

CHINA PROFILE OF THE INTERNATIONAL STANDARD: GEOGRAPHIC INFORMATION – METADATA

JIANG Jingtong LIU Ruomei

National Geomatics Center of China

No.1 aishengcun, Zi Zhu Yuan

Beijing 100044, China

E-mail: std@nsdi.gov.cn, rmliu@public3.bta.net.cn

Abstract

The Chinese ‘Geographic Information - Metadata’ standard has been developed and passed voting as the national standard. The paper introduces the definition, scope, structure, levels, attributes, contents of metadata of the Chinese national standard, modified, extension from and consistency with the ISO 19115:2003, the profile and examples for sharing geographic information, and implementation the standard in China.

It is very important for describing and managing data, providing methodologies of querying and retrieving data, helping data exchanging and transmission, promoting data sharing. Metadata for geographic information is very useful for both data producers and users.

Metadata standard for geographic information is become more and more important in China as well. After 4 years, the Chinese ‘Geographic Information - Metadata’ standard has been developed and passed voting as the national standard. It is based on the ISO 19115:2003, which covered most of requirements derived from an analysis of existing data catalogs of China.

There are three consistency levels for adopting international standards as national ones in China. They are:

● **Identity (IDT)**

The symbol for the identity level is IDT. There are two cases for the level:

- a. Completely equal for technical contents, textual structure and wordings between the Chinese national standard and the international standard. or
- b. Equal for technical contents with edited modification between the Chinese national standard and the international standard.

For the custom of Chinese language, it is inevitably to make some editing modification when adopting the international standard as the national standard. The secondly case is commonly. In this case, according with the national standard means according with the related international standard, and vice versa.

● **Modified (MOD)**

The symbol for the modified level is MOD. It is allowed to have some technical differences between the Chinese national standard and the international standard, but it must be clearly indicated. It is allowed to modify the textual structure of standard, only in the case of capable

comparing contents and structure of these two standards, and list out the structure contradistinguish table in the national standard.

The allowed modification includes: the contents in the national standard more or less than ones in the international standard, modify some contents of the international standard, add another blue print for selecting, and so on.

- **Non-equal. (NEQ)**

The symbol for the unequal level is NEQ. It is allowed the national standard has different contents and structure from the related international standard, and it is dispensed to explicitly describe the difference. Or only keep a few or non-important clauses from the international standard in the national one.

Whereas the particular characteristics of Chinese language, it is necessary to use the methods of translation or re-drafting out when adopting international standards as national ones in China. Among others, the method of translation is applicable for IDT, and the method of re-drafting out is applicable for MOD.

For this purpose, the ISO 19115 has been modified to develop the Chinese national standard 'Geographic Information - Metadata'.

The paper introduces the definition, scope, structure, levels, attributes, contents of metadata of the Chinese national standard Geographic Information-Metadata, modified, extension from and consistency with the ISO 19115:2003, the profile and examples for sharing geographic information, and implementation the standard in China.

1. DEFINITION, SCOPE, STRUCTURE OF METADATA

As defined of the ISO 19115, metadata is data about data. It provides information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data. The scope of the standard is applicable to:

- the cataloguing of datasets, clearinghouse activities, and the full description of datasets;
- geographic datasets, dataset series, and individual geographic features and feature properties.

Metadata is constructed hierarchically by sections, entities and elements. Metadata element is a basic unit of metadata to describe geographic data. An entity is a collection of similar metadata elements and/or metadata entities. A section is a subset of metadata, which defines a collection of similar metadata entities and/or elements. Metadata is consists of several sections. There are two kinds of entities: the single entity (S) which is formed by elements; the compound entity (C) is formed by both elements and entities.

Three classes are defined for metadata section, entity and element:

- Mandatory (M) — the main content of metadata. All metadata sections, entities and elements at this class are always occurrence;
- Conditional (C) — metadata sections, entities and elements at the this class present when the condition is satisfied;
- Optional (O) — metadata sections, entities and elements at the this class may be present or not. It is depended on different datasets.

