

Global Mapping Project by National Mapping Organizations on the Globe

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SUMMARY

Global Mapping Project is a project to develop digital geographic data in 1km resolution covering the whole land area of the globe with consistent specifications under international cooperation among National Mapping Organizations (NMOs) on the globe. Responding to the case of Agenda 21 which points out lack of geographic information for decision making, Ministry of Construction of Japan advocated a concept to develop such geographic data, so called "Global Map" under international cooperation in 1992. This concept became a concrete project in 1998 after getting support of United Nations as well as various NMOs on the globe. In 2002 at the World Summit on Sustainable Development (WSSD), Global Mapping was registered as a Type II partnership / initiative led by International Steering Committee for Global Mapping (ISCGM), where completion of global coverage of the Global Map by the year 2007 was declared.

As of end of January 2005, 137 organizations participated in this project, and 20 of them completed the development of Global Map of their countries, which correspond to 13 % of whole land area of the globe. In order to complete global coverage by the year 2007, participation of Arabic and African countries, where participation remains in relatively low level, is indispensable. Objective of this paper is to inform countries in those regions of the importance of this project, and to invite them to work together to complete global land coverage by Global Map by the year 2007.

This paper describes the past, present and future of the Global Mapping Project. It also describes how Global Map is useful for analyzing global environment issues and attaining sustainable development, and thus great contribution by NMOs to the global society as well as respective country.

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1. GLOBAL MAPPING PROJECT

Global Mapping is a project to develop fundamental digital geographic dataset of whole land area with consistent specifications under international cooperation of national mapping organizations (NMOs). This fundamental digital geographic dataset of whole land area is called “Global Map” which consists of eight layers: Boundaries, Transportation, River system, Population Centers, Elevation, Vegetation, Land Cover and Land Use prepared in 1: 1 million scale, or equivalently 1 km ground resolution. The Global Map aims 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 idea of Global Map was conceived from the efforts in thinking how NMOs can contribute to global environmental issues.

2. HISTORY

In 1992, United Nations Conference on Environment and Development, so called Earth Summit, was held in Rio de Janeiro, Brazil. As a result, Agenda 21 was adopted, which is a baseline document to attain sustainable development. In Agenda 21, necessity of information for decision making, including geo-information, is described here and there. Therefore, Ministry of Construction of Japan advocated developing Global Map under international cooperation as a basis for attaining sustainable development in 1992.

In 1996, after getting support from NMOs in various countries through presentations and discussions in international conferences and other related meetings, International Steering Committee for Global Mapping (ISCGM) was established to promote Global Mapping Concept with the participation of heads of 11 NMOs and other international organizations. Geographical Survey Institute of Japan took the role of the secretariat. After having defined specifications of Global Map, in 1998, Chair of ISCGM sent the invitation letter to the project with the recommendation letter of the director in charge of mapping in the United Nations to all the NMOs in the world. This was the start of Global Mapping Project.

At the first phase of the project, the goal was set to prepare global land coverage mainly by existing data by the year 2000. The activities on Global Mapping were reported to the various events related to World Summit on Sustainable Development held in Johannesburg in 2002. As a result, “Plan of Implementation”, adopted document at WSSD, described the necessity of “global mapping”, and Global Mapping, led by ISCGM, was registered as one of Type II partnerships / initiatives with the target of global land coverage with original data by the year 2007.

3. BENEFITS OF PARTICIPATING IN THE PROJECT FOR NMOS

The benefits of participation in Global Mapping for NMOs include: (1) Joining the world community of surveying and mapping organizations will facilitate the acquisition of the latest information and knowledge of digital geographic data development and service; it would also facilitate to raise the status of the organization by active participation in international activities and the contribution to sustainable development which is the final goal of Global Mapping Project; (2) It increases possibilities of participating in capacity building programs such as the Global Mapping training course and the Global Mapping Seminar; (3) Some GIS software vendors offers or plans to offer grant programs which include provision of GIS software and training. Recipient should be NMOs that are participating in the Global Mapping Project; (4) NMOs can foster personnel to have enough knowledge and experience to develop a NSDI of their countries.

4. PRESENT STATUS

The Global Mapping Project has been getting reputation since its start in 1998. The present situation of the project is as follows.

