Interactive
Comment

Interactive comment on "The GPlates Geological Information Model and Markup Language" *by* X. Qin et al.

X. Qin et al.

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Response to General Comments

We would like to thank Simon Cox for providing some valuable comments about our paper.

The GPML was designed as an effective way to exchange data in plate tectonic research community. Publishing GPML data on remote accessible media through service was always the fundamental consideration during the design of GPML. This is why we have chosen GML, an ISO, AS/NZS and CEN standard, upon which to build GPML. All the data processed in GPlates can be serialised as GPML data, and which in turn can be exchanged in a GML-compliant network and understood easily by a GML-capable

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Interactive Discussion

Discussion Paper

software application (with GPML extension or plug-in).

In this paper, we focus on how to design an information model and xml schema which is compliant with GML and can satisfy requirements from users specifically for plate tectonic research community. We aim to implement a solution which balances the interoperability and standards with community driven needs for simplicity and efficient handling of data and metadata.

How to set up a server to publish GPML data or how to achieve interoperability between applications by using GPML is outside of the scope of this paper. Currently, GPlates developers are setting up a python web framework to publish GPML data in the NeCTAR cloud . Therefore, GPlates users will likely be able to access GPML data and GPlates services from the NeCTAR cloud in the future.

Response to Specific Comments

#1.Feature

With regard to section 2.1, we will mention that location is not mandatory according to definition of "Feature" in ISO 19101:2003 "Geographic Information - Reference Model".

#2.GML version

The GPlates project was initiated in 2003 and has since had a successful history and major uptake in the community (the user community spans 137 countries). We based the GPML on an old version of GML and we are doing what we can to consider the latest GML standard, depending future funding.

#3.Feature identity

In section 2.1, more introductory material will be provided for feature identity.

#4.Feature-type hierarchy

There is detailed description for each feature type on the EarthByte website,

http://www.earthbyte.org/Resources/GPGIM/public/, which has been mentioned in the introduction section of this paper. The only reason we didn't put the descriptions in the paper is its length. We will emphasize this webpage link in section 2.1 and explain that we cannot include a description for each feature type due to the large number of feature types in the GPGIM.

#5.Feature property

In section 2.2, we will mention the feature property concept is inherited from GML which implements the OGC Reference Model, which in turn is based on the ISO 19101 Reference Model.

For section 2.2.2, we will look into the spatio-temporal field of 'coverage' (ISO 19123). Also we do use GML coverages for velocity fields and rasters (specifically the coverage range is a 'gml:DataBlock' for velocities and 'gml:File' for rasters - the latter being time-dependent, although it's GPML time-dependent, not GML time-dependent).

#6.The "To alleviate the disorder brought by heterogeneous data" inaccuracy

We agree. The phrase "To alleviate the disorder brought by heterogeneous geospatial data" is more accurate.

#7.Citation for coverages

A citation to ISO 19123:2005 will be provided in section 4.5.

#8.Raster

We agree that it is a good idea to mention that "Raster is typically a discrete sampling of a spatial function or coverage". And we will also mention that netCDF is now an OGC standard. Our current primary objective is to support multiple raster formats on the desktop but, in the future, we plan to look into netCDF in more detail in relation to WCS. We currently mention part-way through section 4.6 that "A Raster feature is conceptually a GML coverage feature which is essentially a regular feature with

gml:domainSet and gml:rangeSet properties that specify the positions and values of the coverage data.". Following that we mention why our raster feature type does not currently inherit from gml:AbstractCoverageType (and we mention that this may change in the future).

#9.Interoperability

In section 4.8, we focus on the interoperability between the GPGIM and the data format used by other software applications, such as the legacy plate rotation files (*.rot), GMT OGR files and ESRI shapefiles, etc. We didn't talk much about the interoperability of GPML. Since GPML is an application schema of GML, GPML should have inherited all the interoperability merits from GML as long as we used GML blocks and made it GML-compliant.

#10."Fig 1"

The InstantaneousFeature is a snapshot of TimeVariantFeature, which means all time-dependent properties have been lost in an InstantaneousFeature instance. Some-times, an InstantaneousFeature instance needs to refer to the original TimeVariant-Feature instance to look for time-dependent properties. Hence, in GPGIM, each In-stantaneousFeature contains an optional "feature reference" which maintains a link to the original TimeVariantFeature. Conceptually, each InstantaneousFeature "has a" TimeVariantFeature; each TimeVariantFeature could belong to a variable number of InstantaneousFeature instances. And, obviously, the life circle of TimeVariantFeature instance is independent of InstantaneousFeature instance. This is the reason why I used an aggregation to represent the relationship between InstantaneousFeature and TimeVariantFeature. We will explain the relationship between InstantaneousFeature and TimeVariantFeature a little bit more in revised manuscript.

#11."Figs 8-21, 26-29"

This is a good suggestion. However, it seems both XML Spy and oXygen are propri-

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Interactive Discussion

Discussion Paper

etary software. As GPlates is open source software we focus on openly available tools. We will investigate the issue of a suitable free XML graphical editor.

#12.The 'a widely accepted standard' issue

We will change it to "an ISO, AS/NZS and CEN standard".

#13.The GML citation problem

We have no strong physical or emotional attachment to GML Version 2.x. We will change the reference to the following.

"Portele, C. (Ed.) (2007) Geography Markup Language (GML) Encoding Standard v3.2, OGC Implementation Standard. OGC document 07-036 http://www.opengis.net/doc/gml (Also published as ISO 19136:2007).

The GML Version 2.x has been used in GPlates only because of the historical reason. We are doing what we can to follow up with the latest GML standard.

#14.The 'Panagiotis, 2005' citation error

"Vretanos, P. A. (editor): Web feature service (WFS) implementation specification, OGC document, 04-094, 2005."

#Note: "NeCTAR is partnering with Australian institutions and research organisations to create, for the first time, a national research cloud for Australian researchers. The University of Melbourne has built the first node of the research cloud, operational now, and further nodes will be commissioned by other research institutions throughout 2012." (quotation from http://www.nectar.org.au/research-cloud)

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Interactive Discussion

Discussion Paper

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 2, 365, 2012.