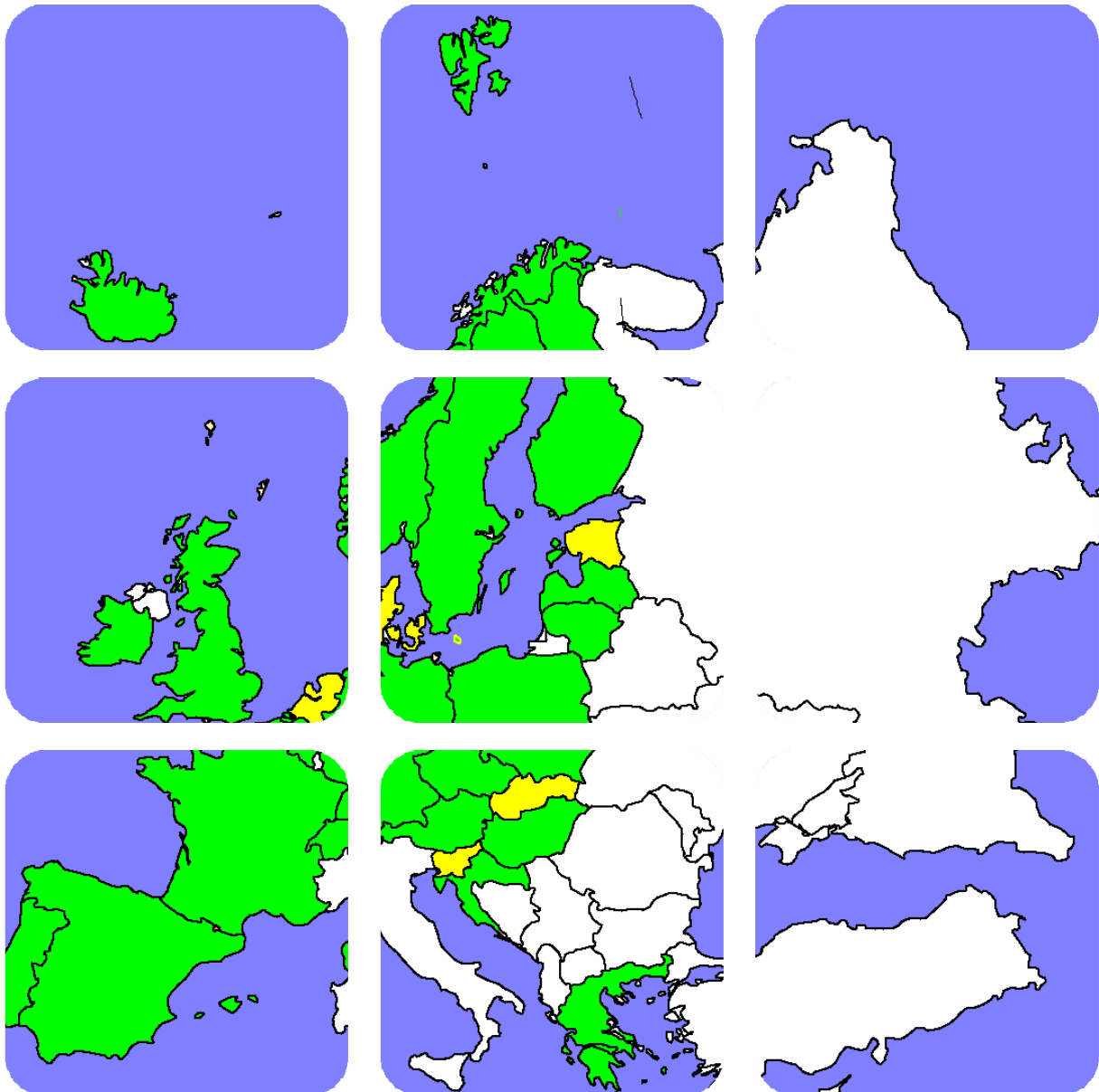


Use of the ISO 19100 Quality standards at the NMCAs

Results from questionnaires taken in 2004 and 2011

Eurogeographics Quality Knowledge Exchange Network



Reference:

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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 are now utilizing parts of the standards.		
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1 Executive Summary

EuroGeographics vision is to achieve interoperability of European mapping and other GI data. To achieve interoperability of geographic data the use of standards is an important issue. In November 2003 the Expert Group on Quality decided that a survey concerning the member's use of the data quality standards for Geographic data was required. As a result of the comments in the answers to that work a guide line document was developed describing how to use the standards. In 2011, the now renamed Quality Knowledge Exchange Network (Q-KEN), decided that a follow-up of the use of the standards should be done. In the intervening period further quality related standards have been released and these are included in this follow-up.

The result this time shows that most of the members are now using the three main data quality standards (ISO 19113, 19114 and 19115) and that the guidelines document produced by Eurogeographics has been used by a number of countries. For the newer standards the use is less and there are about half of the members using them today. The positive impact of the Inspire project is evident on the result.

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3 Background

At the plenary meeting with EuroGeographics (EGG) expert group of quality (Q-KEN) in November 2003 it was decided that a questionnaire concerning member countries use of data quality standards was to be carried out. The result was published in the report "Use of the ISO 19100 Quality standards at the NMCAs." At a Co-ordinating Committee meeting in 2010 it was decided that a follow-up exercise should be carried out. The original questionnaire was added to with some questions about the use of the guide *Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies*. This document was produced as a result of the comments received in the original questionnaire. Also included were questions about the new standards in this domain. The questionnaire was sent to all members of Q-KEN representing 26 organisations from 25 countries.

The main objective with the questionnaire was to find out if there has been a change in the use of the quality standards, ISO 19113 Quality principles, 19114 Quality evaluation procedures, 19115 Metadata and if the guideline document had been useful.

A supplementary questionnaire asking for the use of the metadata as described in the ISO 19119 Services was sent out later. The number of responses on that questionnaire was less, but with some newer members answering this.

Christina Wasström and Gunhild Lönnberg analysed the responses to the questionnaire. The results were presented and discussed at the plenary meeting in May 2011 and a decision was taken to make a report of the result.

4 Scope of the documents in the questionnaire

4.1 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.

4.1.1 ISO 19113 Quality principles

This standard 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.

4.1.2 ISO 19114 Quality evaluation procedures

This standard 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.

4.1.3 ISO 19115 Metadata

This standard 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 provide information about an organization's databases to others. It includes the model for reporting the data quality described in ISO 19113.

4.1.4 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.

4.1.5 ISO 19119 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.

4.1.6 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.

4.1.7 ISO 19138 Quality measures

This Technical Specification 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.

4.2 Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies

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 Result from the questionnaires

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 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 a possibility 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, and 18 members answered this time. Ten of them have answered both times; 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.

The results for the questions asked both times are divided into three categories; a straight comparison between the results from 2004 and 2011; a comparison between the “adjusted” results from 2004 and 2011 and a comparison between the results that were obtained from the ten countries that answered both questionnaires.

In the additional question about the use of the service standard there were answers 15 members: Austria, Belgium, Czech Republic, Great Britain, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Norway, Poland, Portugal, Spain and Sweden.

5.2 Using ISO 19113 - Quality principles

5.2.1 Result

The result for the first question; “Are your NMA using ISO 19113 (Quality principles)?” is that almost all organisations say that they use the standard. In comparison the 2004 results showed that only half of the organisations used the standard.

Table A. Use of ISO 19113 (original answers)

Standard	Yes %	No %	Year
ISO 19113	47	53	2004
	89	11	2011

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. Several members had used the standard partly in some way and others were working towards using it. Here are some examples of comments that changed some of the original answers to *partly*. The original answers are in brackets;

- “More *no* than yes, but it was used for creation of data quality model of topographical basic map.” (No)
- “Use the standard ENV 12656:1999 which has been mostly included in ISO 19113”. (No)
- “Some of our datasets have *acceptable quality levels* that are based upon the ethos of the ISO standard.” (No)
- “No direct use, but the principles of it is taken in account.” (No)
- “Not entirely” (Yes)
- “Partly, under development.” (Yes)
- “Used the standard to support the evaluation of the conversion software.” (Yes)
- “Parts of the standard were used when creating a new conceptual data model.” (Yes)

When the comments were included and the answers were divided into three categories it shows that most of the members were using the ISO standard 19113 in some way. Just 20 per cent of those who answered the questionnaire were not using the standard.

This is confirmed in this follow up where only 11 % say that they do not use the standard. And this time the comments about partly are from some of those who have answered yes.

- “Quality models concerning topographic products are based on standards in sense that mainly the same elements are included. Starting point has, however, not been these standards but general national needs” (Yes)

- “ISO 19113 quality principles are very similar to legacy internal quality principles.” (Yes)
- “No comparison was done so far between the used quality principles and the content of ISO 19113” (No)
- “Research and application” (Yes)
- “Parts of the organisation” (Yes)
- “Elements of the standard are incorporated within internal quality principles” (Yes)
- “ISO 19113 quality principles are partially implemented by the cadastral and cartographic data acquisition technical specifications in force.” (Yes)

Table B. Use of ISO 19113 standard (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19113	20	60	20	2004
	67	22	11	2011

When combining the yes- and the *partly*-answers, it was clear that most of the members had at least and now in 2011 most of them are using it, see Figure 1.

