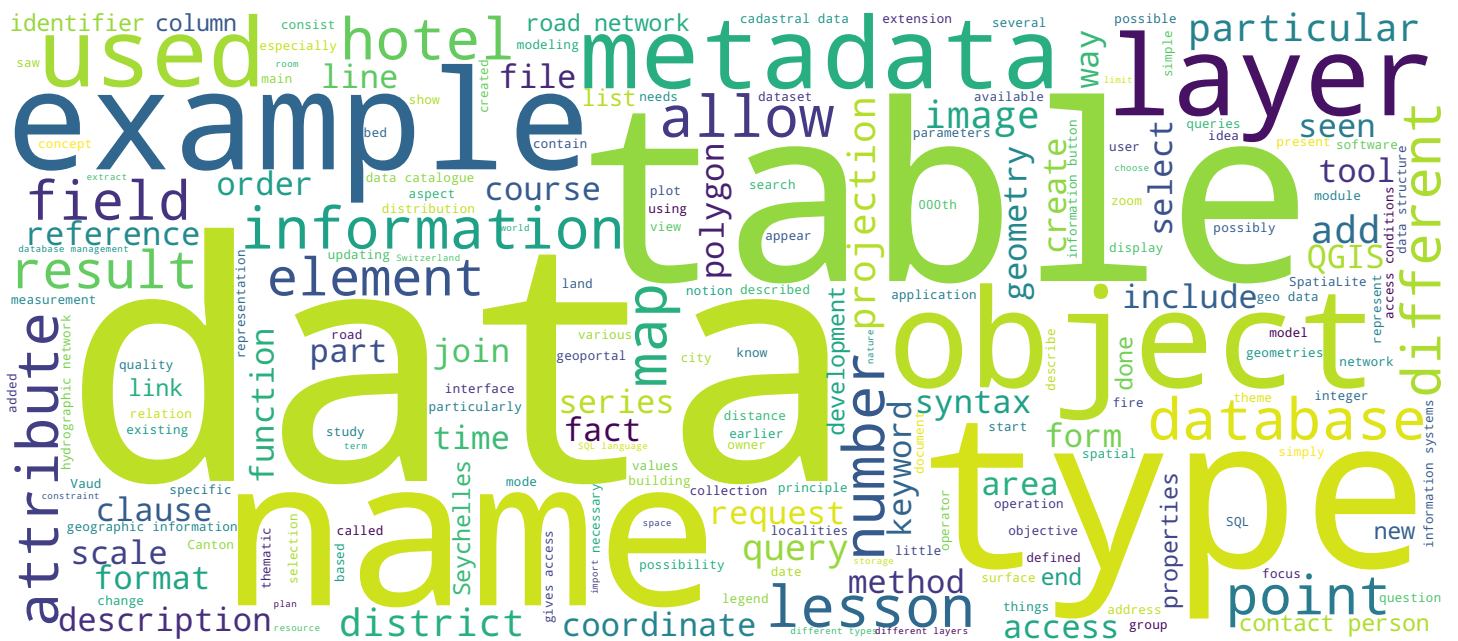


An Introduction to Geographic Information Systems

Metadata

Stéphane Joost, Marc Soutter, Fernand Kouamé, Amadou Sall



Search MOOC

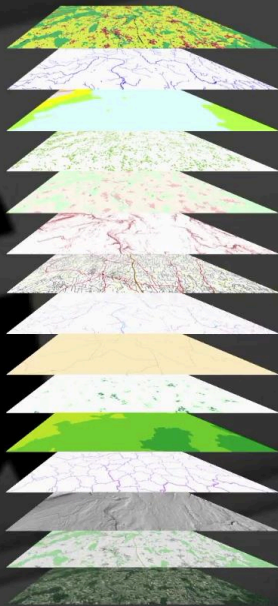


Video



General principles

Date ? Accuracy ? Meaning of attributes ?
Origin ? Phenomenon ?



An Introduction to Geographic Information Systems

Welcome to this lesson that will focus on metadata which are the data on the data and which play an extremely important role to keep track of data acquisition that we do for geographic information systems. The objectives of this lesson consist in emphasizing the importance of metadata, describing their content in the context of geo-information and show when and how these metadata are used. At the end of the lesson, You will be able to document a dataset and consult the metadata of a dataset in order to know if they match your needs or not. In this lesson, we will therefore address successively the general principles of documentation of a data set, we will then see the standardization efforts that have been carried out in the metadata field and we will finish with a few examples illustrating the use of metadata. With the development of information systems and databases from the 60s, 70s, we began to gather masses of information in computer systems, only to realize after a few months or years that all these data had become completely unusable for lack of saving the memory of the conditions in which these data had been acquired, of the type of phenomena they represented, of the accuracy of data, of a whole bunch of parameters of this type which in fact prevented the use of these data in the end.