Each metadata section, entity or metadata element has 7 attributes: name/role name, short name, definition, obligation/condition, maximum occurrence, data type and domain values.

- Name/role name is a label assigned to a metadata entity or to a metadata element. There are two kins of name in the national standard: the Chinese name and the English name to build close relationship with the ISO 19115.
- Short name is unique within this International Standard and may be used with the extensible Markup Language (XML) and ISO 8879 (SGML) or other similar implementation techniques.
- Definition is a description of a metadata entity or metadata element.
- Obligation/condition is a descriptor indicating whether a metadata entity or metadata element shall always be documented in the metadata or sometimes be documented (i.e. contains value(s)). This descriptor may have the values mentioned above: M (mandatory), C (conditional), or O (optional).
- Maximum occurrence specifies the maximum number of instances the metadata entity or the metadata element may have. Single occurrences are shown by "1"; repeating occurrences are represented by "N". Fixed number occurrences other than one are allowed, and will be represented by the corresponding number (i.e. "2", "3"...etc).
- Data type specifies a set of distinct values for representing the metadata elements; for example, integer, real, string, DateTime, and Boolean.

- Domain indicates the line numbers covered by the entity for an entity. For a metadata element, the domain specifies the values allowed or the use of free text.

2. CONTENTS OF METADATA

The Chinese national standard is divided into two levels: comprehensive and core metadata. It keeps all of ISO 19115 contents, except deleting the informative Annex I (Implementation examples) and informative Annex J (Multilingual support for free text metadata element), and adding an informative Annex K (Profile for the community of sharing geographic information); changing some elements with their Definition, Obligation /Condition, Maximum occurrence, Data type or Domain according to the Rules for creating an extension; extending some Codelists.

The comprehensive metadata gives full and more detailed information about data. It contains the complete metadata required to uniquely identify a dataset (independent dataset, dataset series, or individual geographic features and attributes). It fully defines the complete range of metadata required to identify, evaluate, extract, employ, and manage geographic information. They are consisted of ?? sections, ?? entities and more 300 elements which keep all of sections and most of entities and elements from the ISO 19115, while some elements about image data were added and some more detailed elements about data quality were deleted. The ?? sections are information of Identification, Constraints, Data Quality, Maintenance Information, Spatial Representation, Reference System, Content Information, Portrayal Catalogue Reference, Distribution, Metadata Extension Information, Application Schema Information. All of the information at the this level is much more detailed. It is necessary to make a profile from the metadata standard for a specified Community.

The core metadata just gives the general and macroscopically information about data to answer the questions about data: What, Where, When and Who. Its content is as the table below (Table 1). It is the same with the international standard. They are the core metadata elements (mandatory and recommended optional) required for describing a dataset, and used mainly for the purposes of cataloguing datasets or dataset series and supporting data clearinghouse activities and facilitating data discovery.

Dataset title (M) (MD_Metadata > MD_DataIdentification.citation > CI_Citation.title)	Spatial representation type (O) (MD_Metadata > MD_DataIdentification.spatialRepresentationType)
Dataset reference date (M) (MD_Metadata > MD_DataIdentification.citation > CI_Citation.date)	Reference system (O) (MD_Metadata > MD_ReferenceSystem)
Dataset responsible party (O) (MD_Metadata > MD_DataIdentification.pointOfContact > CI_ResponsibleParty)	Lineage (O) (MD_Metadata > DQ_DataQuality.lineage > LI_Lineage)
Geographic location of the dataset (by four coordinates or by geographic identifier) (C) (MD_Metadata > MD_DataIdentification.extent > EX_Extent > EX_GeographicExtent > EX_GeographicBoundingBox or EX_GeographicDescription)	On-line resource (O) (MD_Metadata > MD_Distribution > MD_DigitalTransferOption.onLine > CI_OnlineResource)
Dataset language (M) (MD_Metadata > MD_DataIdentification.language)	Metadata file identifier (O) (MD_Metadata.fileIdentifier)
Dataset character set (C) (MD_Metadata > MD_DataIdentification.characterSet)	Metadata standard name (O) (MD_Metadata.metadataStandardName)
Dataset topic category (M) (MD_Metadata > MD_DataIdentification.topicCategory)	Metadata standard version (O) (MD_Metadata.metadataStandardVersion)
Spatial resolution of the dataset (O) (MD_Metadata > MD_DataIdentification.spatialResolution > MD_Resolution.equivalentScale or MD_Resolution.distance)	Metadata language (C) (MD_Metadata.language)
Abstract describing the dataset (M) (MD_Metadata > MD_DataIdentification.abstract)	Metadata character set (C) (MD_Metadata.characterSet)
Distribution format (O) (MD_Metadata > MD_Distribution > MD_Format.name and MD_Format.version)	Metadata point of contact (M) (MD_Metadata.contact > CI_ResponsibleParty)
Additional extent information for the dataset (vertical and temporal) (O) (MD_Metadata > MD_DataIdentification.extent > EX_Extent > EX_TemporalExtent or EX_VerticalExtent)	Metadata date stamp (M) (MD_Metadata.dateStamp)