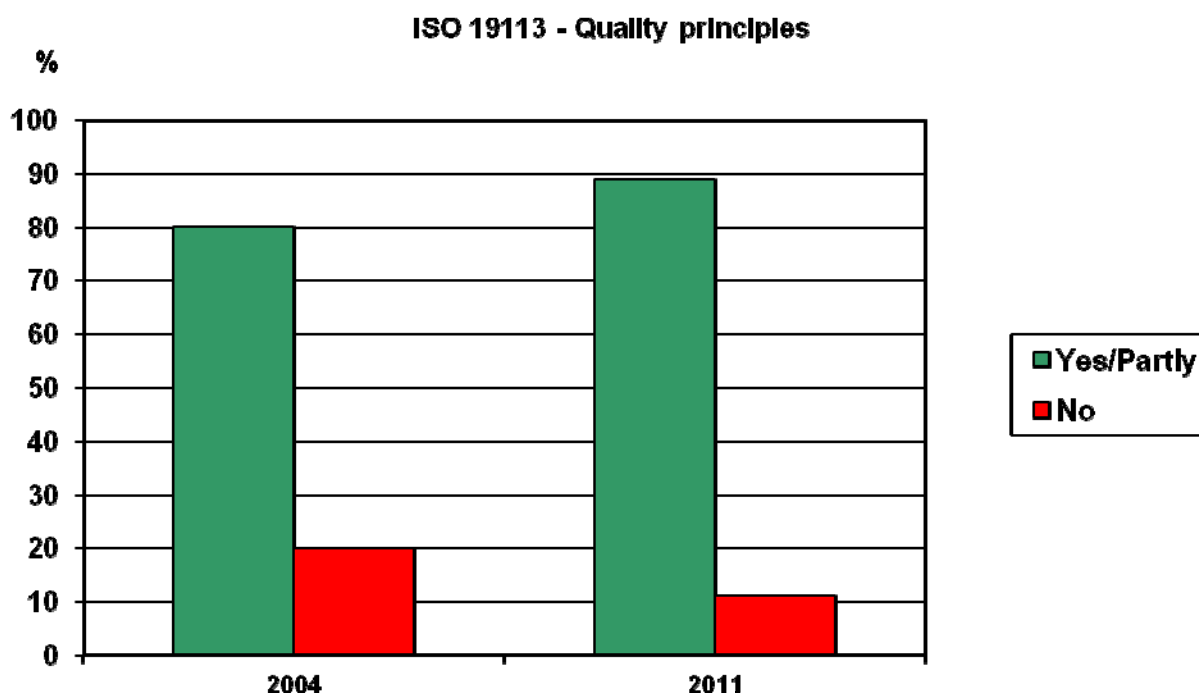


Figure 1. Result from question related to ISO 19113

5.2.3 Result from members answering both times

In this group there are now more members that use this standard than do it partly or not at all. But the members that answered no in 2004 still don't use it.

Table C. Use of ISO 19113 standard (analysed) members answering both times

Standard	Yes %	Partly %	No %	Year
ISO 19113	30	50	20	2004
	60	20	20	2011

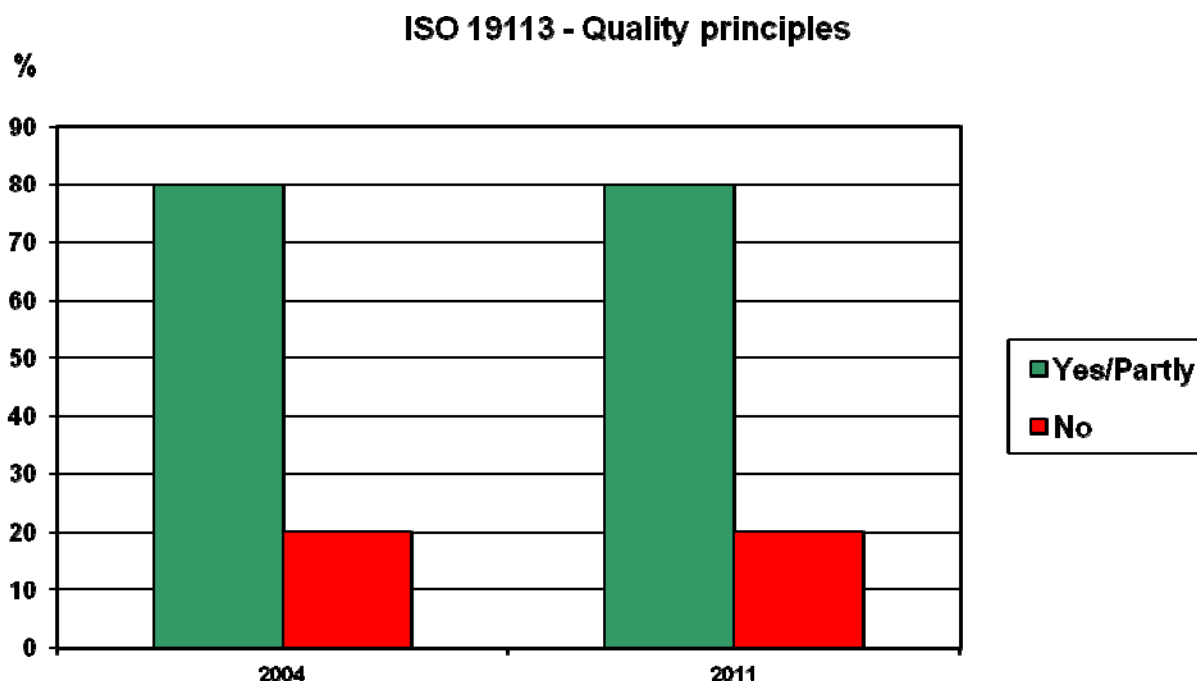


Figure 2. Result from question related to ISO 19113, members answering both times

5.3 Using ISO 19114 - Quality evaluation procedures

5.3.1 Result

After compiling the result from the second answer; "Are your NMA using ISO 19114 Quality evaluation procedures the majority of the members answered yes, this is different from 2004 when the majority answered no.

Table D. Use of ISO 19114 (original)

Standard	Yes %	No %	Year
ISO 19114	40	60	2004
	72	28	2011

5.3.2 Adjusted result

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

- "More *no* than yes, but it was used for creation of data quality model of topographical basic map." (No)
- "Some of our quality evaluation is based upon the ethos of this standard." (No)
- "No direct use, but the principles of it is taken in account." (No)
- "Partly, under development." (Yes)
- "Not entirely" (Yes)

There were more direct answers to this question in 2011. For example:-

- “Partly; Quality models concerning topographic products are based on standards in sense that mainly the same elements are included. Starting point has, however, not been these standards but general national needs.” (Yes)
- “We are modifying the description of quality in order to apply this standard” (No)
- “COSMC (Czech NMCA) evaluates quality through own quality evaluation procedures” (No)
- “ISO 19114 is compatible with IGN practices” (Yes)
- “Not yet” (No)
- “No comparison was done so far between the used quality evaluation procedures and the ISO 19114” (No)

Table E. Use of ISO 19114 (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19114	27	40	33	2004
	61	17	22	2011

When the interpreted comments are included it's clear that many more members are now beginning to use the ISO standard 19114, see Figure 3.

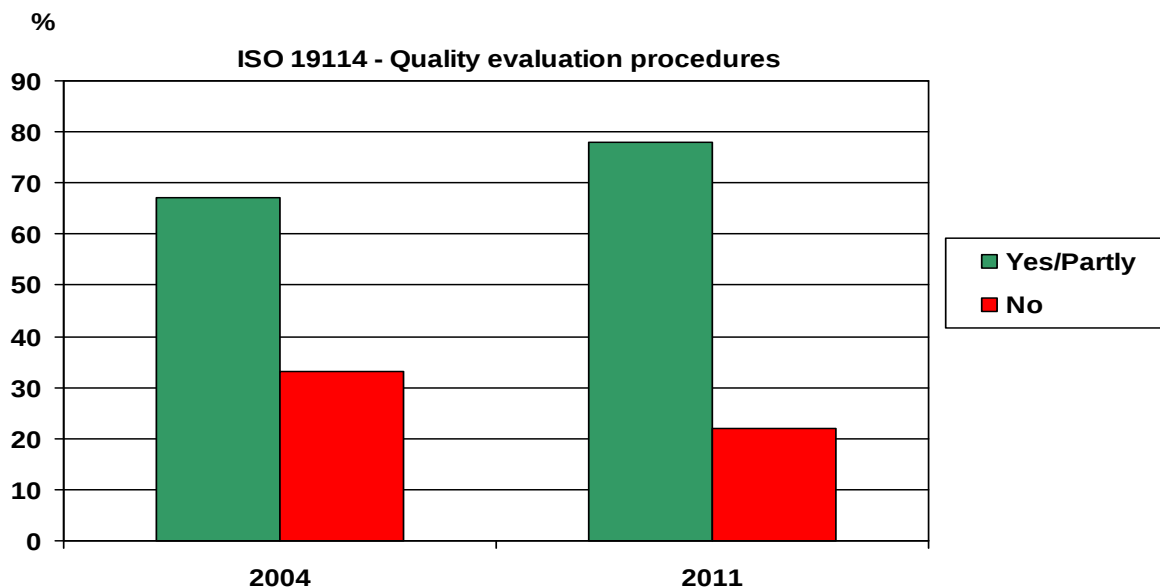


Figure 3. Result from question related to ISO 19114.

5.3.3 Result from members answering both times

If we look at the change in use for those members that answered both times there is an increase in use but the percentage of users that don't use ISO19114 is greater than the average..