Notes

Summary



0m 24s

General principles

Metadata = Data on data

- To document spatial information so as its sense is understood in the same way by all users
- Each information layer, each entity, and each attribute must be defined and characterized according to its measurement scale and its nature



And we started talking of this data cemetery syndrome since all these large databases were finally buried, hence the following two axioms: first of all, the idea that an information system and especially a geographical information system is alive if it is used, and that for such a system to be used, it must contain reliable data, up to date and of which we know what they represent. These two axioms have as a first corollary to emphasize on the maintenance and the updating of data which can represent a significant effort, and as a second corollary, the fact that the volume and the nature of the data stored in an information system must be adapted to the needs of the users and to the available resources to organize the maintenance and the updating. This is why the concept of Big Data, which is very fashionable lately, is encountering a certain scepticism from many people whom I am. The metadata, as data on the data, aim at documenting spatial information so that it is understood in the same way by all its users. This implies that each data layer, that each object, each attribute, is described and characterized from its scale and its nature point of view.

Notes

Summary



2m 08s

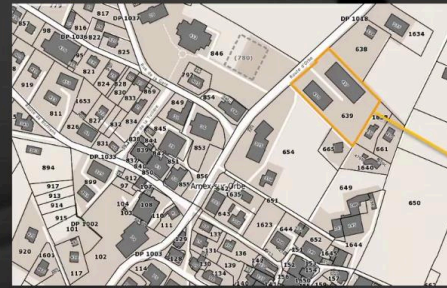
General principles

Scope of metadata

- Source ?
- Contenu ?
 - Name and description
 - Data type

geometry – point, line, polygon, etc.
datetime - time, timestamp, date
numeric - integer, float >> real, **double**
string - char, binary
array
structure
etc.

Example of cadastral data



Bléss-fonds	Bâtiments		
N° commune cantonal	N°	Désignation	Lien
256	639	parcelle privée	Informations du registre foncier

Geometry
Town ID
Plot ID
Plot type
Link

polygon
integer
integer
string
string

An Introduction to Geographic Information Systems

If we look now a little closer at what metadata is all about, the first aspect that we address is that of the source of information, where the institution can be documented who produced the data, possibly the institution that published it, that distributes these data, who is the contact person, who assumes the responsibility of updating for example, Etc. Etc. A second important element is the content. Here, in the cadastral data example, first the name and the description of these data. They are said to come from official measurements, that they include realty and soil cover, that they are extracted from an official cadastral database. Etc. Etc. The type of data, geometric, temporal data, numerical values of integer or real type, character chains, vectors, object structures, etc. In our cadastral data example, the plot itself is represented... is of the geometry type represented by a polygon, whilst the attributes, council number, plot number, are integers, the designation and the link, character chains.

Notes

Summary



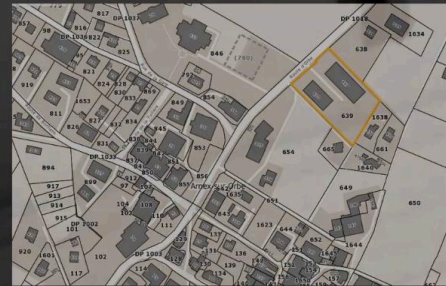
3m 39s


General principles

Scope of metadata

- Source ?
- Content ?
- Quantity ?
- Accessibility
 - Format
 - Rights
 - Price
 - Restrictions
 - Address
 - etc.

Example of cadastral data



Informations sur la métadonnée	
ID	517
Date de création	16.11.2006
Date de mise à jour	5.10.2015
URL	www.asitvd.ch/
Contact pour la métadonnée	Support diffusion  Etat de Vaud - Office de l'information sur le territoire Avenue de l'Université 5 1014 Lausanne T 021 316 36 46 - F 021 316 24 84