Table 1. Core metadata for geographic datasets (from ISO 19115:2003)

3. CODELISTS AND ENUMERATIONS

There are 28 Codelists and enumerations in the ISO 19115. Most of them were adopted as a part of the Chinese national metadata standard, while some codelist were modified to suit the Chinese situation, for example, the MD_CharacterSetCode << codelist >> has been added a new character set name 'GB 18030' with the code '030'. It is a new character set containing more than 20,000 Chinese characters. The original included set 'GB 2312' with the code '029' only has more 7,000 Chinese characters. Other examples are: using new names and codes to replace the original ones for the DS_InitiativeTypeCode <<CodeList>>; using the new definitions according to documents from the government of China replacing the original ones; adding a new name 'every ten days' with new code '013' in the MD_MaintenanceFrequencyCode <<CodeList>>.

Besides the 28 Codelists and enumerations, two new Codelist have been added in the national standard. One is SD_GeodeticReferenceSystem<< CodeList >> which lists several kinds of geodetic reference systems mainly used in China. There are Beijing Geodetic Coordinate System-1954, Xi'an Geodetic Coordinate System-1980, Independent Coordinate System, World Reference System, Geodetic Reference System-1980 and World Geodesy System-1984. Another is SC_VerticalReferenceSystem<< CodeList >> which lists several kinds of vertical reference systems mainly used in China. There are Huanghai Vertical Datum-1956, National Vertical Datum-1985, Independent Vertical Datum, Lowest Normal Low Water, Depth Datum, National Gravity Datum-1957 and National Gravity Datum-1985.

It is planed to replace all contents of the MD_TopicCategoryCode << Enumeration>> when another Chinese national standard 'Geographic information – rules for classification and coding of geographic features' has been constituted and published.

4. METADATA IMPLEMENTATION

Two forms of implementations could be used for the storage and management of digital geographic metadata. These two forms of implementation are:

- A flat-file metadata system is one in which the metadata are entered as fielded and potentially repeating elements within a structured text file. Such systems include full-text and fielded text document indexing software.
- A database metadata system is one in which the metadata are stored within a self-contained database management system and the metadata entries are only accessible via database methods. Such systems include relational, hierarchical, and object-oriented database management software.

The relation of spatial data to metadata may be one of the following:

- Spatial data are off-line. Metadata entries are made using written and derived information for the off-line information. In this case there is no direct linkages between the off-line data and on-line metadata.
- Spatial data is on-line and local to the metadata server. Metadata will be derived from managed characteristics of the spatial data and from producer-developed metadata elements.
- Spatial data is on-line but remote from the metadata server. Metadata will be input locally or forwarded as complete entries from or with consent of the originating organization. Linkages are made through the Distribution Information to provide direct access to remotely hold data on the network.

As an example, spatial data sharing system may include data nodes and communication network among nodes. Each data node shall include the metadata management system, metadata search and retrieval system, data access and browse system, data obtain system and the spatial databases.