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

Standard	Yes %	Partly %	No %	Year
ISO 19114	30	30	40	2004
	50	20	30	2011

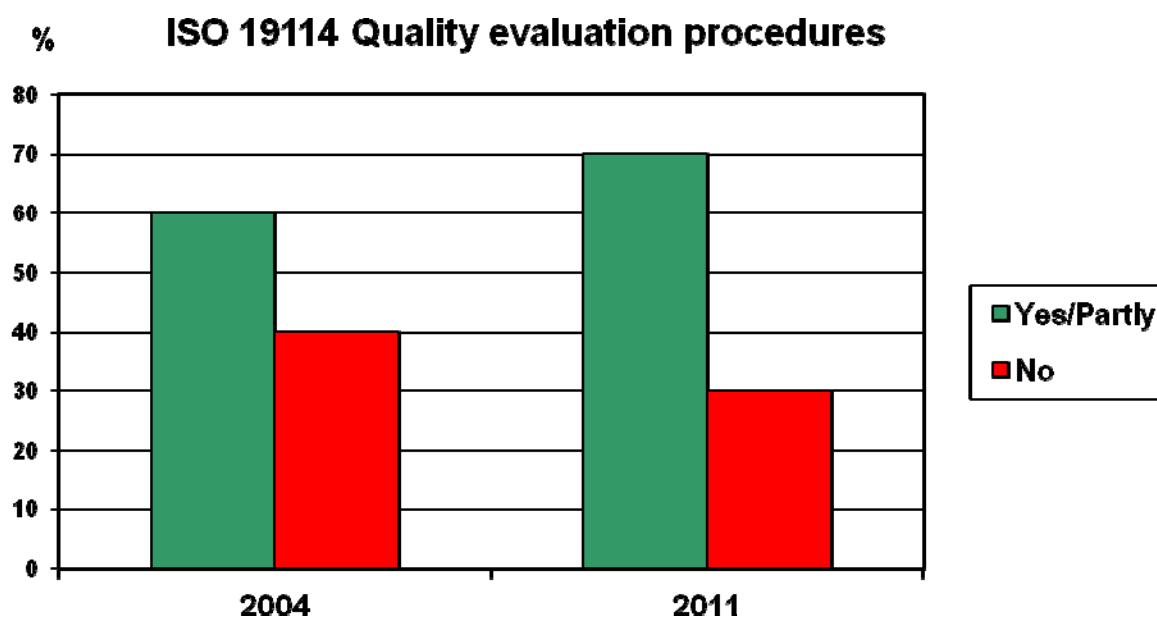


Figure 4. Result from question related to ISO 19114, members answering both times.

5.4 Using ISO 19115 - Metadata

5.4.1 Result

After compiling the result from the third answer; "Are your NMA using ISO 19115 (Metadata)?", there were more members which answered yes than members which answered *no*.

Table G. Use of ISO 19115 (original).

Standard	Yes %	No %	Year
ISO 19115	60	40	2004
	83	17	2011

5.4.2 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 "partly". The original answers are in brackets;

- "Partly". (Yes)
- "Partly, still undergoing revision" (Yes)
- "The new metadata service will be based on the standard" (Yes)
- "A working group is studying how to implement the standard" (Yes)
- "No direct use, but the principles of it is taken in account." (No)
- "Partly, under development." (Yes)
- "Partly, still in testing phase" (Yes)

- “Not entirely” (Yes)
- “Planning on building a new metadata system based on the standard” (No)

There were many comments to this question. The conclusion is that many members are starting to create new services for metadata and that the systems were to be based on the ISO 19115 standard.

Table H. Use of ISO 19115 (adjusted)

Standard	Yes %	Partly %	No %	Year
ISO 19115	13	60	27	2004
	78	17	5	2011

Even when the *yes*- and the *partly*-answers were combined there were several members that don't use, or plan to use, the standard, see Figure 5.

- For all INSPIRE data themes of Annex I that are provided by BEV (Yes)
- Partly; All the NLS-FI datasets which belong to Inspire annex I – III themes has metadata according the Inspire metadata regulation which is based on ISO 19115.(Yes)
- “We use INSPIRE metadata implementation rules” (No) Yes
- “Implementation of metadata on COSMC Geoportal” (Yes)
- “This is the referenced standard for metadata. IGN contributes to ISO 19157 and ISO 19115rev development” (Yes)

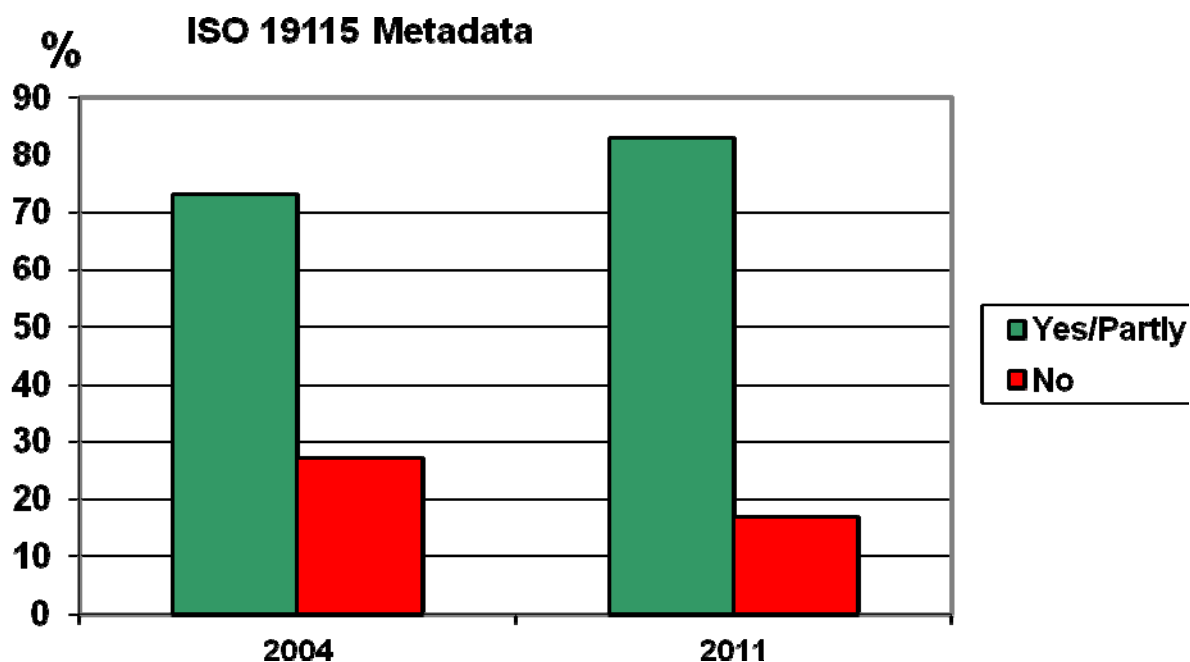


Figure 5. Result from question related to ISO 19115.

5.4.3 Result from members answering both times

The change in use for those answering both times was that most of them are using the standard now.

Table I. Use of ISO 19115 (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19115	30	50	20	2004
	70	20	10	2011

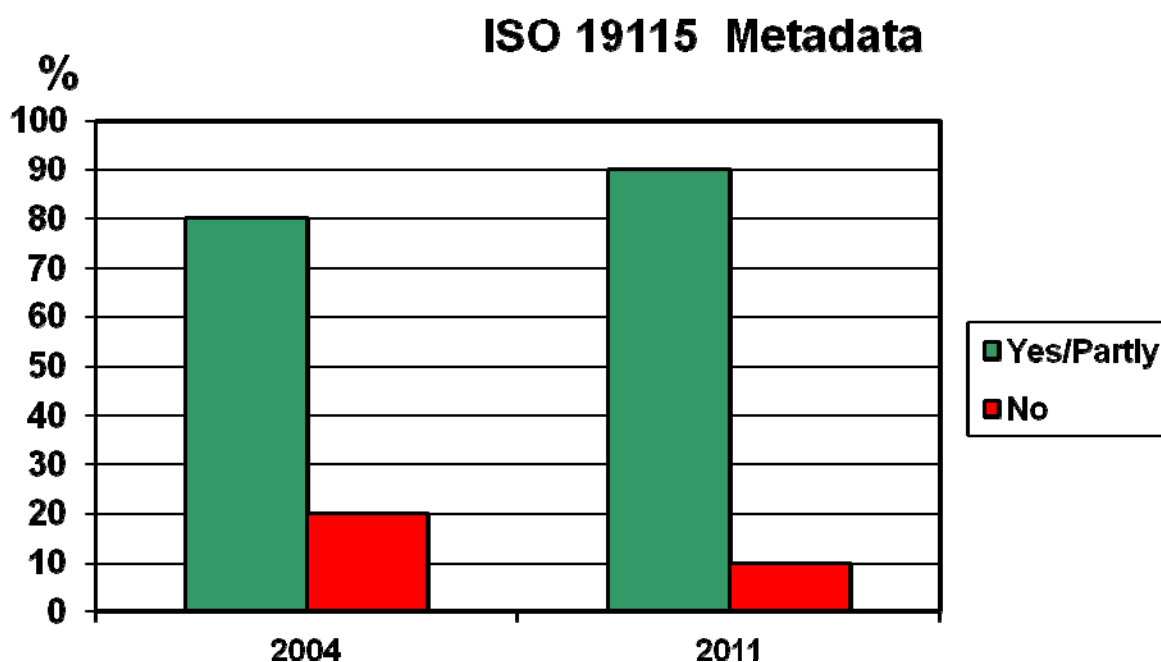


Figure 6. Result from question related to ISO 19115, members answering both times

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

This is a new standard that has been introduced after the 2004 questionnaire. There are few users of this standard and there are no one using it partly. Comments were as follows:

- "Laser scanning was started 2010 and the project leading group stated that ISO standards are not used for the metadata. Re-building of the Aerial photograph register is going to be started 2011 or 2012 and for that ISO 19115-2 is carefully considered." (No)
- "It was not necessary. We simply do not need to use metadata elements introduced in ISO 19115-2 in metadata profiles implemented in Poland" (No)
- "Implementation of metadata on COSMC Geoportal" (Yes)
- "Not yet because the standard is quite new, but we are going to use it soon." (No)
- "Waiting for ISO 19139-2 XML encoding of ISO 19115-2. Usability and Coverage result concepts are fundamental." (Yes)

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

Standard	Yes %	No %	Year
ISO 19115-2	28	72	2011

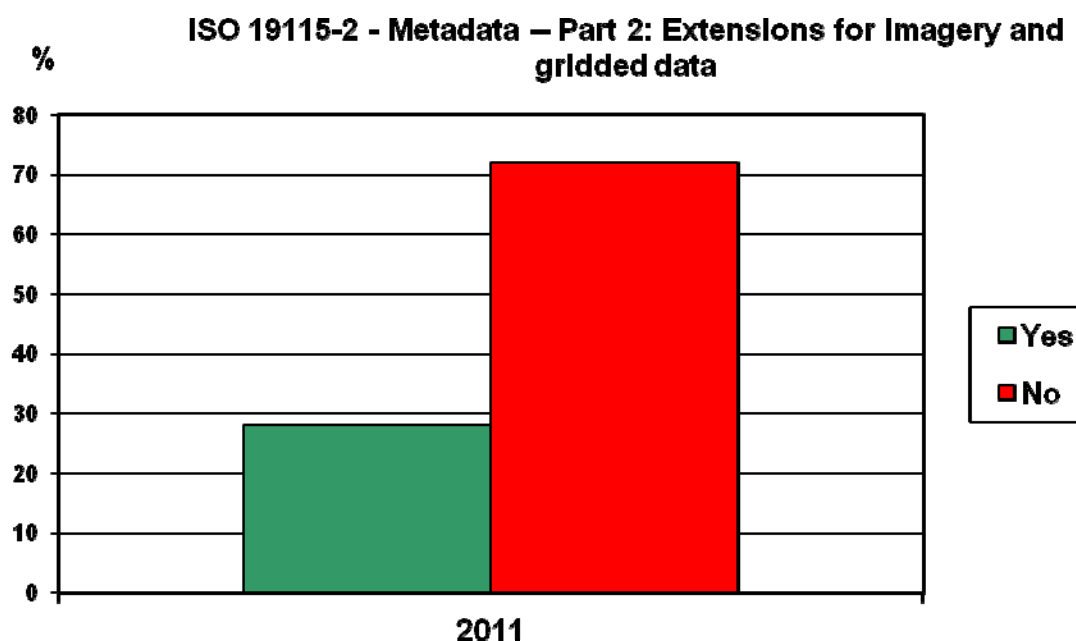


Figure 7. Result from question related to ISO 19115-2

5.6 Using ISO 19131 - Data product specifications

This was a new standard that was introduced since the 2004 questionnaire. Comments were as follows:-

- “Data product specifications are based on intern legal instructions (process instructions)” (No)
- “We have this kind information and specifications available for those data-layers connected to NLS network services but we can’t say that this standard is generally used.” (No)
- “Are going to implement”(No)
- “Elements of the standard are incorporated within internal quality practices” (Yes)
- “The principles are useful as long as they are not applied to strictly. The UML Model is inconsistent.” (Yes)

Table K. Use of ISO 19131 (original).

Standard	Yes %	No %	Year
ISO 19131	50	50	2011

Table L. Use of ISO 19131 (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19131	50	16	34	2011

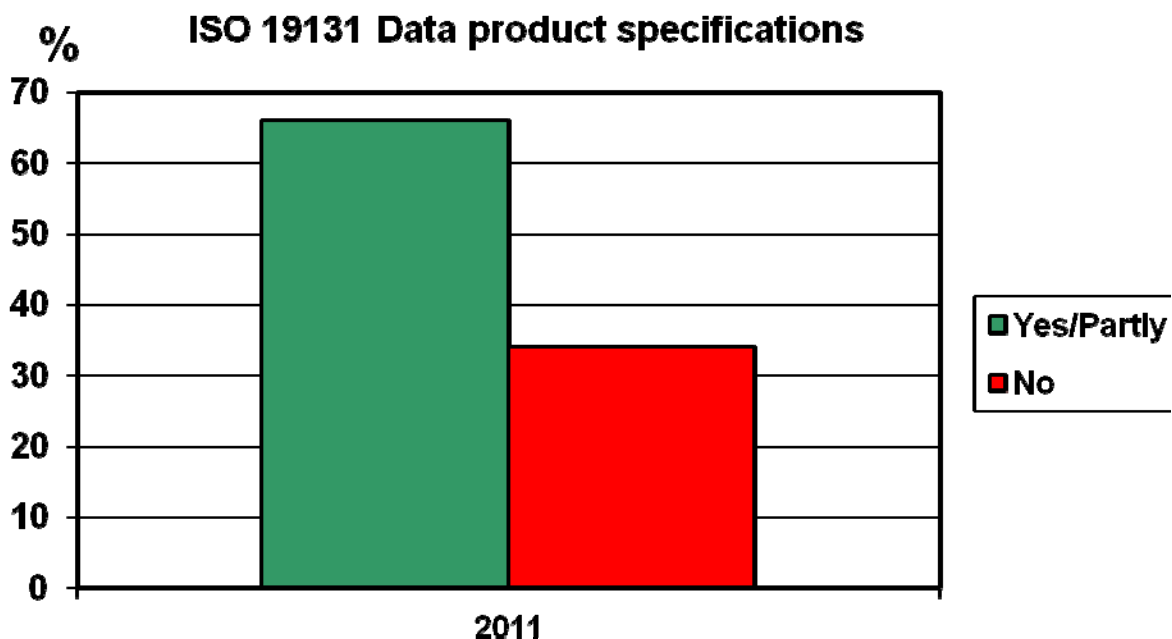


Figure 8. Result from question related to ISO 19131

5.7 Using ISO 19138 - Quality measures

This was a new standard that was introduced after the 2004 questionnaire. Comments were as follows:

- "No exact evaluation was done between the used quality measurements and the content of ISO / TS 19138" (No)
- "Partly;Quality models concerning topographic products are based on standards in sense that mainly the same elements are included. Starting point has, however, not been this standard but general national needs.Quality model concerning legal surveys is based partly on ISO 19138.Field sampling which is made for DQ purposes (topographic data) is using ISO standards 2859-4 and 3951-1 (sizes of the samples)." (No)
- "Research and application" (Yes)
- "We are working on the adoption of this standard" (No)
- This is an interesting document but a extensible online register is missing."(Yes)

Table M. Use of ISO 19138 (original).

Standard	Yes %	No %	Year
ISO 19138	65	35	2011

Table N. Use of ISO 19138 (analysed)

Standard	Yes %	Partly %	No %	Year
ISO 19138	53	12	35	2011

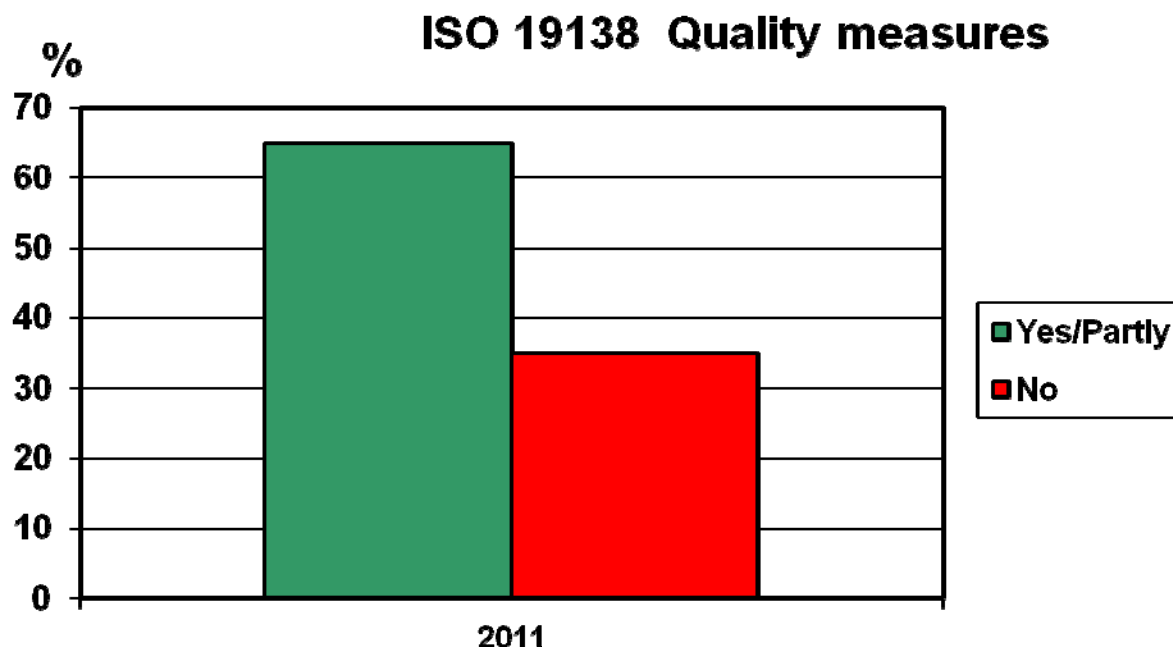


Figure 9. Result from question related to ISO 19138

5.8 Using Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies

The answers to the question show that the guide has been of value. Answers include

- “I suppose the reason for not implementing ISO 19100 standards in NLS-FI better than now is not the lack of knowledge and documentation but more lack of resources and the way setting priorities.” (No)
- “This document was used together with ISO standards in research framework” (Yes)
- “Very little” (No)

Table O. Use of Guidelines (original).