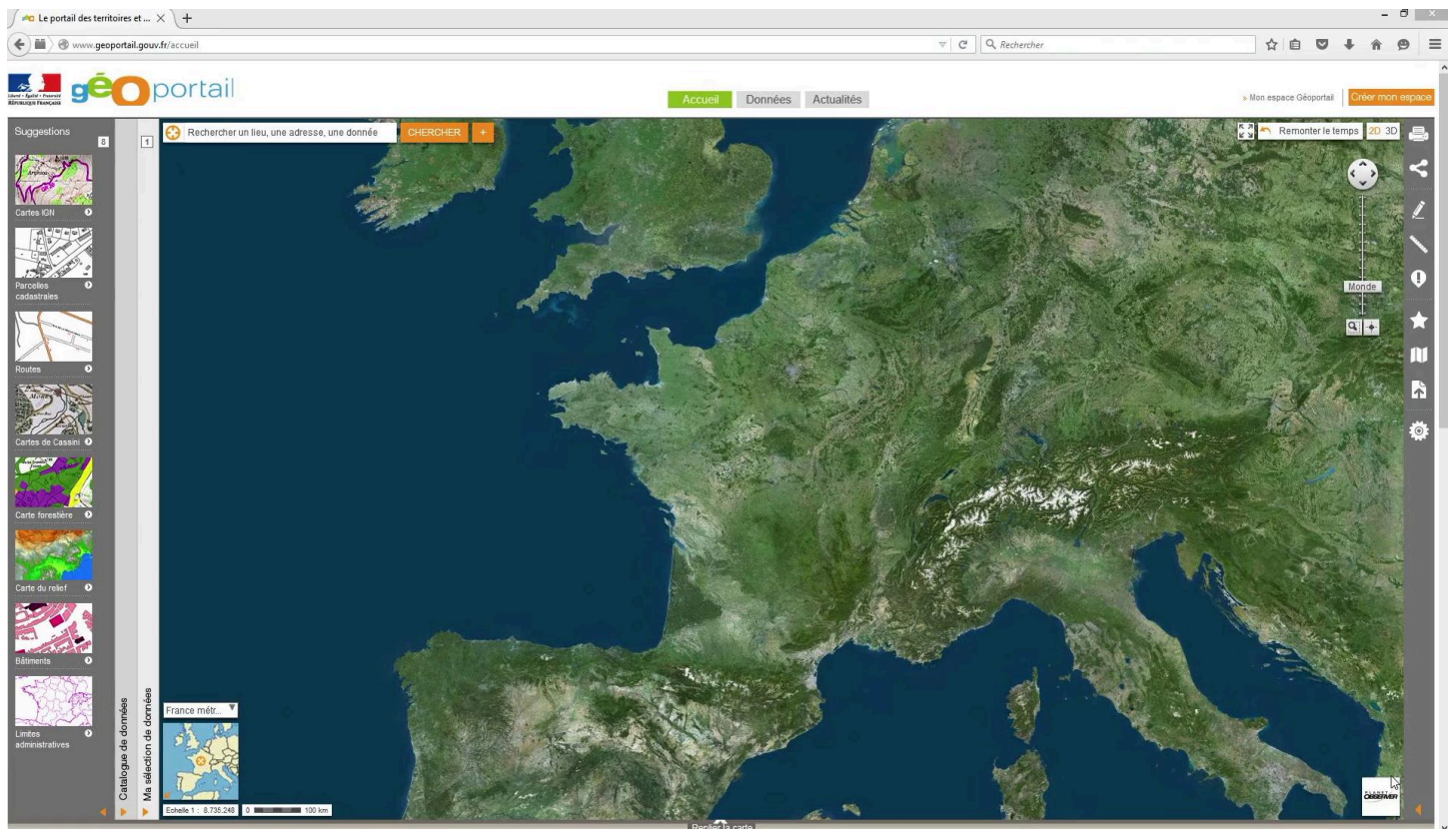
An Introduction to Geographic Information Systems

An information on the reference scale and the accuracy of data, we see here that the scale of the cadastral plan was determined at the time of data entry, usually the 500th scale in urban areas, of the 1,000th in agricultural zones and the 5,000th in mountain areas. The data entry date or the availability date of these data on the infrastructure data, here the 31st December 1983. The quantitative elements constitute another aspect of the metadata including the spatial overlap, in the case of our cadastral data, the whole of the canton of Vaud and the bounding box, that is to say the framework which includes all the data concerned, volume values like the number of objects involved in the data set or possibly the disk space occupied by these data. The access modalities to the data are obviously a very important element, in particular the format in which the data is distributed, the associated rights, the tariffs which can, as seen here, be consulted online, the eventual restrictions which apply to the use of data, the service address or the person in charge of the distribution, here, the State of Vaud.

Notes

Summary





For several years, many efforts to standardize metadata have been undertaken, efforts aimed at enabling a better understanding of geo-data at different levels, whether it is that of the producer, that of the administrator or the end user, to facilitate the trades between various partners and systems, to improve the capacity to search for geographic data and finally to create a reference framework for the development of methods and metadata management tools. At the international level the body in charge of standardization in the geographic information and geomatic field is known as ISO / TC 211. This organization produced the ISO 19100 series of norms some of which are specific to metadata, in particular the 19115 and the 19115-2, which are about the description of geo-data, the 19119 on the description of geo-services and the 19139 on the exchange of metadata. At the European Union level, the standardization takes place through the INSPIRE Directive, in the U.S. it is the Federal Geographic Data Committee and in Switzerland, it's the GM03 standard. All these norms are ultimately very similar since they group the same basic data type with some specific variants. We will now see some examples of uses and consultation of metadata beginning with the geoportal of the IGN-France.