The metadata management system is one of the core systems of the geospatial data sharing network system. The data providers use it to generate the metadata database from related spatial data sets. They also can manage, update and maintain the metadata databases through the metadata management system.

The metadata management system is mainly composed of the spatial metadata editor, the metadata index module and the metadata databases. The spatial metadata editor is developed according to the China metadata standard for geographic information. It provides a user-friendly interface to enable users to edit the spatial metadata and output in multiple formats such as XML, SGML, TXT, HTML. Then, users can index the metadata record and load it into the metadata database using the metadata index module.

The spatial metadata search and retrieval system adopts the Client/Server architecture. It is independent of any plat and

operation system. Communications between the metadata servers and spatial databases of each node in National Spatial Information Network System take place through the Internet. The system includes spatial metadata browser, WWW server, spatial metadata search and retrieval server and spatial metadata databases.

5. METADATA EXTENSION

Geographic information is information refer to resources, environment, society, economy, disaster, planning, management, etc. It is possible to make metadata extension in case of the metadata standard content does not meet the needs for a specified dataset. Metadata standard is needed to specify a method for metadata extending to accommodate user-defined requirements. Rules and procedures should be followed for metadata extension.

The metadata extension types could be:

- Extend the domain of a metadata element
- Add a new type of metadata element
- Add a new type of metadata entity
- Add a new type of metadata section
- Impose more limitation on a existing metadata element
- Impose more limitation on existing domain of a metadata element

The rules for metadata extension are as follows:

- Do not change the name, definition or type of an existing element.
- It is possible to define entities and include extended and existing metadata elements as components. If an existing metadata element is included in an extended metadata entity, no components of the existing metadata element are changed.
- It is permitted to impose more limitation on existed metadata elements.
- It is permitted to impose more limitation on domains of existed metadata elements.
- It is permitted to restrict the use of domain values.
- It is not permitted to extend anything not allowed by the standard.

The procedure for metadata extension is:

- Review of existing metadata elements, entities and sections, find those which need to be extended.
- Define the new extended metadata elements, entities or sections and their characteristics following the rules mentioned above.
- Define more limitation on existing metadata elements, or domains and domain values of existing elements.
- Make a conformance and testing on extended documentation of metadata standard.

6. A PROFILE OF THE NATIONAL STANDARD

Even the Chinese national standard modified some part of and is a profile of the ISO 19115:2003, it is a common and basic standard in China. It is very much complicated and detailed to suit any types of spatial data. It is necessary to make a profile from the standard for a specified purpose and to make extensions if it is needed. It should be the basis for creating profiles of metadata standard for different communities in China. To help creating profiles, the profile for the community of sharing geographic information and 4 examples are given in the annex K of the Chinese national standard.

As an example, the profile of the national standard for the community of sharing geographic information is mainly for data cataloguing, dataset description or data service of clearinghouse at the different communities in China, such as the engineering of scientific data sharing, the e-government, digital China (including digital industry, digital province, digital city, etc.).

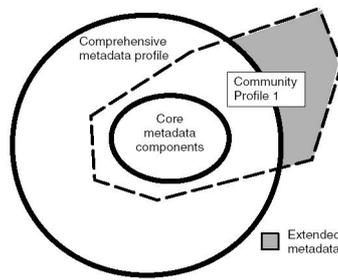


Figure 1. Metadata community profile (from ISO 19115:2003)

According to the rules for creating a profile based a existing base standard (Fig.1), the profile keeps all entities and elements of core metadata and some others selected from the comprehensive metadata. And extended some elements specially for imagery data. The sections of the profile are information of Identification, Constraints, Data Quality, Reference System, Content Information, Distribution, Metadata Extension Information (Fig. 2). The total number of entities and elements is about 140.

