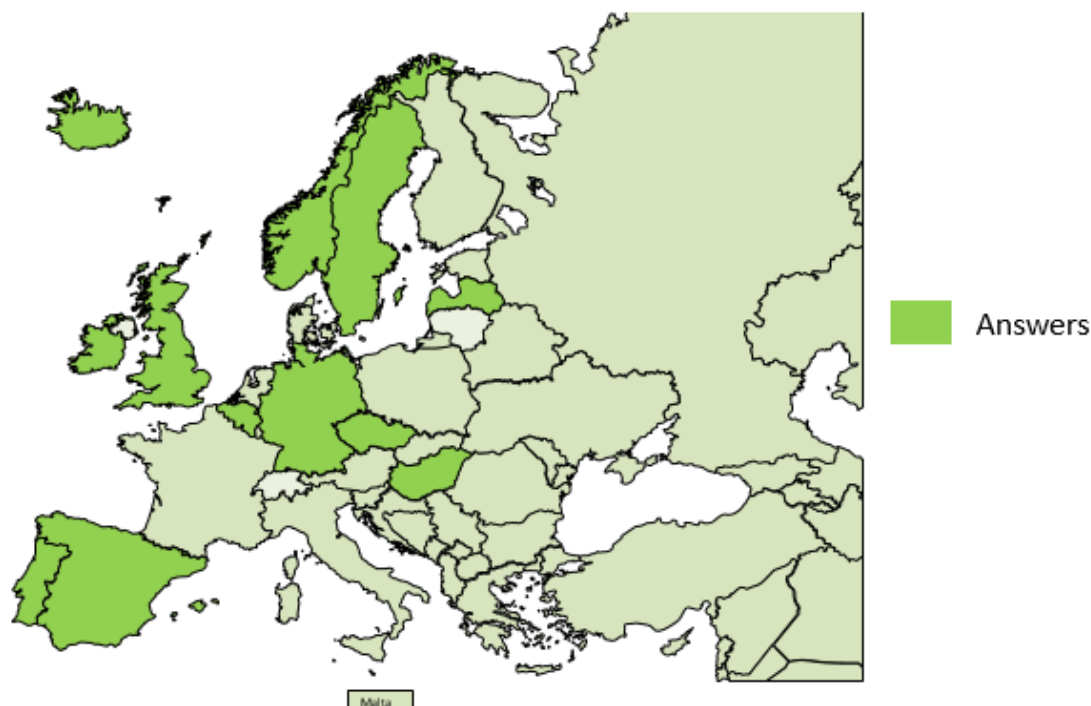


Figure 20. Overview of nations participating 2011

Table AA. Use of Metadata for Services

Standard	Yes %	No %	Year
ISO 19119	75	25	2011
or 19115-1	92	8	2017

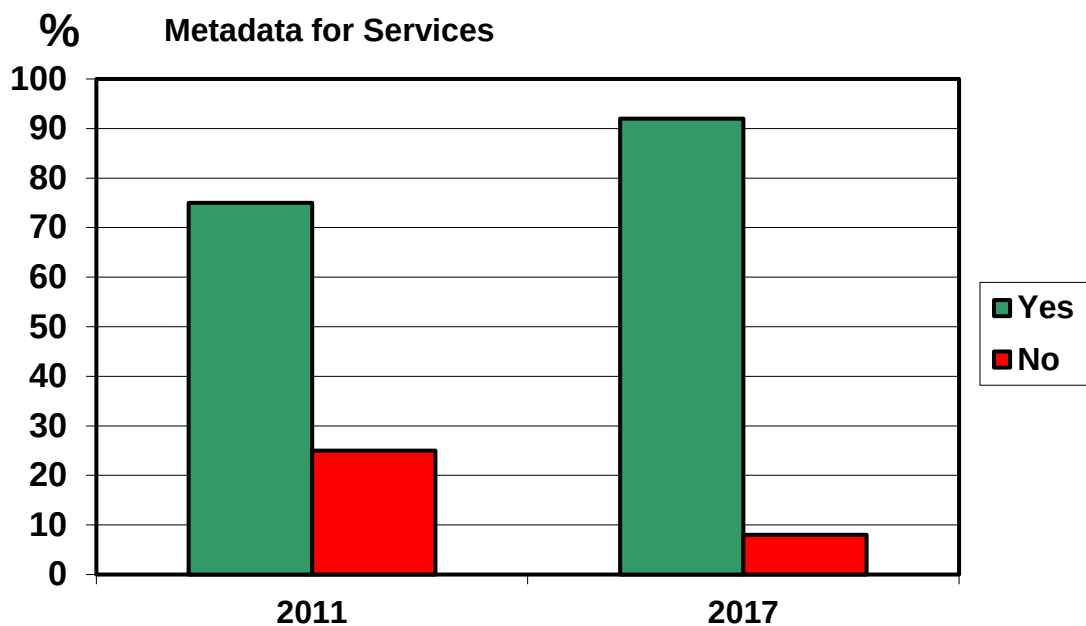


Figure 21. Result from question related to metadata for services

6.10 Comparison Summary

It is clear from the results and comparison above that nearly every standard has seen an increase in use since the last survey. This can only be down to the adoption of INSPIRE in many European countries and the spreading of best practise through organisations such as the EuroGeographics Quality Knowledge Exchange Network.

Appendix A - Questionnaire 2017

Q-KEN: Use of ISO 19100 Geographic information quality standards in NMCAs - 2017

1.

The EuroGeographics Quality Knowledge Exchange Network (QKEN) has run two surveys in the past, in 2004 and 2012, on the use of ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Authorities (NMCAs). The results and reports from this work are available at the website. The original 2004 survey was the basis for drafting the document "Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies".

In order to get a current overview of the use of ISO Standards in NMCAs, the QKEN hopes that you can answer this updated questionnaire. There have been some changes in the standards in use today so please make a comment if you are still implementing previous versions of the standards. A question on the use of the guidelines document is also included.

If you have decided not to implement any of the standards indicated in this questionnaire, please include your reasons for not doing so in the comments sections.

It should take no more than 15 minutes to complete this questionnaire.