Notes

Summary



Parcelles cadastrales - Géo... X +

www.geoportail.gouv.fr/donnee/50/parcelles-cadastrales?c=1.3088140728253799,48.05261225543652&z=0.010806606872858265&l=CADASTRALPARCELS.PARCELS\$GEOPORT

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géoportail

Accueil Do

Suggestions 8

Catalogue de données

Politiques publiques
INSPIRE

+ de données

Eau

Energie

Etat et collectivités

Europe et monde

Forêt

Géodésie

Histoire et patrimoine

Images satellitaires

Logement et construction

Ma sélection de données

Routes

0 100%

Routes

Affichage du réseau routier français et européen.

De 1:2.000 à 1:8.725.000

Légende

Producteur de la donnée:
Eurogeographics, Institut national de l'information géographique et forestière

Rechercher un lieu, une adresse, une donnée

CHERCHER +

Légende et téléchargement

In this geoportal, we can activate the data catalogue directly, as well as a display area of the data selection. We choose to display the layer of the buildings that appear on the map and in the selection area, we have the different layers with an information button which provides access to metadata, in this case, the name, a description, the data producer and the legend which we see is different when the scale is smaller than the 30,000th or greater. So, if you zoom in a bit in this map to get closer a little, to see these things on a smaller scale, we see that indeed, the richness of description is a little larger with a greater variety of building types. The data catalogue is also directly accessible with the list of different data available. Here, we choose the cadastral plots to display them. We see that these plots occupy the entire country by default. So we zooms for a more precise zone to have some detailed information. And again, the access to metadata is done by the "information" button, the name, a description, the input scale, the legend, etc. In the data catalog, we can add for the example a transport-related layer, in this case, the road network, this road network on a larger scale appears more clearly, and again the "information" button gives access to some metadata, particularly the producer which is the IGN and the legend of the road network.

Notes

Summary



8m 23s

Information sur la géodonnée

Filaire des voiries régionales
Tracé des voiries gérées par la Région wallonne.

Propriétaire : Région wallonne
Dernière mise à jour de la géodonnée : 06 mai 2015

Représentation spatiale: Vecteur

Résolution spatiale: Non renseigné

Echelle (limites): 10000

Précision: Non renseigné

Généalogie du jeu de données: La digitalisation sur base des cartes IGN au 1/10000 a permis de construire dans un premier temps le tracé de chaque route gérée par le SPW. Pour chacune de celles-ci, la géométrie du PICC remplace la digitalisation réalisée sur base de l'IGN là où les données le permettent. La table attributaire du PICC relative aux voiries est reprise : la colonne « VoirieMet » est complétée et mise à jour au besoin. Une importante mise à jour de ce fichier a eu lieu en 2014, elle s'est basée sur le PICC. Cette donnée est utilisée non seulement pour la création de cartes de service, c'est-à-dire des cartes présentant le réseau en gestion et réalisées pour chaque service (Districts, Directions territoriales routières et Directions électromécaniques) et de

We see that in the case of IGN-France, the richness in metadata is relatively low. Second example, the geoportal of the Walloon region. We see that on the homepage, we have a direct access to the geo-catalog with several themes and in each theme, a set of applications which are all GIS web systems accessible online and for each of these applications, a fact sheet with in particular the use access conditions, the quality of data, the contact person etc. The same for geo-data with for example here for the land use map of Wallonia all the relevant metadata. The data can be accessed directly in an online map and in the online interface we find the data catalogue with its various themes. Here the regional road network. And for each theme, as earlier an information button which gives access to the same fact sheet containing keywords, the updating dates, the use access conditions, the quality of data, the contact person etc. Here we see in the quality the scale and the way with which the dataset has been constituted, especially here on the basis of digitalization, and the contact details of the contact person if necessary.