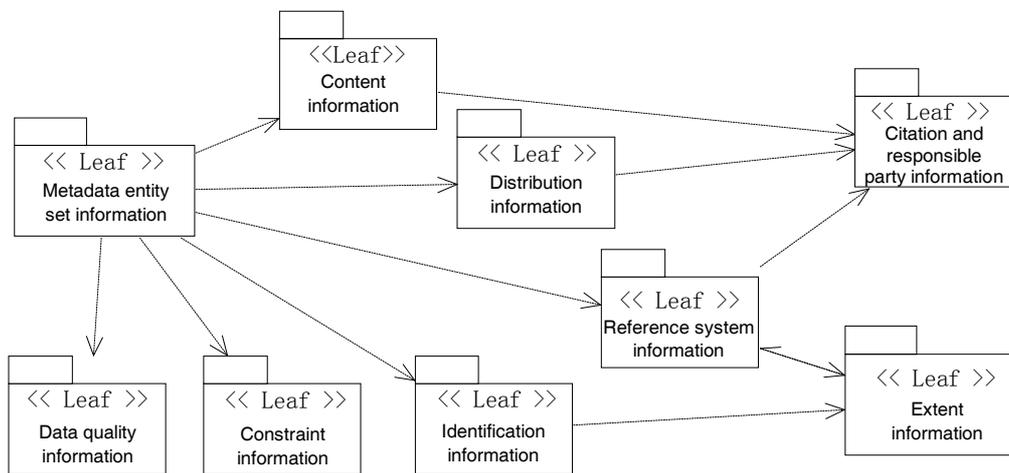


Figure 2. Metadata packages of the profile

Metadata of the profile is defined using an abstract object model in the Unified Modelling Language (UML). Total 9 diagrams provide “views,” which are portions of the total abstract model for metadata of the profile. Each diagram defines a metadata section (UML package) of related entities, elements, data types, and code lists. Related entities, which are defined in another diagram, are shown with elements suppressed and the defining package specified under the entity name in parenthesis. A data dictionary describes the characteristics of the metadata defined in the profile. The dictionary is specified in a hierarchy to establish relationships and an organization for the information. The dictionary is categorised into sections by UML model package diagram: Each UML model class equates to a data dictionary entity. Each UML model class attribute equates to a data dictionary element.

Of course, the profile is just an example showing how to create a profile from the base national standard. It is allowed to make some changes to the profile including delete, modify and/or extend some contents when using it for a special use.

For implementing the profile standard, a tool software to input, edit and integrate metadata has been developed and tested through several Chinese national key research projects, such as the National Fundamental Geographic Information System of China (NFGIS), the Chinese Sustainable Development Information Sharing System (SDINFO) and the China Spatial Information (SCI) Network.

The main functions of metadata tool software are:

- Using XML database management system to collect the data of each dataset’s metadata.
- Utilizing XML format to submit metadata from remote distance.
- Controlling the user’s access authorization.
- Distributing and accessing metadata base on XMLRPC interface. People can access it by keying in any Chinese words.
- Base on the JAVA and PHP, developing software to ensure installation and run in multi- operation system.

The profile and related software have been published on the web. The website is: <http://nfgis.nsd.gov.cn/> or <http://nfgis.nsd.gov.cn/sdinfo>. Some training courses are planned to help people better understand the standard.

7. AN EXAMPLE OF METADATA

As an example, the metadata of the 1:1M-Scale Topographic Data Base of the National Fundamental Geographic Information System of China is attached here (XML) :

