

RELEASE OF THE GLOBAL MAP DATA SET VERSION 1

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ABSTRACT:

Global Map is global digital framework geographic information. 179 countries and regions participate with the project to develop the Global Map and over 96 % of whole land areas of the earth are included in the project. The first version of the Global Map data set has released by June, 2008.

Global Map consists of eight layers, namely, boundaries, drainage, transportation, population centers, elevation, land-cover, land-use and vegetation. The scale of Global Map is 1 to 1 million or 1 km resolution. The former four layers are provided by vector format and the latter four layers are provided as raster images.

For monitoring and evaluation of the global environment issues, the data have to be updated continuously. Therefore, the Global Map is planned to update in every five years.

1. Introduction

The Global Map is a digital geographic data set covering almost whole land area of the earth. In 1992, Earth Summit was held in Rio de Janeiro, Brazil, and “Agenda 21” was adopted as an action program for addressing global environment problems. Agenda 21 says various kinds of information are essential for decision making to realize sustainable development. In response to this program, the Ministry of Construction of Japan has proposed concept of global map and preparation works to launch the Global Mapping Project has been started. In 1996, International Steering Committee for Global Mapping (ISCGM) was established in order to promote the project. Actual works to develop Global Map data started in 1998 in a few countries which have already participated to the project. Currently 179 countries

and regions participate the project and most of them have released Global Map version 1 by June 2008.

This paper briefly summarizes the Global Mapping Project and introduces the Global Map version 1.

2. Participants

The Global Mapping Project is being promoted by voluntary participation of national mapping organizations and regional geographic information organizations in the world. In 1998, ISCGM called for participation to the project to the National Mapping Organizations around the world with a letter of Director of department of statistics, UN. After that, the Secretariat of ISCGM was continuing the calling to the un-participating countries and regions. These approaches are continued still now. As a result of these activities, the number of participating countries and

regions were continuously increasing and it is 179 (163 countries and 16 regions) as of April 30, 2008 (Figure. 1).

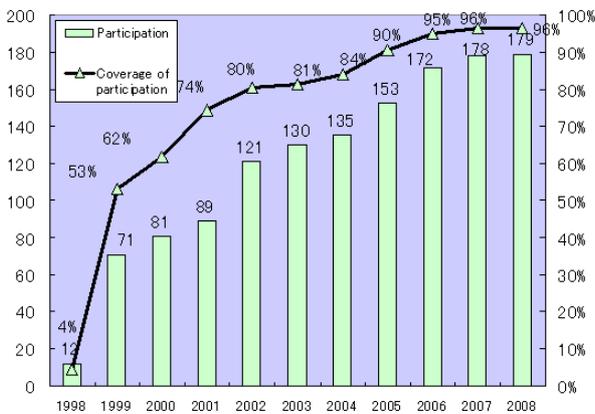


Figure 1 Number of participating countries and regions (As of April 30, 2008)

3. ISCGM

International Steering Committee for Global Mapping (ISCGM) was established in 1996. The primary purpose of ISCGM is to examine measures that concerned national, regional and international organizations can take to foster the development of Global Mapping in order to facilitate the implementation of global agreements and conventions for environmental protection as well as the mitigation of natural disasters and to encourage economic growth within the context of sustainable development. The Committee consists of 20 members from the representatives of national mapping organizations and regional geographic information organizations in the world except for the chair of ISCGM. Currently ISCGM is chaired by Professor D. R. F. Taylor of Carlton University, Canada. Geographical Survey Institute (GSI), Japan has been working as its secretariat since its establishment. ISCGM holds meeting basically once a year and makes or updates the specification of the Global Map and strategies to promote data development, cooperation between participants, use of the Global Map and other all issues concerning the project.

4. Specifications of the Global Map

The Global Map is a digital data set with the scale of 1 to 1 million or 1km resolution. It is composed of 8 layers, namely Boundaries, Drainage, Transportation, Population centers, Elevation, Land cover, Land use and Vegetations (Figure.2). First four layers are vector data and latter four layers are raster images.

ITRF94 coordinate systems are used for the reference coordinate system. GRS80 ellipsoid will be adopted to represent the position of spatial objects in longitude and latitude.

Regarding accuracy of the Global Map, followings are described in the latest specification (version 1.3). Absolute horizontal and vertical accuracy will vary by location according to the source data.