Notes

Summary

10m 11s



<div> <div> <div>Accueil - Géoportail de la ...</div> <div>Géoportail de la Wallonie</div> <div>Metawal - Catalogue pour l'inf...</div> </div> <div> <div>metawal.wallonie.be/geonetwork/srv/fr/search?uuid=bdc3789c-4b02-4dc0-863a-98dace4ed0240</div> <div>Fermer l'onglet</div> <div>Rechercher</div> </div> </div>	
<div> <div>Filaire des voiries régionales</div> <div> <div>Affichage</div> <div>Actions</div> </div> </div>	
	<div> <div>Ville NAMUR</div> <div>Code postal 5000</div> <div>Pays Belgique</div> <div>Adresse e-mail frederic.plumier@spw.wallonie.be</div> <div>Adresse Internet</div> </div>
Point de contact	<div> <div>Nom de la personne responsable Frédéric Plumier</div> <div>Nom de l'organisation Direction des Équipements routiers (SPW - DGO1 - DGO1.20 - DGO1.22)</div> <div>Fonction Attaché</div> <div>Numéro de téléphone +32 (0)81/772760</div> <div>Adresse Boulevard du Nord, 8</div> <div>Ville NAMUR</div> <div>Code postal 5000</div> <div>Pays Belgique</div> <div>Adresse e-mail frederic.plumier@spw.wallonie.be</div> <div>Adresse Internet</div> </div>
Propriétaire	<div> <div>Nom de l'organisation Région wallonne</div> <div>Adresse e-mail helpdesk.carto@spw.wallonie.be</div> <div>Protocole Adresse Internet (http)</div> <div>Nom Géoportail de la Wallonie</div> <div>Description Géoportail de la Wallonie - Les sites de l'information géographique wallonne</div> <div>Adresse Internet Géoportail de la Wallonie</div> </div>
<div> <div>Contacts pour les métadonnées</div> </div>	
Point de contact	<div> <div>Nom de la personne responsable Frédéric Plumier</div> <div>Nom de l'organisation Direction des Équipements routiers (SPW - DGO1 - DGO1.20 - DGO1.22)</div> <div>Fonction Attaché</div> <div>Numéro de téléphone +32 (0)81/772760</div> <div>Adresse Boulevard du Nord, 8</div> <div>Ville Namur</div> <div>Code postal 5000</div> <div>Pays Belgique</div> <div>Adresse e-mail frederic.plumier@spw.wallonie.be</div> <div>Adresse Internet</div> </div>
<div> <div>Les informations techniques</div> </div>	
Contraintes d'accès et d'utilisation	<div> <div>Conditions légales et contractuelles</div> <div>Régime d'accès à la ressource Autres restrictions: Restrictions non prévues</div> <div>Définition des conditions d'utilisation Licence: Restriction induite par l'existence d'une licence</div> <div>Conditions détaillées Accès pour les autorités publiques, pour des missions de service public ou pour la recherche et l'enseignement.</div> <div>Conditions détaillées Des conditions d'utilisation de la donnée s'appliquent. Elles sont décrites dans la licence de mise à disposition de données géographiques et biologiques numériques par le SPW consultable à l'adresse http://geoportail.wallonie.be/files/LicData.pdf</div> <div>Autres conditions</div> <div>Limite d'utilisation Aucune contrainte d'accès pour la consultation</div> </div>
Type de représentation spatiale	<div> <div>Vecteur: Donnée vecteur (point, ligne, polygone)</div> </div>
Résolution spatiale	<div> <div>Dénominateur 10000</div> </div>
Généalogie des données	<div> <div>Généalogie des données La digitalisation sur base des cartes IGN au 1/10000 a permis de construire dans un premier temps le tracé de chaque route gérée par le SPW. Pour chacune de celles-ci, la géométrie du PICC remplace la digitalisation réalisée sur base de l'IGN à où les données le permettent. La table attributaire du PICC relative aux voiries est reprise ; la colonne « VoirieMet » est complétée et mise à jour au besoin. Une importante mise à jour de ce fichier a eu lieu en 2014, elle s'est basée sur le PICC. Cette donnée est utilisée non seulement pour la création de cartes de service, c'est-à-dire des cartes présentant le réseau en gestion et réalisées pour chaque service (Districts, Directions territoriales routières et Directions électromécaniques) et de cartes thématiques, c'est-à-dire des cartes réalisées à la demande (carrefours, revêtements, glissières, service hivernal, réseau éclairé, ...). Elle est également utilisée dans de nombreuses applications informatiques de la Direction des Équipements routiers.</div> </div>
<div> <div>Date de mise à jour des métadonnées 2015-09-17 Identifiant unique bdc3789c-4b02-4dc0-863a-98dace4ed0240</div> </div>	