Thank you for responding to this questionnaire.

Jonathan Holmes
Chair of the Quality Knowledge Exchange Network

Q-KEN: Use of ISO 19100 Geographic information quality standards in NMCAs - 2017

2.

* 1. What is the name of your organisation?

* 2. Is your NMCA using the section on Quality Principles in ISO 19157? (Formerly ISO 19113)

☐ Yes

☐ No

Comment

* 3. Is your NMCA using the section on Quality Evaluation Procedures in ISO 19157? (Formerly ISO 19114)

☐ Yes

☐ No

Comment

* 4. Is your NMCA using the section on Data Quality Measures in ISO 19157? (Formerly ISO/TR 19138)

☐ Yes

☐ No

Comment

* 5. Is your NMCA using ISO 19158 Quality Assurance Of Data Supply?

☐ Yes

☐ No

Comment

* 6. Is your NMCA using ISO 19115-1 Metadata?

☐ Yes

☐ No

Comment

* 7. Is your NMCA using ISO 19115-2 - Metadata Part 2: Extensions for imagery and gridded data?

☐ Yes

☐ No

Comment

* 8. Is your NMCA using the Metadata section of ISO 19119 - Services?

☐ Yes

☐ No

Comment

* 9. Is your NMCA using ISO 19131 (Data Product Specifications)?

☐ Yes

☐ No

Comment

* 10. Do you have reference documents that describe how the standards are implemented?

☐ Yes

☐ No

Comment

* 11. Do you have these reference documents in English?

☐ Yes

☐ No

Comment

* 12. Do you have further reference documents that could be of an interest to other NMCAs?

☐ Yes

☐ No

Comment

* 13. Do you have these reference documents in English?

☐ Yes

☐ No

Comment

* 14. Have you used the document "Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies"?

☐ Yes

☐ No

Comment

* 15. Who is your contact person for issues concerning ISO 19100?

Name

e-mail

Q-KEN: Use of ISO 19100 Geographic information quality standards in NMCAs - 2017

3.

Thank you for participating in the survey.