4.1 Status on Participation and Data Development

As of end of January, 2005, 137 NMOs have participated in this project, and 20 among them have completed the development of Global Map of their countries and their data are available on the Internet. More than 30 countries have already submitted their draft Global Map data to the Secretariat of ISCGM, which is located at Geographical Survey Institute of Japan, and these data are under checking. Rests of participating NMOs are developing Global Map of their countries (Figure 1).

4.2 Methodology of Data Development

In the phase up to the year 2007, most of participating organizations are developing data by digitizing existing paper maps whose scales are from 1:250,000 to 1: 1 million. As for three layers, land cover, land use and vegetation, satellite images are used for data development. For these layers, several central organizations are supposed to make classification while participating NMOs are to identify land cover class of training areas.

As Global Map is supposed to update regularly about every 5 years, some steady system to update it should be established. Two methods are considered. One is to update Global Map using latest topographic maps of larger scales. Another is to use satellite imagery. The former method is applied to vector layers, namely, layers of Boundaries, Transportation, River system and Population Centers. It is preferable to update Global Map in accordance with update of topographic map series of respective countries. Satellite imagery is indispensable for updating land cover and two other related layers. Update of these layers is very important because they reflect environmental change very much.

Progress of Global Mapping Project

As of 2005-01-12
Secretariat of
International Steering Committee for Global Mapping

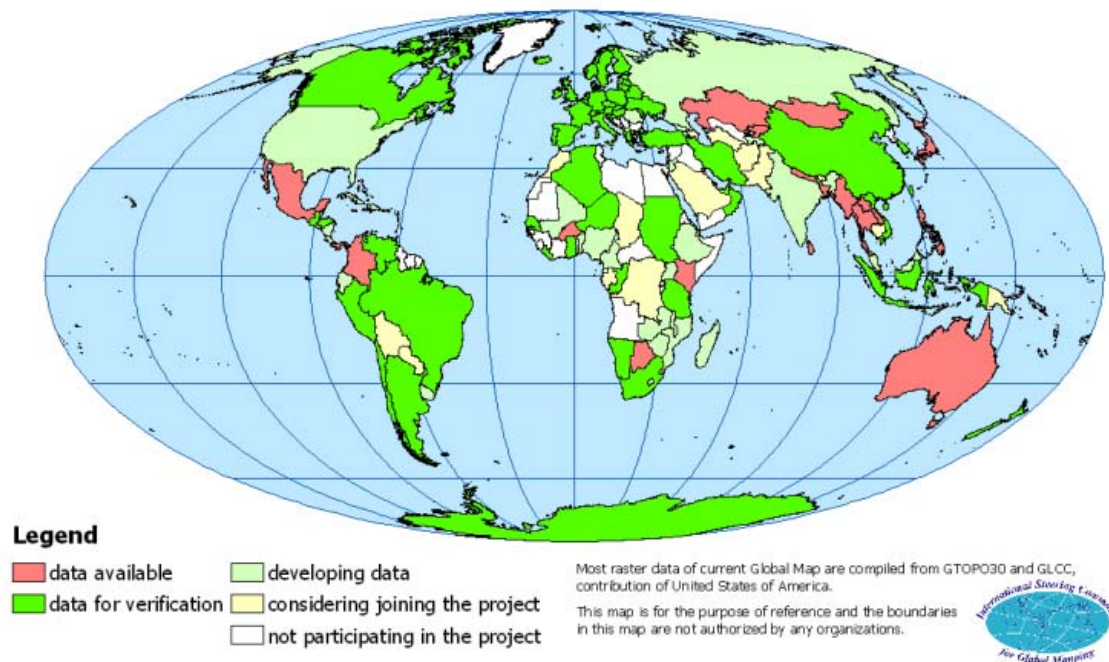


Figure 1: situation of participation and data development

4.3 ISCGM Meeting

In order to promote and coordinate the Global Mapping Project, ISCGM meeting is held once or twice a year. At present, ISCGM, chaired by Prof. Taylor, consists of 20 members, two advisors and 14 liaison organizations including proposing ones. All members are from NMOs or international organizations in charge of data development in specific regions. Liaison organizations are from global or regional SDI (Spatial Data Infrastructure) related bodies (e.g. PCGIAP, PCIDEA, GSDI, and ISDE), UN organizations (e.g. UN Statistic Division, UNEP), academic institutions (e.g. ICA and ISPRS) and international organizations (e.g. ISO/TC211, PAIGH).