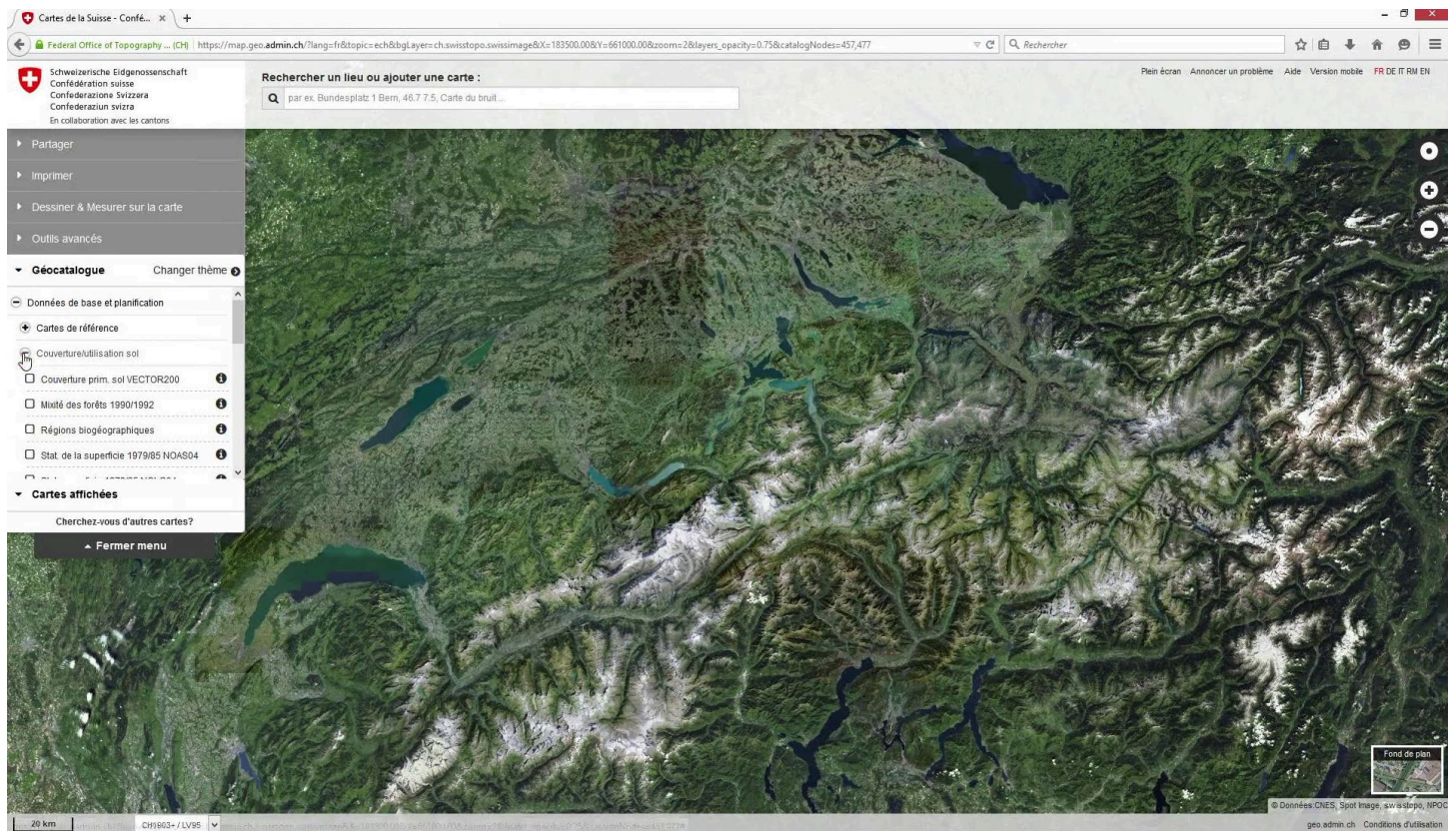
In an additional button offering access to more information, we have access to the complete model of metadata, with the possibility of choosing the type of presentation, according to the European norm, the American norm or others and different actions, including the possibility of exporting these data in different formats. These complete metadata include general information, of elements describing the origin of the resource, the geometrical aspects, the contact details of the contact person for the metadata, the technical information elements such as the use access conditions etc. The geoportal of the Swiss Confederation which, in its interface, also includes the data catalogue, with data classified by thematic and here we will search in the land cover / use a map of the forests diversity.

Notes

Summary



11m 47s



Also a small button of information which gives access to the metadata, so the name and description of this layer which was built on a Landsat image, the legend and additional information, particularly a link to the website of the data geocatalogue which includes the entire metadata of the different layers concerned, the possibility to export them in different formats. These metadata contain a set of information, the reference information, a descriptive summary, the data of the contact person for the resource, the same for the update and the scheduled update dates, the constraints of use, particularly the existence of a license, the numerical, quantitative aspects. So the covered area, the method of distribution, in particular the formats, the reference system used so the projection system, the quality of data, the metadata managers. And the information on the legislative framework which in fact includes the use of these data. Another example, with the hydrographic network.

