INTERNATIONAL STANDARD

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Geographic information — Classification systems —

Part 2: Land Cover Meta Language (LCML)

Information géographique — Systèmes de classification —

Partie 2: Métalangage de couverture du sol (LCML)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 19144-2 was prepared jointly by the Food and Agriculture Organization of the United Nations (UNFAO) and Technical Committee ISO/TC 211, *Geographic information/Geomatics* under a cooperative agreement between the two organizations.

ISO 19144 consists of the following parts, under the general title *Geographic information — Classification systems*:

— *Part 1: Classification system structure*

— *Part 2: Land Cover Meta Language (LCML)*

Introduction

Efficient assessment of land cover and the ability to monitor change are fundamental to sustainable management of natural resources, environmental protection, food security and successful humanitarian programmes. Such information is also required to help towards raising levels of nutrition, improving agricultural productivity, enhancing the lives of rural populations and contributing to sustainable growth of the world economy. However, in the past, policy-makers and planners have not had access to reliable and comparable land cover data, not only for lower-income countries but also at the regional and global levels.

Access has been limited by two factors: Lack of mapping activities and lack of commonality between systems. The solution has been to carry out separate regional mapping projects using national or regional land cover classification systems. However, it has not been possible to compare or to exchange information between current systems.

The aim of this part of ISO 19144 is to enable the comparison of information from existing classification systems in a meaningful way without replacing them. The aim is to complement the development of future classification systems that can offer more reliable collection methods for particular national or regional purposes by allowing them to be described in a consistent manner.

A critical factor in implementing such global activities is the availability of a common, umbrella land cover classification system structure. This then provides a reliable basis for interaction without replacing the increasing number of national, regional and global land cover mapping and monitoring activities. This enables comparisons of land cover classes to be made regardless of mapping scale, land cover type, data collection method or geographic location.

Another critical factor is the availability of a common reference for land cover classification systems. This part of ISO 19144 provides a metalanguage expressed as a UML model that allows different land cover classification systems to be described.

This part of ISO 19144 establishes a metalanguage for a set of objects and rules (language) to describe land cover features based on physiognomy that can be part of different land cover legends (nomenclature). This provides a framework for comparing different systems and nomenclatures such as Corine, Africover, Anderson (USGS), Global Map and national systems without replacing them. This is not a description of a nomenclature nor is it a description of a specific set of classes.

Geographic information — Classification systems —

Part 2:
Land Cover Meta Language (LCML)

1 Scope

This part of ISO 19144 specifies a Land Cover Meta Language (LCML) expressed as a UML metamodel that allows different land cover classification systems to be described based on the physiognomic aspects. This part of ISO 19144 also specifies the detailed structure of a register for the extension of LCML but does not specify the maintenance of the register. This part of ISO 19144 recognizes that there exist a number of land cover classification systems. It provides a common reference structure for the comparison and integration of data for any generic land cover classification system, but does not intend to replace those classification systems.

2 Conformance

2.1 Classes

Three conformance classes are identified in this part of ISO 19144.

2.2 Conformance of a land cover classification system

A land cover classification system, as defined in accordance with the LCML defined in this part of ISO 19144, shall satisfy the conditions specified in the following abstract test suite:

a) ISO 19144-1 (Annex A) for general conformance of the classification system;

b) A.2.

2.3 Conformance of a register for the extension of the metalanguage

The register defined in this part of ISO 19144 shall satisfy all of the conditions specified in the following abstract test suites:

a) ISO 19135 for the general register structure;

b) A.3.1 for the minimum register content;

c) A.3.2 for uniqueness of registered metaclass names;

d) A.3.3 for backward compatibility.

2.4 Conformance of a comparison process of land cover classification systems

The process of comparison of two land cover classification systems shall be done by developing descriptions of the two land cover classification systems, each in accordance with the abstract test suite in A.2, and then identifying the differences in accordance with the abstract test suite in A.4.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 19109:2005, *Geographic information — Rules for application schema*

ISO/TS 19103:2005, *Geographic information — Conceptual schema language*

ISO 19144-1:2009 *Geographic information — Classification systems — Part 1: Classification system structure*

ISO 19135:2005, *Geographic information — Procedures for item registration*

4 Terms, definitions, and abbreviations

4.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The technical terms applying to plant physiognomy, and terms from other disciplines used to establish the classifiers in the classification scheme are not defined in this part of ISO 19144.

4.1.1
abstract test suite
abstract test module specifying all the requirements to be satisfied for conformance

[ISO 19105:2000, 3.4]

4.1.2
classification
abstract representation of real world phenomena using **classifiers** (4.1.4)

[ISO 19144-1:2009, 4.1.4]

4.1.3
classification system
system for assigning objects to classes

[ISO 19144-1:2009, 4.1.5]

4.1.4
classifier
definition used to assign objects to **legend classes** (4.1.11)

[ISO 19144-1:2009, 4.1.6]

NOTE Classifiers can be algorithmically defined, or defined according to a set of **classification system** (4.1.3) specific rules.

4.1.5
feature
abstraction of real world phenomena

[ISO 19101:2002, 4.11]

EXAMPLE The phenomenon named “Eiffel Tower” can be classified with other similar phenomena into a feature type named “tower”.

4.1.6
item class
set of items with common properties

[ISO 19135:2005, 4.1.6]

NOTE Class is used in this context to refer to a set of instances, not the concept abstracted from that set of instances.