Using ISO standards to design a metadata registry for climate data

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Abstract

The climate modelling community collaborate globally to generate a coordinated portfolio of climate simulations which serve to advance scientific understanding and to support the Assessment process of IPCC. The interoperability of data products among the participating institutions is guaranteed by a detailed specification of the parameters to be archived and the associated metadata requirements. This paper looks at the potential for increasing interoperability towards users outside this core community by expressing metadata requirements through the language of ISO standards on metadata registries.

Keywords: Data registry, Climate data management

1. Introduction

The CMIP6 Data Request provides detailed technical specifications of thousands of climate parameters which are being archived by climate modelling centres around the world as part of a global effort to update the set of reference climate simulations which guide global policy on climate change mitigation and adaptation.

The DREQ is built on domain standards which have evolved with the CMIP project. In this paper we explore the feasibility and potential benefits associated with expressing these specifications through ISO standards.

The work cuts across a range of standards which are introduced in Section 1.1 below, covering aspects of geospatial referencing, physical quantities,

and the organisation and processes inherent in running a registry of metadata specifications.

The expected benefits will be both in terms of inter-operability with other standards which deal with environmental information and also in terms of learning from and exploiting practises which are embedded in the ISO standards.

1.1. Exploiting the International Standards Organisation [ISO]

[provisional literature notes]

[1] describes the ise of 11179 to facilitate exchange across clinical work and care domains.

The main pillars of the work will be:

ISO 11179. [Metadata Registry 2, 3] provides a framework for the organisational structure of a metadata registry and for the technical specifications of the registers within that registry. Critically, this clarifies the decision processes and responsibilities surrounding the registration of new items.

Here are two sample references: [3].

[4] provides information on geospatial referencing.

2. Overview of the metadata structures

3. Conclusions

The mapping of the DREQ onto the ISO standards reveals areas where improvements can be made in terms of clarity of decisions making processes and a structured approach to definingthe attributes which characterise registered items.

There does not appear to be any inherent obstacle to full compliance, though it has not been the purpose of this paper to compile a full technical specification.
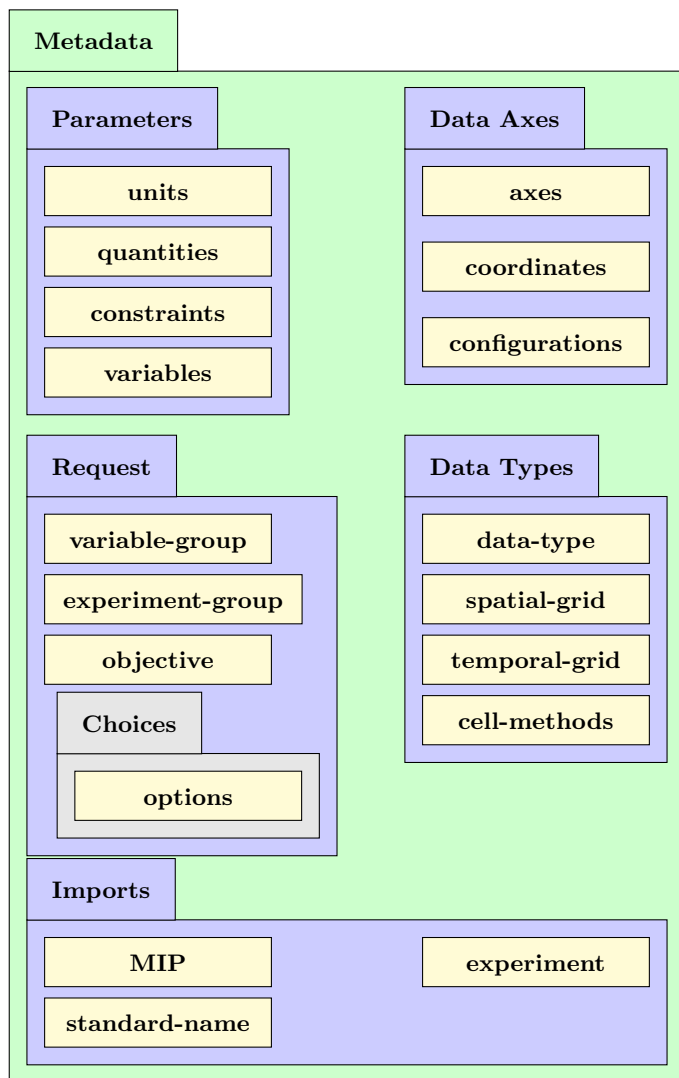
Metadata

Parameters

units

quantities

constraints

variables

Data Axes

axes

coordinates

configurations

Request

variable-group

experiment-group

objective

Choices

options

Data Types

data-type

spatial-grid

temporal-grid

cell-methods

Imports

MIP

experiment

standard-name

Figure 1: The metadata package is split into 5 sub-packages characterised by different harmonization and conformance requirements and mechanisms.

4. References

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