Notes

Summary



13m 00s

Cartes de la Suisse - Confé... x geocat.ch - Le catalogue g... x

www.geocat.ch/geonetwork/srv/fin/metadata.show?uuid=0351bc2e-3cdc-4e8a-b422-0142e494e7b4&currTab=simple

rechercher

INFORMATION SUR LE CONTENU

Description du catalogue d'objet

Conformité à ISO 19110	0
Langue	Allemand
Langue	Français
Inclus dans le jeu de données	0

Référence du catalogue d'objet

Information de référence

Titre	VECTOR25 Le modèle numérique du territoire de la Suisse : Information de produit
-------	--

Date

Date	2004-04-01
Type de date	Publication: Date à laquelle la ressource est publiée

Forme de la présentation: Document numérique contenant du texte et pouvant contenir des illustrations

Autres informations de référence: <http://www.swisstopo.admin.ch/internet/swisstopo/de/home/products/landscape/vector25.parsysrelated1.47641.downloadList.50692.downloadFile.tmp/vector25infode.pdf>

Type de modèle: Description des objets:

INFORMATIONS SUR LA LÉGISLATION

Législation

Pays	Switzerland
Langue	Allemand
Langue	Français
Langue	Italian
Type de législation	Ordonnance nationale:
Référence interne	510.620

Références sur la source légale

Information de référence

Titre	Ordonnance sur la géoinformation : Annexe 1, Catalogue des géodonnées de base relevant du droit fédéral
Titre court	OGéo

Date

Date	2008-05-21
Type de date	Création: Date à laquelle la ressource est créée

Date

Date	2008-07-01
Type de date	Publication: Date à laquelle la ressource est publiée

Autres informations de référence: Dans l'annexe 1 sont listées toutes les géodonnées de base de droit fédéral.

We see here that the metadata also includes the detailed legend of the different types of watercourse sections and again links to different pieces of information, in this case also the geocatalogue where we find the same data structure as earlier, with this time having perhaps the scale of 25,000th as a particularity which was used to digitalize the data, the formats in which this data is available, so the ESRI shapefile, but also the different Internet links, the hyperlinks, which enable to access the Swisstopo store, the Swisstopo online store which allows to buy these data, the system of reference projection, EPSG: 21781, which we have already talked about in a previous lesson and the contact information for the management of metadata, to conclude again by the legislative elements, in particular the order on geo-information, which is the legal framework which establishes the use of geographical data in Switzerland.