Standard	Yes %	No %	Year
guidelines	55	45	2011

Table P. Use of Guidelines (adjusted)

Standard	Yes %	Partly %	No %	Year
guidelines	55	6	39	2011

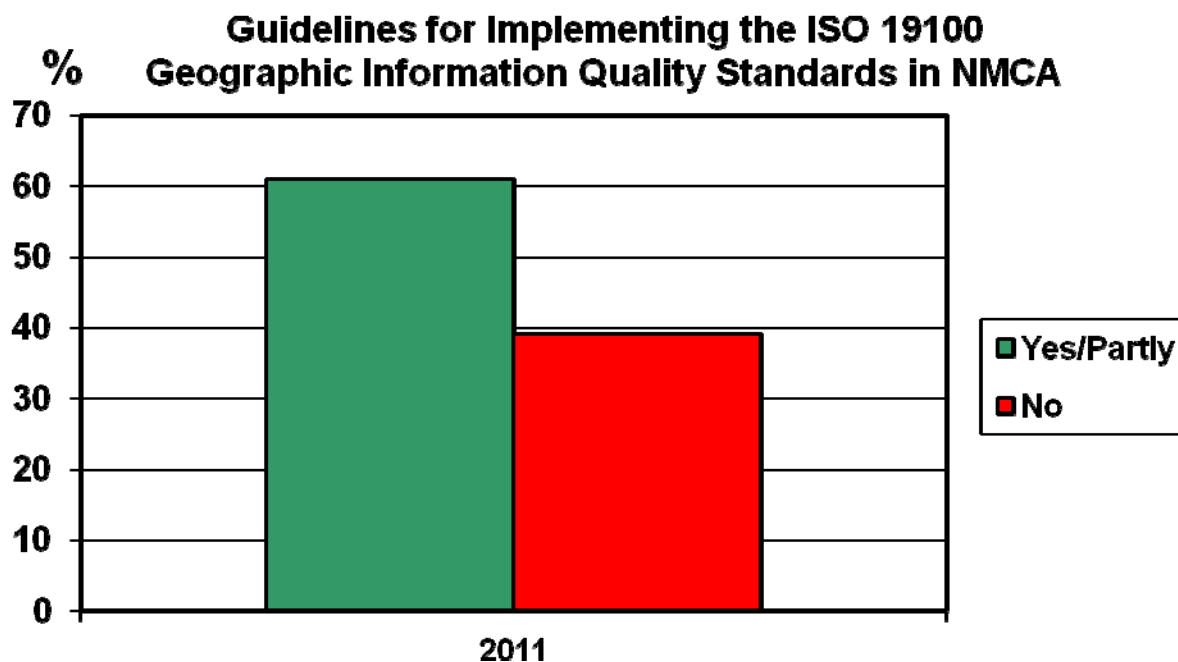


Figure 10. Result from question related to the Guidelines document

5.9 Using ISO 19119 - Services

This standard was introduced after the 2004 questionnaire and was not included as a quality standard 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 previous ones. The comments did not led to any changes from no to partly. Comments were as follows:

- A very import standard for metadata BKG contributed to its development (yes)
- COSMC provides this information in INSPIRE conformable services (both information: description and URL address to access these services) (yes)
- We will use this in the future, when we'll put up our services. (no)
- We are using it in our National Geoportal as part of the INSPIRE compliant metadata. (yes)

Table Q. Use of ISO 19119 (original)

Standard	Yes %	No %	Year
ISO 19119	75	25	2011

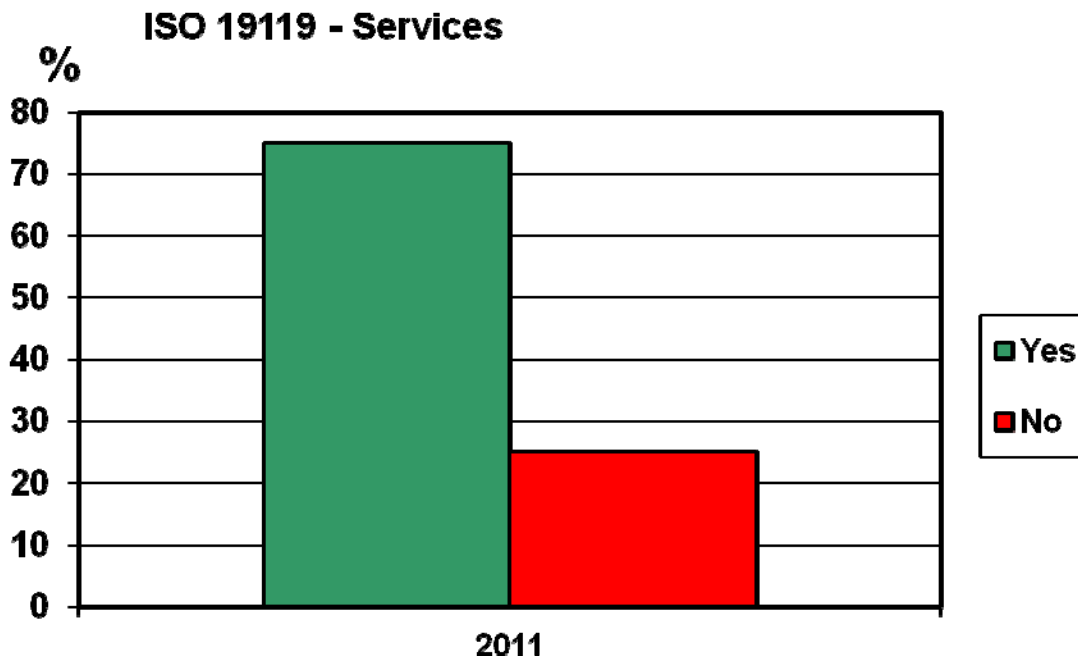


Figure 11. Result from question related to ISO 19119

5.10 Documentations of work with implementation of standards

There was only one country (Germany), who had documentations about how the standards was implemented. One document is available on the Internet <http://www.advonline.de/dokumente/geoinfodok-eng-v30.pdf> but it is in an older version than the version in German and their metadata is available at http://www.geodatenzentrum.de/isoinfo/iso_rahmen.iso_div?iso_spr_web=2
For 19119 Services they have the document ISO19115/ISO19119 Application Profile for CSW 2.0.

A couple of other members mention that they had other reference documents, which are partly translated into English and Malta is planning to have a document in English in the next 12 months.

France inform that IGN contribute to the ISO standardization activity to share their knowledge.

Greece has one document of interest; "Technical Specifications of Cadastral Projects – Quality Control"

Finland has a document describing how ISO 19131 should be implemented, but only in Finnish.

In Sweden they are working with a handbook that shall describe the steps to make a data product specification in accordance with the standard.

6 Future work

In 2009 the process of revising the data quality standards began. Most of ISO 19113, 19114, 19138 and quality parts from 19115 will be integrated in 19157 Data Quality. Parts of 19113, the quality overview elements, are put into 19115 and that will change its name to 19115-1 Metadata. A new technical specification ISO/TS 19158 Quality assurance of data supply is developed. When these changes are in place then a revision of the document *Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies* will be required.

7 Appendix

7.1 Questionnaire's

7.1.1 Questionnaire on the Use of ISO 19100 Geographic information quality standards

In 2004 EuroGeographics expert group of quality sent out a questionnaire to get an overview of the use of the Quality standards for geodata. The answers from this work are available at the [website](#), and as a result of the comments the document Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies was written.

In order to get a view of the use of the standards today, the expert group hopes that you can answer this updated questionnaire. There are some new standards available today and a question of the use of the guidelines document is also included.

The main purpose with a standard is to be able to exchange data, so the word "implement" could mean both how to change your own data into the ISO standard or just to make it possible to communicate with another dataset.

If you have decided not to use a standard, please add your reasons in the column for comments.

	YES	NO	Comments
Are your NMA using ISO 19113 (Quality principles)?			
Are your NMA using ISO 19114 (Quality evaluation procedures)?			
Are your NMA using ISO 19115 (Metadata)?			
Are your NMA using ISO 19115-2 (Metadata -- Part 2: Extensions for imagery and gridded data)?			
Are your NMA using ISO/TS 19138 (Data quality measures)?			
Are your NMA using ISO 19131 (Data product specifications)?			
Do you have reference documents that describe how the standard was implemented			
Do you have this reference documents in English			
Do you have other reference documents that could be of an interest to other NMAs			
Do you have this reference documents in English			
Have you used the document Guidelines for Implementing the ISO 19100 Geographic Information Quality Standards in National Mapping and Cadastral Agencies			
Who is your contact person for issues concerning ISO 19100?			