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<Metadata>
  <mdFileID> meta_xxx.xml </mdFileID>
  <mdLang> zh </mdLang>
  <mdChar> GB2312 </mdChar>
  <mdContact>
    <rpOrgName> National Geomatics Center of China (NGCC) </rpOrgName>
    <rpCntInfo>
      <cntAddress>
        <delPoint> No. 1 Baishengcun, Zi Zhu Yuan </delPoint>
        <city> Beijing </city>
        <adminArea> Beijing </adminArea>
        <postCode> 100044 </postCode>
        <country> China </country>
        <eMailAdd> std@nsdi.gov.cn </eMailAdd>
      </cntAddress>
      <cntOnLineRes>
        <linkage> http://nfgis.nsd.gov.cn </linkage>
      </cntOnLineRes>
      <voiceNum> +86-10-68462660 </voiceNum>
      <faxNum> +86-10-68424101 </faxNum>
    </rpCntInfo>
    <role> Metadata vindicator </role>
  </mdContact>
  <mdDateSt> 2003-11-27 </mdDateSt>
  <mdStanName> The profile of the national standard "Geographic information - metadata" for the community of
    sharing geographic information
  </mdStanName>
  <mdStanVer> 1.0 </mdStanVer>
  <dataIdInfo>
    <DataIdent>
      <idCitation>
        <resTitle> The 1:1M-Scale Topographic DataBase of the National Fundamental Geographic
          Information System of China
        </resTitle>
        <resRefDate>
          <refDateType> published </refDateType>
          <refDate> 1994-08-01 </refDate>
        </resRefDate>
        <resEd> 1.0 </resEd>
      </idCitation>
      <idAbs> Covering entire China. Data contain administrative bountry, reservation, hydrography, railway,
        road, hypsography, vegetation, etc. The data source is the topographic map at the scale of
        1:1,000,000 published in 1980s, with totally 77 map sheets. Data are divided into 17 layers.
      </idAbs>
      <idPurp> As a common platform for locating all kinds of thematic data for governments, organizations,
        institutions, agencies and so on; for compiling small scale maps in digital or simulative
        form.
      </idPurp>
      <idStatus> Completed </idStatus>
    </DataIdent>
  </dataIdInfo>
</Metadata>
```

```

<idPoC>
  <rpOrgName> State Bureau of Surveying and Mapping </rpOrgName>
  <rpCntInfo>
    <cntAddress>
      <delPoint> No. 9 Shanlihe Road </delPoint>
      <city> Beijing </city>
      <adminArea> Beijing </adminArea>
      <postCode> 100830 </postCode>
      <country> China </country>
      <eMailAdd> mailbox@sbsm.gov.cn </eMailAdd>
    </cntAddress>
    <voiceNum> +86-10-68337751 </voiceNum>
    <faxNum> +86-10-68321893 </faxNum>
  </rpCntInfo>
  <role> Management </role>
</idPoC>
<descKeys>
  <keyword> surveying and Mapping  fundamental geographic information  spatial data  database
    information sharing  GIS  NFGIS
  </keyword>
</descKeys>
<resConst>
  <SecConsts>
    <class> Unclassified </class>
  </SecConsts>
</resConst>
<resConst>
  <LegConsts>
    <useLimit> Execute the “ordain for using the data of the National Fundamental Geographic
      Information System of China”
    </useLimit>
  </LegConsts>
</resConst>
<deFormat>
  <formatName> ArcGIS </formatName>
  <formatVer> 8.3 </formatVer>
</deFormat>
<spatRpType> Vector </spatRpType>
<dataScale>
  <equScale> 1,000,000 </equScale>
</dataScale>
<dataLang> zh </dataLang>
<dataChar> GB2312 </dataChar>
<tpCat> Fundamental Geography </tpCat>
<dataExt>
  <geoEle>
    <GeoBndBox>
      <eastBL> 136°E </eastBL>
      <southBL> 3°N </southBL>
      <westBL> 72°E </westBL>
      <northBL> 54°N </northBL>
    </GeoBndBox>
  </geoEle>
</dataExt>
<dataExt>
  <exDesc> Countrywide </exDesc>
</dataExt>
</DataIdent>

```