4.4 Relation with Other Communities

Relation with user community is very important to enhance the use of Global Map. In this regard, Global Mapping Forum has been held almost every 3 years, in which users and producers come together and exchange experiences, views and ideas on Global Map.

As described above Global Mapping is registered as Type II partnerships / initiatives at WSSD. Performances of Type II partnerships / initiatives are to be reviewed by meetings of

Committee on Sustainable Development (CSD), UN, therefore, in order to be involved in review process actively, ISCGM has got consultative status following UN ECOSOC rules.

ISCGM is also heavily involved in GEOSS (Global Earth Observation System of Systems) activities. This was launched at the first Earth Observation Summit in Washington in July 2003, where it was decided to develop ten-year implementation plan for a GEOSS. Ten year plan was adopted at the third Earth Observation Summit in Brussels in February 2005, and its implementation plan is to be monitored. ISCGM is participating in this activity since April 2004, and claiming that Global map is indispensable as a basis to integrate earth observation data and socio-economic data.

4.5 Applications

There are several areas of applications using Global Map. One is for monitoring global environment. By comparing the Global Map data in different years, environmental changes of the ground surface such as deforestation and desertification can be monitored in good accuracy for the whole land area of the globe.

Second area is for prediction of the future condition. By combining with other data such as statistics and environmental indices, Global map can be used for predicting global environmental changes. There are actual research examples on this area such as natural resource control and water resource control.

Third area is for disaster of large scale. After unprecedented tsunami disaster having taken place in Indian Ocean, the secretariat of ISCGM has prepared the map of Sumatra Island and its surroundings using Global Map and other global dataset as base information on which damages by tsunami are mapped and various countermeasure are planned. This map was distributed at United Nations World Conference on Disaster Reduction in Kobe, Japan in January 2005 with a good reputation (Figure 2).