Notes

Summary

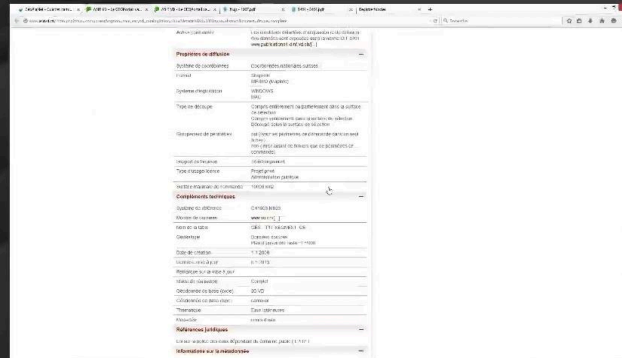


14m 29s

Examples

- Geoplanet-VD, canton de Vaud's geoportal

www.geo.vd.ch



An Introduction to Geographic Information Systems

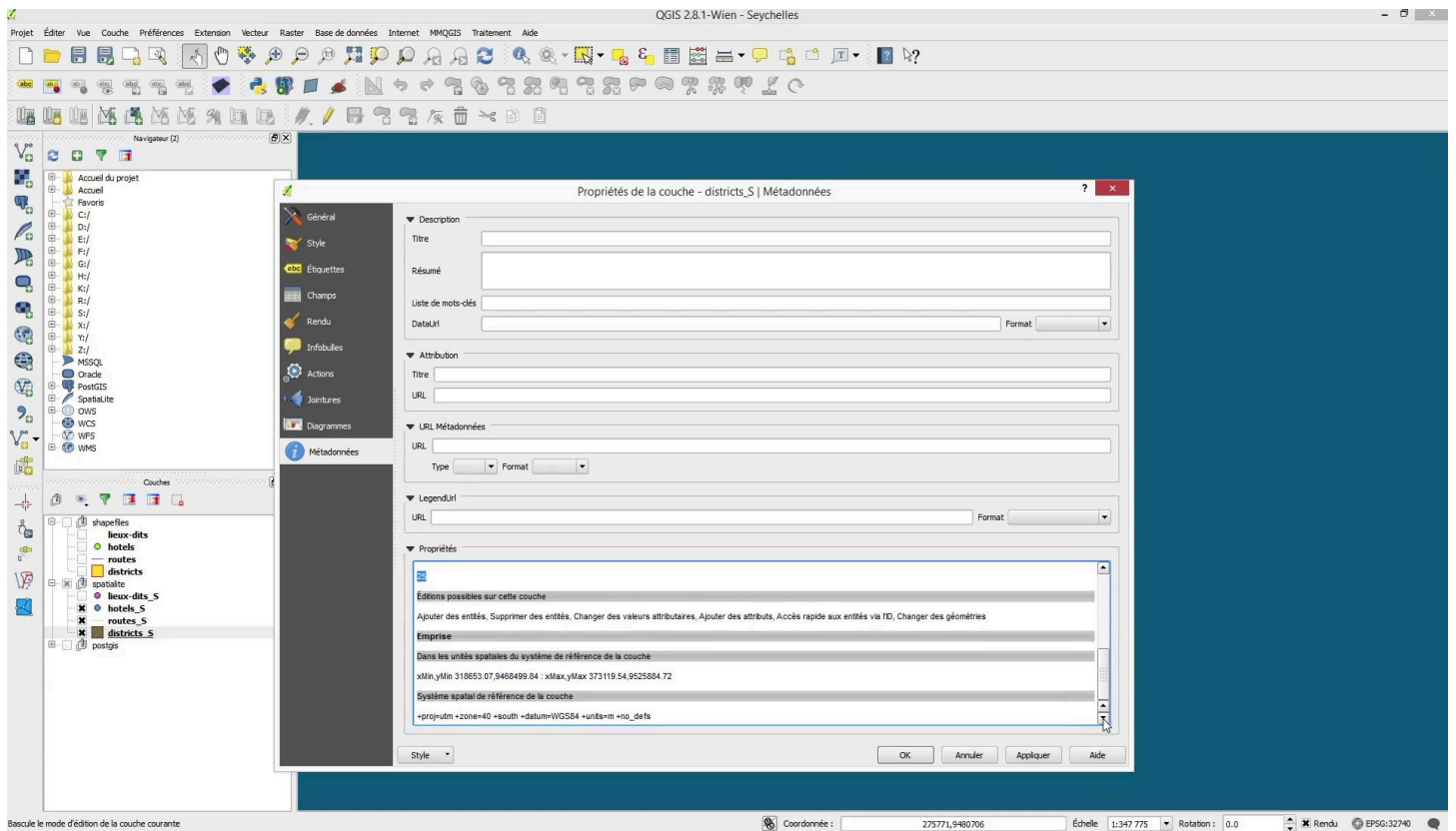
We also see that other types of information can be displayed, here the information relating to the water protection field, with in particular the hydrographic network and in this case in the region, a particular watercourse which is the Talent if I am not mistaken, yes the Talent, with the attributes related to this watercourse, so its identifier, its number etc. and again the access to the metadata of the hydrographic network layer and we see that this layer comes from a system called Gesreau, which is in fact the watercourse management GIS of the Canton of Vaud, the data are accessible to the public, the pricing rules are known, there is a basic rate of 25 francs to recover and use these data, the principles of diffusion, some technical complement elements, the reference system so it is the same projection system, it is a Swiss projection that has been used, the date on which the data was created, the date of the last update, and finally those responsible for the diffusion.

Notes

Summary



17m 02s



To conclude we will see how to document a data set in QGIS, the GIS software that we will use throughout this course. We will use for this a project containing data from the Seychelles, a project whose preparation is the subject of a lesson which will be presented as part of the second module of this course. we see that by right clicking on the layer of hotels, these properties can be accessed, amongst which a heading contains the metadata with a descriptive part, a title, hotels, a short summary to describe in fact what it is about, possibly a list of keywords, a data format, so text or HTML, possibly an Internet link, a URL address, and then a set of properties which have already been defined, in particular the data format, the ESRI shapefile, the type of geometry of points, the number of objects and the hold in the units of the projection system used, and the coordinates of this projection system, so UTM zone 40 South. Another example with the district layer where we see again that by default, the data type is an SQL Spatial Lite database, with the address of the file containing this data, the type of data, the polygons, the number of objects, 25 and again the total hold of the layer and then the projection system used, so again UTM 40 South. We see that in the standard version of QGIS, the possibilities of documenting a data set are relatively limited.

Notes

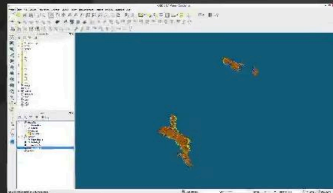
Summary

18m 25s



Examples

- Metadata in QGIS



An Introduction to Geographic Information Systems

There are several extensions which are under development which will, gradually with time, correct this existing situation and offer more complete instruments for the metadata capture.

Notes

Summary



20m 22s