```

</dataIdInfo>
<dqInfo>
  <dqScope> The dataset </dqScope>
  <dqDescription>
    <dqStatement> Follow the 1:1,000,000 Map Specification
    </dqStatement>
  </dqDescription>
  <dataLineage>
    <statement> (omited)
    </statement>
  </dataLineage>
</dqInfo>
</refSysInfo>
<refSysInfo>
  <MdCoRefSys>
    <ellipsoid> Krasovsky ellipsoid </ellipsoid>
    <datum> Beijing Geodetic Coordinate System 1954 </datum>
  </MdCoRefSys>
</refSysInfo>
<contInfo>
  <FetCatDesc>
    <incWithDS> No </incWithDS>
    <catFetTypes> The data contains: administrative boundary, residence, transportation, hydrography and
      fictitious graticule. Divided into 9 layers. It includes national boundary, administrative
      boundaries of provincial, district and county, cities, residences, airports, railways,
      lords, bridges, rivers, lakes, reservoirs, reefs, and so on.
    </catFetTypes>
    <fetAttDesc> Attribute names and their definitions are: GB_CODE —— feature classification code
      (GB/T 13923-92); CNTY_CODE —— administrative code (GB/T 2260-2000);
      NAME —— name in Chinese; PYNAME —— name in pinyin; CLASS——
      administrative level of residence; ISO3166——Country codes in 3 characters (ISO
      3166-1); IKO —— codes of airports (ICAO); VALUE —— longitude or latitude.
    </fetAttDesc>
  </FetCatDesc>
</contInfo>
<distInfo>
  <onLineSrc>
    <linkage> http://ngcc.sbsm.gov.cn </linkage>
  </onLineSrc>
  <distFormat>
    <formatName> ArcGIS E00 </formatName>
    <formatVer> 8.3 </formatVer>
  </distFormat>
  <distributor>
    <distorCont>
      <rpOrgName> National Geomatics Center of China (NGCC) </rpOrgName>
      <rpCntInfo>
        <cntAddress>
          <delPoint> No. 1 Baishengcun, Zi Zhu Yuan </delPoint>
          <city> Beijing </city>
          <adminArea> Beijing </adminArea>
          <postCode> 100044 </postCode>
          <country> China </country>
          <eMailAdd> xinxi@nsdi.gov.cn </eMailAdd>
        </cntAddress>
        <cntOnLineRes>
          <linkage> http://ngcc.nsdi.gov.cn </linkage>
        </cntOnLineRes>
      </rpCntInfo>
    </distorCont>
  </distributor>

```

<voiceNum> +86-10-68462660 </voiceNum>
<faxNum> +86-10-68424101 </faxNum>
</rpCntInfo>
<role> Distributor </role>
</distorCont>
<distorOrdPrc>
<distorOrdPrc> Please contact the distributor </distorOrdPrc>
</distorOrdPrc>
</distributor>
</distInfo>
</Metadata>

REFERENCES

- [1] China national standard: Geographic Information – Metadata (FGB)
- [2] ISO 19115:2003 Geographic Information - Metadata
- [3] FGDC, (1997), Content Standards for Digital Geospatial Metadata, V.2.0
- [4] Jiang Jingtong, Liu Ruomei, Zhou Xu, etc. (2003), On the developing and implementation of the national standard Geographic Information – Metadata, *Geomatics World* , Vol. 01 No.5
- [5] Jiang Jingtong, Liu Ruomei, (2004), Analyzing the Chinese National Standard: ‘Geographic Information – Metadata’, *Proceedings of the Conference of Cartography and GIS of China*
- [6] Liu Ruomei, Jiang Jingtong, etc. (1999), Implementation of Matadata Standard of Information Sharing for Sustainable Development of China, *Research on the China Geographic Information Metadata Standard*, Sciences Publishing House

BACKGROUND

Name: JIANG JINGTONG

Employment: National Geomatics Center of China (NGCC), State Bureau of Surveying and Mapping (SBSM)

Title / Position: Professor / Former vice-director of NGCC

Professor Jiang Jingtong is one of the earliest experts researching on GIS in China. As the key project leader, he has worked on the National Fundamental Geographic Information System of China (NFGIS), especially the 1:1M- and 1:250,000-scale Topographic Databases cover the whole China. He is the deputy director of the Subcommittee for Data Quality and Standardization of the CSGIS, since 1994, and was the head of the Chinese secretariat for the ISO/TC 211, 1995~2002 and the deputy director and secretary of the National Technical Commission of Geographic Information Standardization of China, 1997~2003.