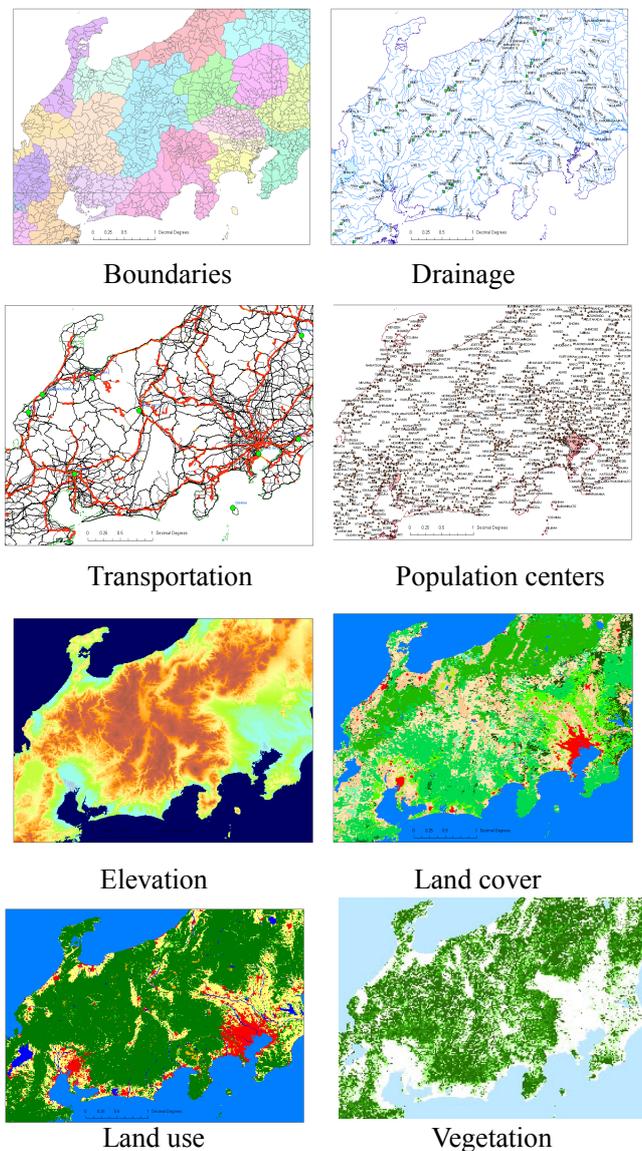


Figure 2 Layers of Global Map

Absolute accuracy is defined as the difference between the stored coordinates and the true coordinates for a specific point.

For horizontal accuracy, 90% of points will be within $\pm 2\text{km}$ of their actual location. In the case of data obtained from satellite images, the maximum error is less than or equal to 0.5km . July, 2007. Vertical accuracy is notionally ± 150 meters for 90% of points. This figure may need to be reviewed once the data are available, as sources to this accuracy may not be available in areas of high relief.

The format for vector data are the Vector Product Format (VPF), which are developed United States National Imagery and mapping Agency (NIMA). For raster data, the format is Band Interleaved by Line (BIL) with separate headers.

5. Data Development

Participants are expected to develop Global Map data of their own countries. But for some countries, it isn't easy to develop the data by themselves because of their financial or technical situations. For those countries, other some countries, such as Japan, support them to develop their data. In general, the Global Map data are developed from existing small scale maps of the country or region. But existing global digital data set such as V-map 0 or satellite images are used in case of there are no appropriate data for Global Map (Figure 3.).

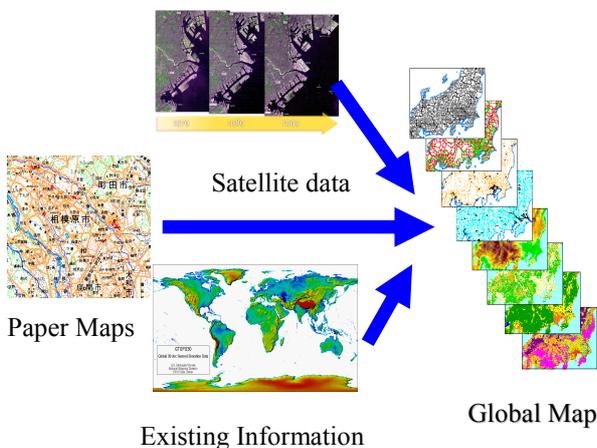


Figure 3. Data Development

Data which are developed as source of the Global Map will be sent to the Secretariat and converted to the Global Map format. Finally, converted data will be sent back to the concerned country and are checked again by them. The process of data development and the role of ISCGM are shown in figure 4.