7.1.2 Questionnaire on the Use of ISO 19119 Service

Use of the metadata part in ISO 19119 - Services

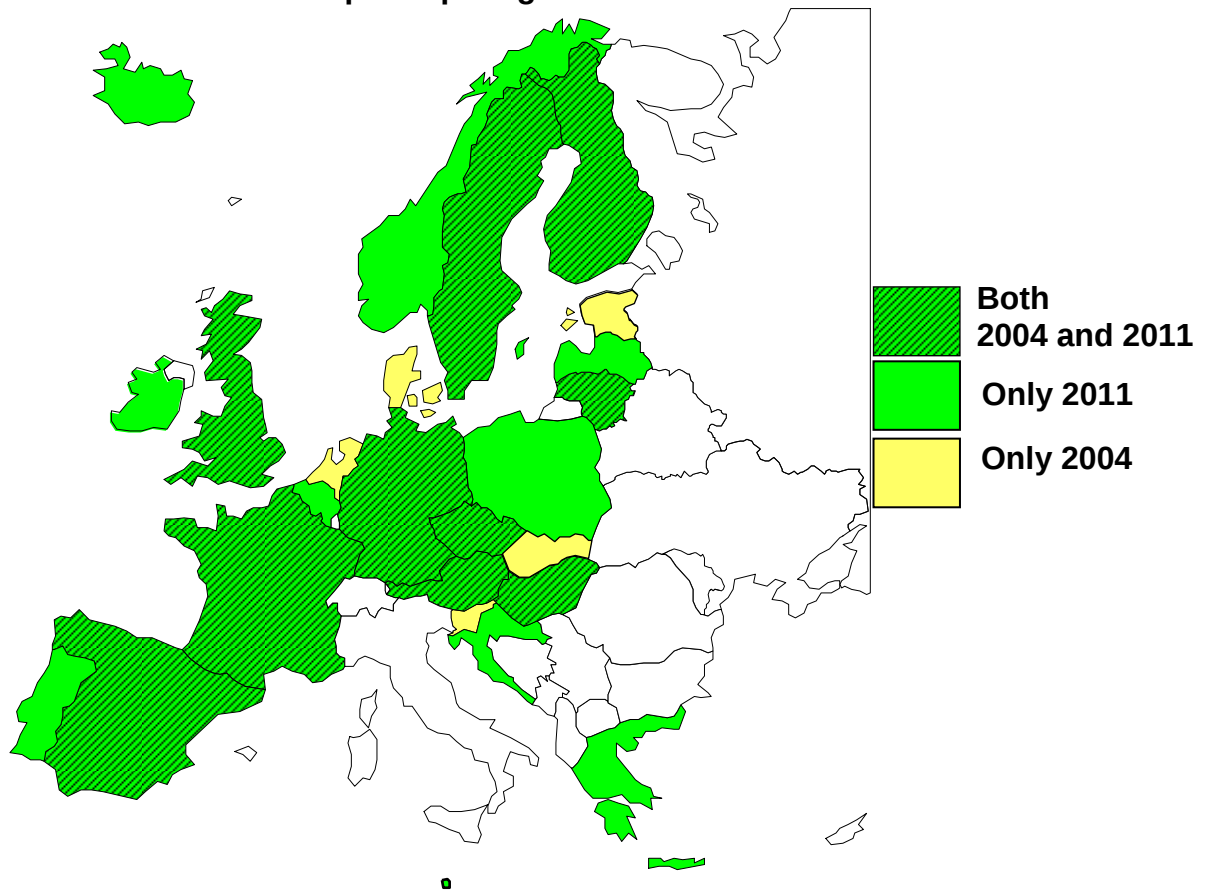
In the standard ISO 19119 Services there is a part that describes metadata.

Part from the standard:

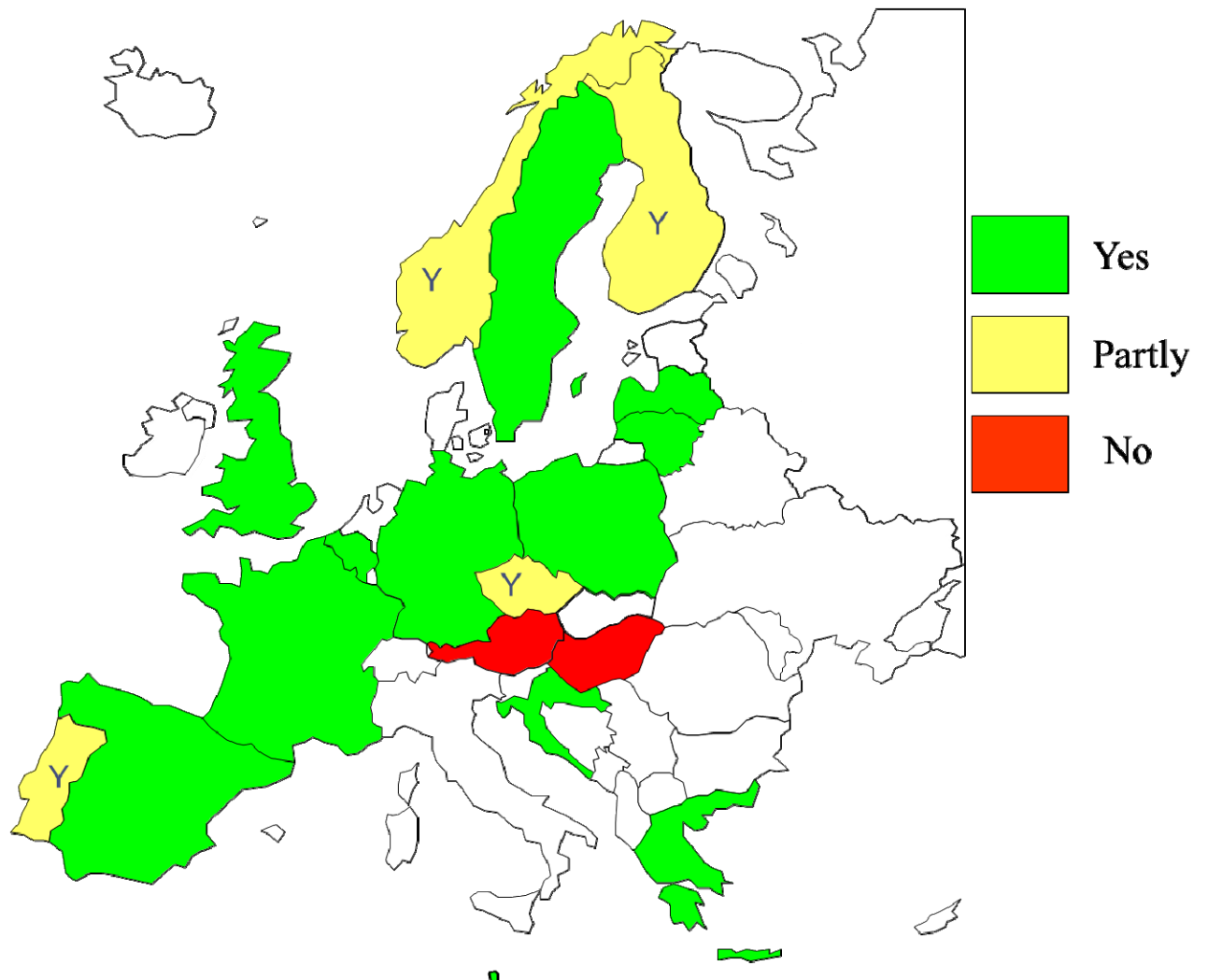
service metadata: a service metadata record describes a service instance, including a description of the services operations and an “address” to access the specific service instance;

	YES	NO	Comments
Are your NMA using the metadata part of ISO 19119 - Services?			