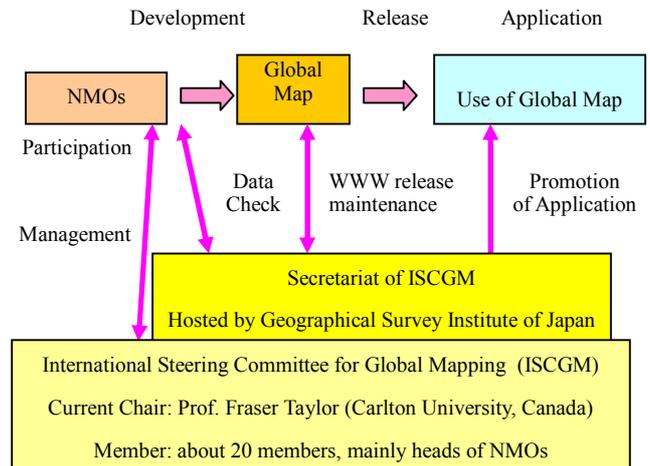


Figure 4 Framework of the project

Land cover, land use and vegetation layers, they were similar concepts and it is difficult for some countries to develop these layers by themselves. Therefore, ISCGM studied this issue and concluded that it was effective to develop land cover and vegetation layers not for country by country but for whole globe using satellite images. Based on this new idea, these two layers are developed and released in June, 2008. Main works have done by GSI and Chiba university of Japan but other NMOs also played important role such as collection of GCP and validation works for improving quality of the data. Specification has been also revised for these two layers. New vegetation layer is percent tree cover by 1km mesh. Land surfaces are classified into 20 land covers in new layer.

6. Data release

The developed data as the Global Map are released separately by country or region. In year of 2000, the data of Japan, Nepal, Laos, Sri Lanka and Thailand have been released for the first time. But the number of countries and regions which released their Global Map has not increased so fast in those days. Therefore,

tentative version which is used the existing global geographic data sets such as GTOPO30 and GLCC for raster data and changed the specification to those of the Global Map were developed and released as global Map version 0. On the other hand, WSSD was held at Johannesburg, South Africa in 2002 and adopted Johannesburg plan of Implementation. The plan called for promoting initiatives and partnerships for Global Mapping and a target which the whole land areas of the earth would be covered by 2007 was set up. As a result, development of the data were promoted by each participant and the data of almost all land areas of the earth except for few areas such as those of non-participating countries have been released by June, 2008 as the Global Map version 1.

Copy rights of the data are owned by each country/region, but there are free of charge when they are used for non-profitable purposes. Previously, all data used to be released from ISCGM web site. User registers his/her e-mail address and gets ID number and password, and they can download the data which they want. But the way of data release begins to change. In the 14th meeting, July, 2008, ISCGM resolved to recommend that participating organizations interested released their Global Map data from their own website. Of course, for some countries, it isn't easy to release their Global Map by their own website. In this case, those data are continuously released from the website of ISCGM. By this resolution, it is expected that the awareness and use of the Global Map will be increased in those countries.

7. Issues to be solved and future plan

7.1 Data format for vector layers

As mentioned above, data format of vector layers is VPF. This format was adopted by ISCGM because it was able to describe various geographic data and it was completely opened to the public and so on. On the other hand, there is no common GIS software which can deal with the data of VPF directly. As a result, ISCGM has decided to release the Global Map data with user friendly format and change the format of vector data to other ones in the next stage. Now, the

discussion continues in the ISCGM and GML3 will be used as new format for releasing.

7.2 Use of the Global Map

Global Map should be used for various purposes such as evaluation of current global environment, disaster countermeasures, decision making for sustainable development, education for global issues and so on. In order to promote the use of the Global Map, many kinds of activities should be done. "The Global Mapping Forum 2008" has been held on 5th -7th June, 2008 at Tokyo, Japan as one of those activities of this purpose. In the forum, a lot of data producers and users participated and discussed how to promote the data use. Various activities like the forum are necessary and we will continue those activities.

7.3 Development of the Global Map version 2

Global environment will be change with time passing. It is necessary to update the Global Map data to show the current status of the earth and its change. Therefore Global Map will be updated with cooperation of participating organizations by 2012 and released as version 2.

Towards to the development of the Global Map version 2, some changes of the specifications will be also discussed and implemented.

8. Conclusions

The concept of Global Map was proposed in 1992, after the Earth summit at Reo de Janeiro and through some preparing period, ISCGM was established in 1996. Actual data development of the Global Map, scale of 1 to 1 million, with 8 layers has started in 1998 and continued it in 179 participating counties and regions. As a result, the Global Map version 1 has released by June, 2008. Since updating of the data is necessary to monitor the changes of global environment, Global Map version 2 will be developed and released by 2012.

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