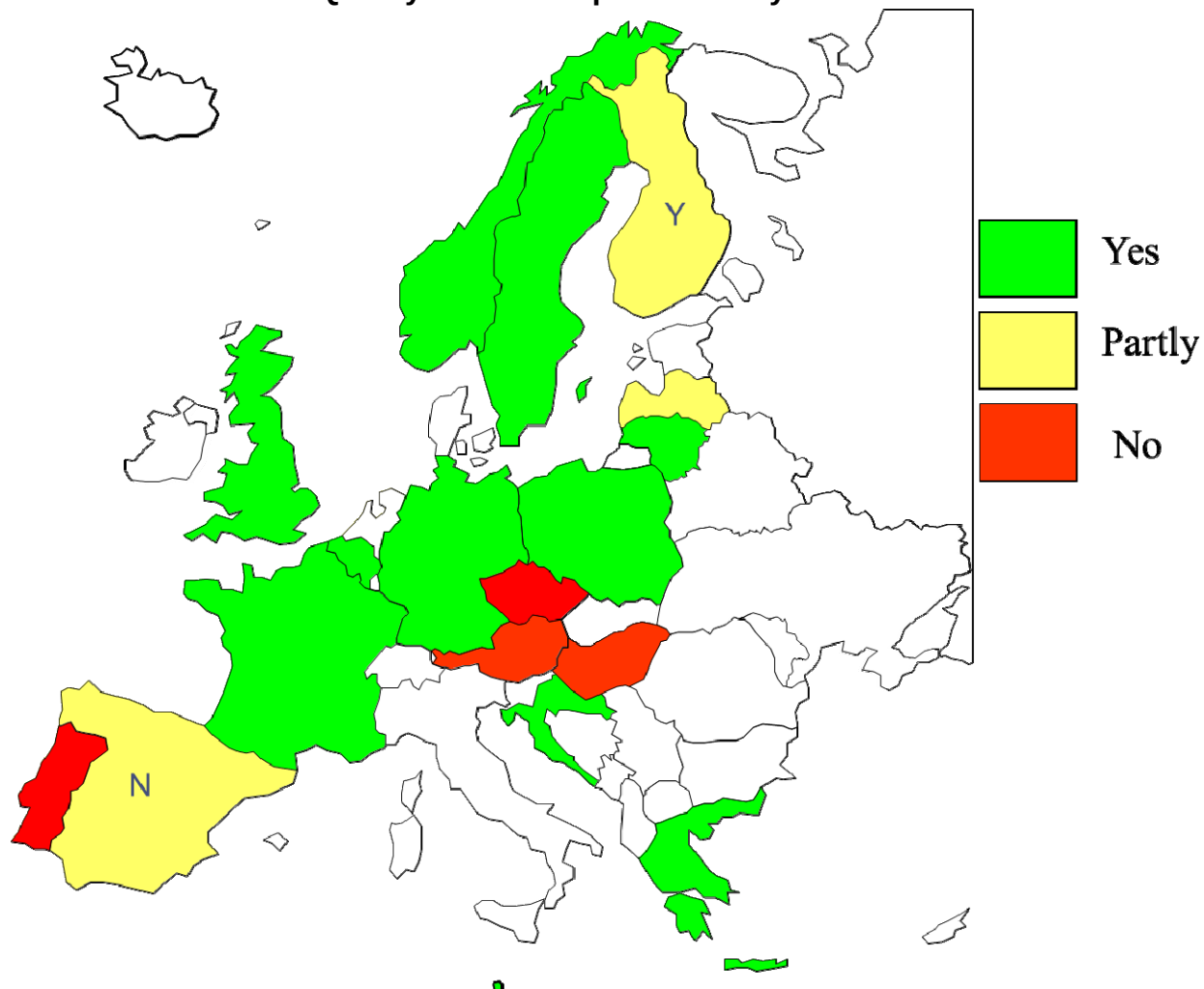
7.2 Overview of nations participating



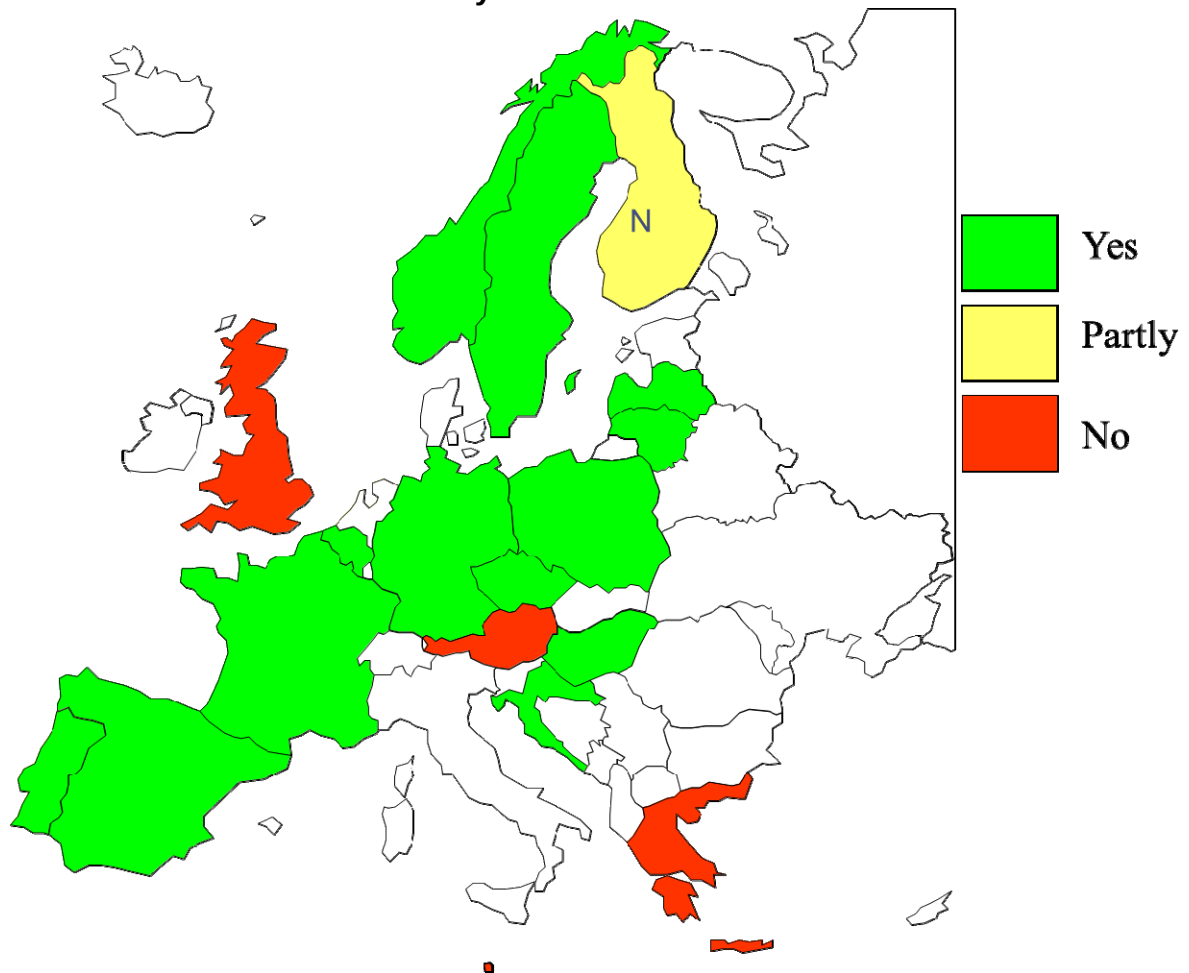
7.2.1 Use of ISO 19113 Quality principles year 2011



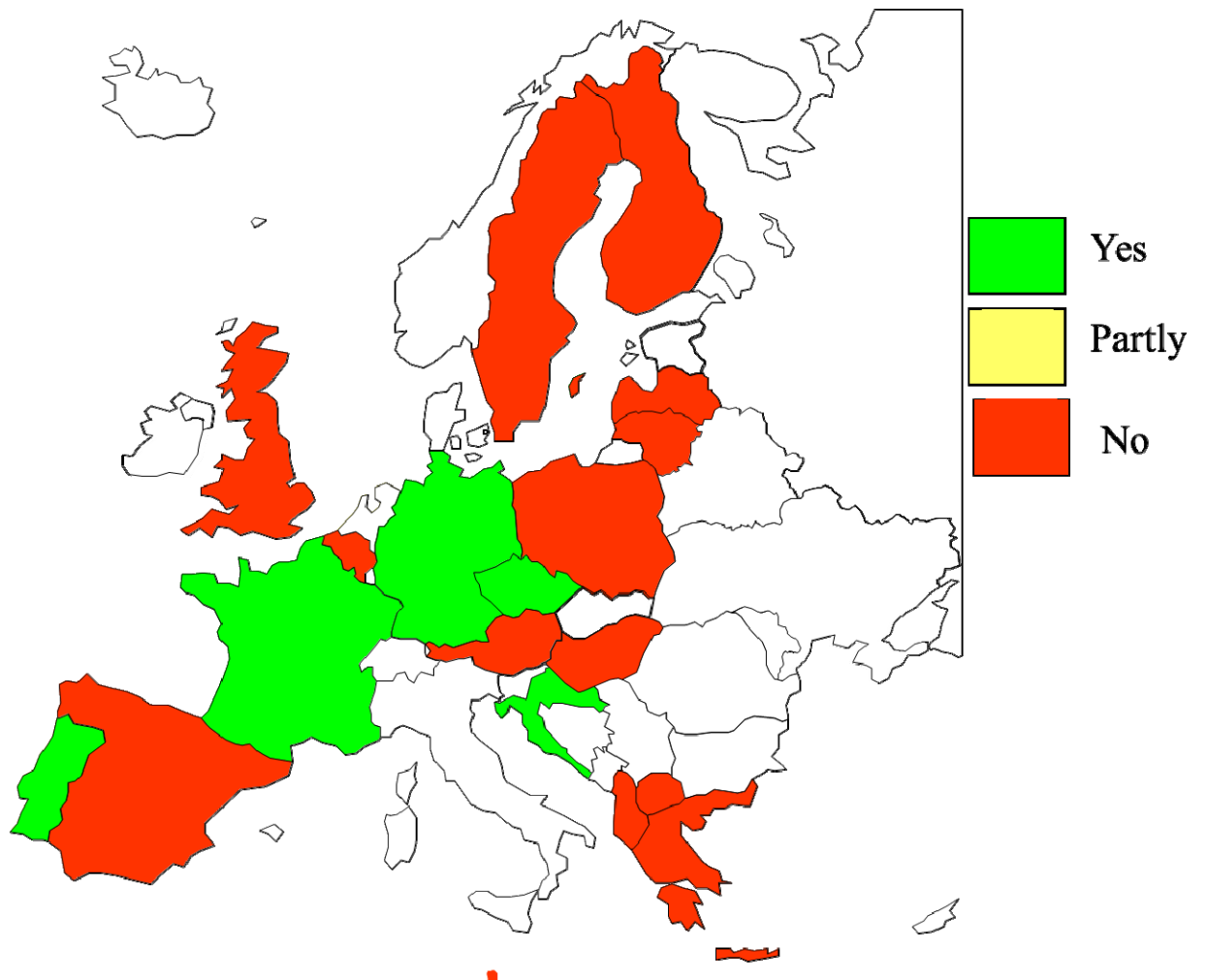
7.2.2 Use of ISO 19114 Quality evaluation procedures year 2011



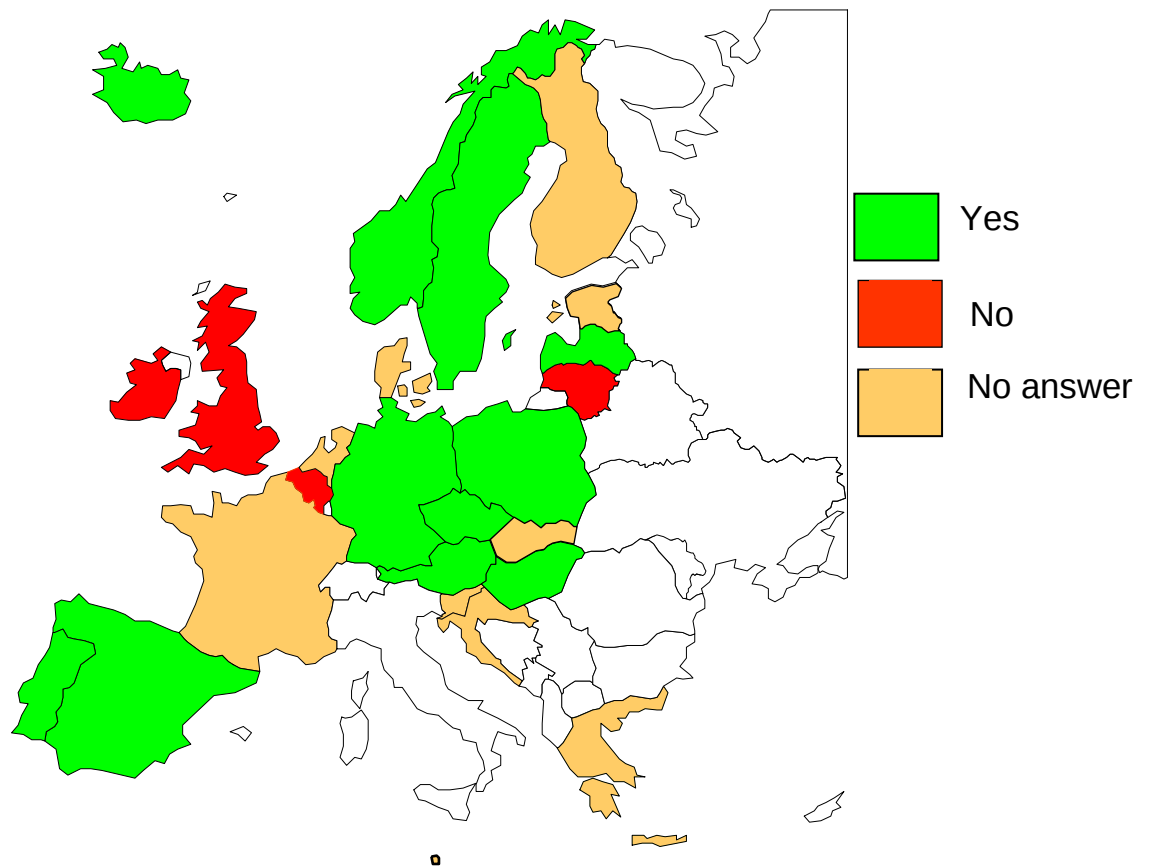
7.2.3 Use of ISO 19115 Metadata year 2011



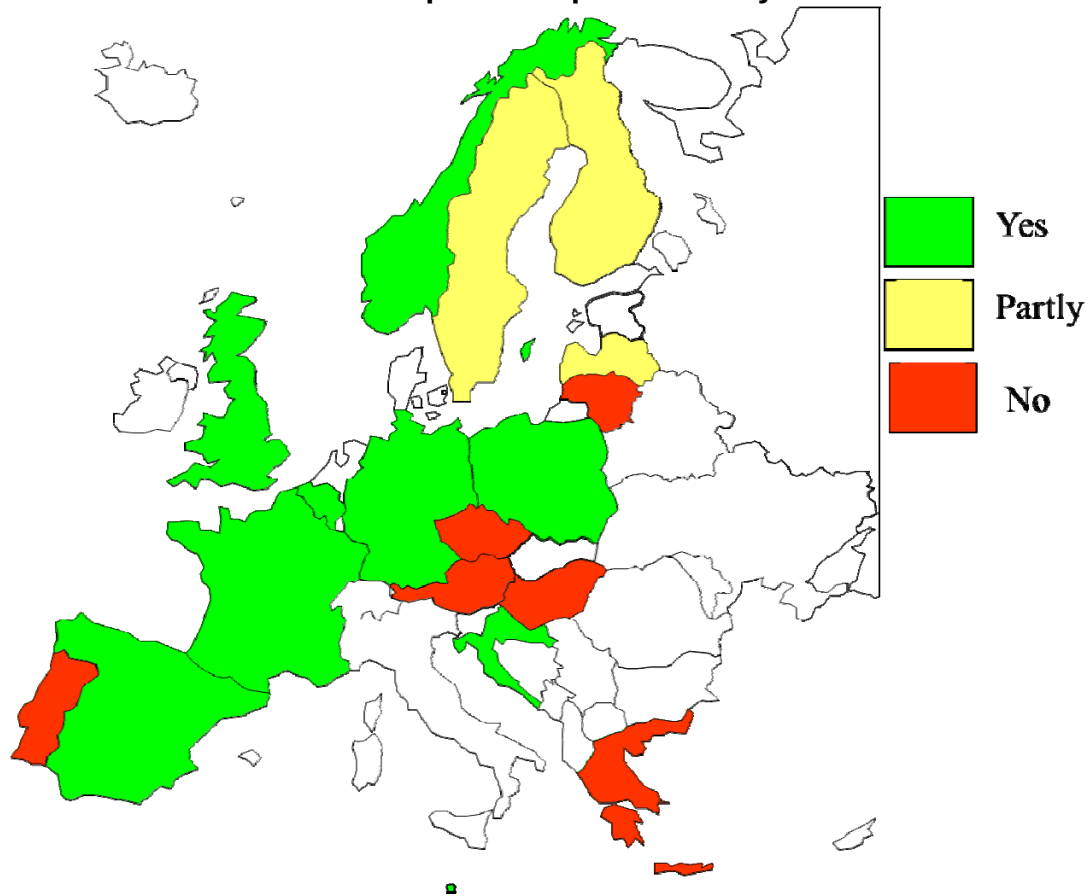
7.2.4 Use of ISO 19115-2 Metadata - Part 2: Extensions for imagery and gridded data year 2011



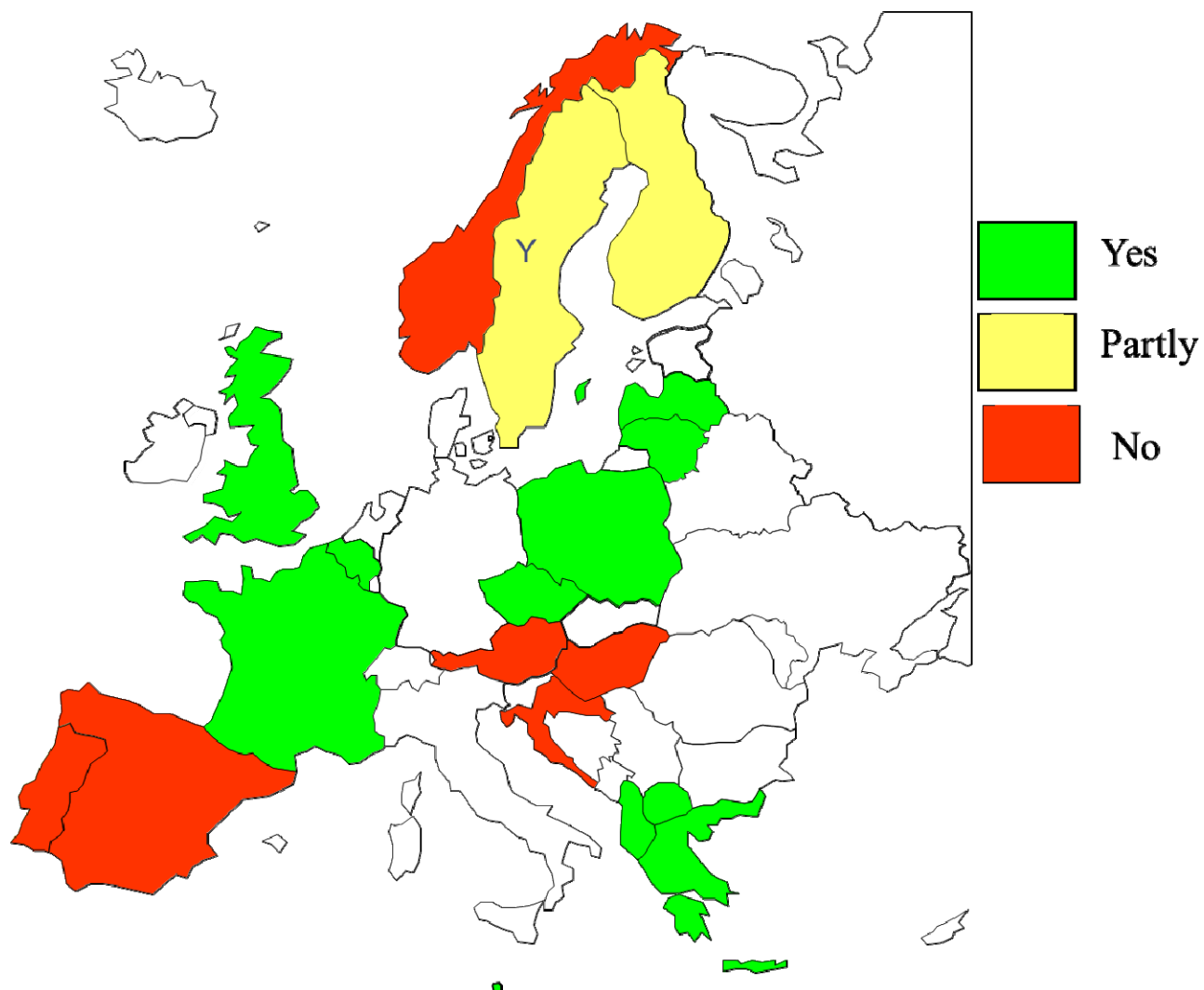
7.2.5 Use of ISO 19119 - Services year 2011



7.2.6 Use of ISO 19131 - Data product specification year 2011



7.2.7 Use of ISO 19138 - Quality measures year 2011



7.2.8 Use of Guidelines document year 2011