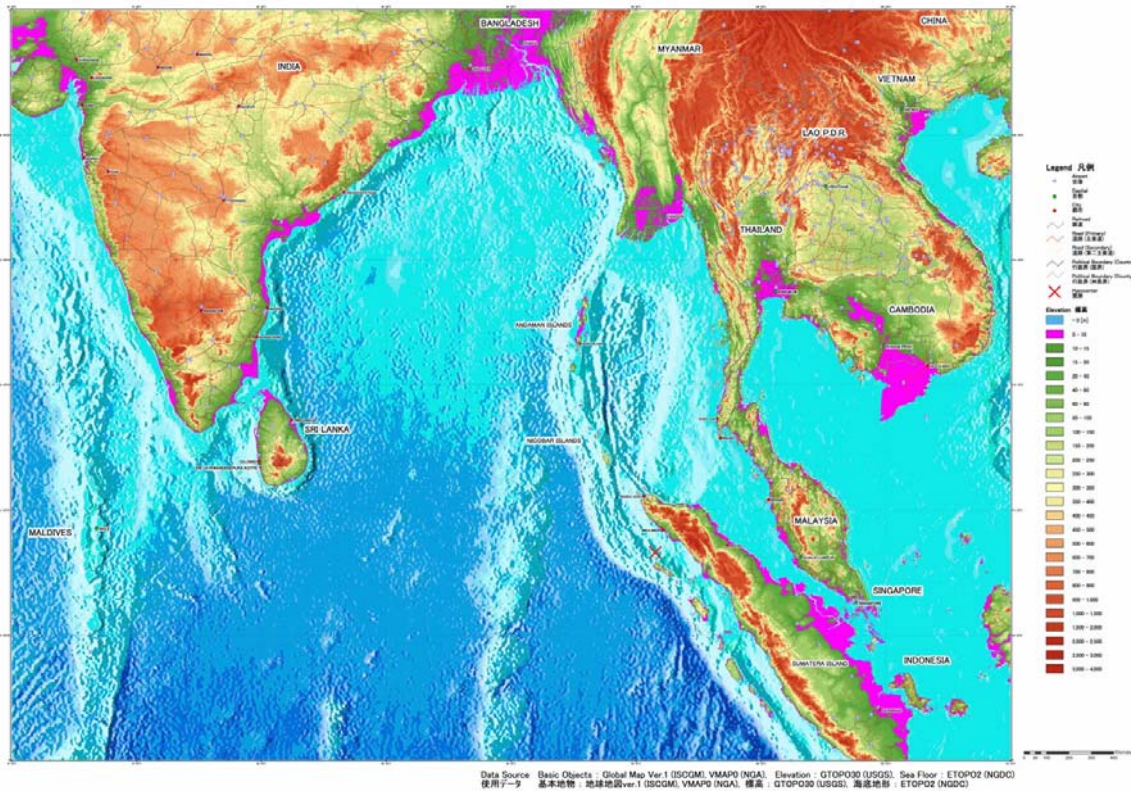


Figure 2: A base map for tsunami in Indian Ocean made using Global Map and other data

5. ISSUES TO BE SOLVED

To complete global land coverage by the year of 2007, there are several issues to be solved. The first one is to invite more countries / regions to the project. Participation in Arabic and African countries / regions is relatively low, so more efforts to attract them to the project are required. The second issue is data development. Present specifications define VPF as the format of vector layers of the Global Map. This format is very complex and a little bit obsolete in Internet era on the other hand. ISCGM is trying to set up Global Map web portal to accelerate the use of it. Therefore, new format harmonizing with web mapping service should be introduced.

The third issue is expansion of user of the Global Map. We can say this project has succeeded only if the Global Map is effectively used by many people for various applications, especially for attaining sustainable development. Integration with other global data should be also considered because the Global Map has only eight layers which includes limited contents.

The fourth issue is sustainability of the project itself. After the year 2007, the Global Map should be maintained regularly. For that purpose, maintenance of Global Map of respective country should be built in operational work of participating NMOs in the world.

6. FUTURE OF THE PROJECT

The future of the project relies on the establishment of Spatial Data Infrastructure (SDI) of the respective countries. Global Mapping Project is a cooperative work by all the NMOs in the worlds, so capability of NMOs is essential for sustainability and further expansion of the project. Through participation in the project, participating NMOs have a great chance to establish SDI in their countries because Global Mapping Project provides participating NMOs with factors necessary for establishment of SDI such as data development, standardization and capacity building. Once SDI is established in respective countries, it will be easy to maintain Global Map within their capacity. Thus Global Mapping and SDI rely on each other. In collusion, the future of the Global Map resides in SDI (Figure3).

REFERENCES

- Ministry of Land, Infrastructure and Transport of Japan, 2002, Wider Use for Global Map.
- Maruyama, H., Une, H., Shimizu, O., Shimizu, M. and Fujimura, H., 2004. Technical Issues to be solved for further promoting Global Mapping, DVD of GSDI 7th Conference
- Maruyama, H., Sasaki, H., Okatani, T., Taylor, D.R.F., Kaneko, J., 2004. Basic-Mapping Africa for Africa Through Global Mapping, AARSE 5th Conference
- Masaharu, H. et al, 2003. Global Mapping: its status and challenges. Submitted to Africa GIS 2003
- Taylor, D.R.F., 2003. The International Map of the World and Global Map: Will History Repeat Itself?, Conference Papers of Cambridge Conference 2003
- Taylor, D.R.F., 2004. Global Map: An Operational Spatial Data - Infrastructure and New International Map of the World-, GIM International, July

BIOGRAPHICAL NOTES

Mr. **Hiromichi Maruyama** joined Geographical Survey Institute in 1979, where he engaged mainly in photogrammetric work. From the year 2000 to 2002, he worked for Kenya Institute for Surveying and Mapping, Survey of Kenya, as a JICA expert. He is Secretary General of ISCGM since 2003.

Mr. **Hisakazu Sasaki** joined Geographical Survey Institute in 1985, where he engaged mainly in printing and image processing works. He is a secretariat of ISCGM since 2004.

Mr. **Takaki Okatani** joined in Geographical Survey Institute in 1997, where he engaged in Photogrammetric research work. He is a secretariat of ISCGM since 2004.

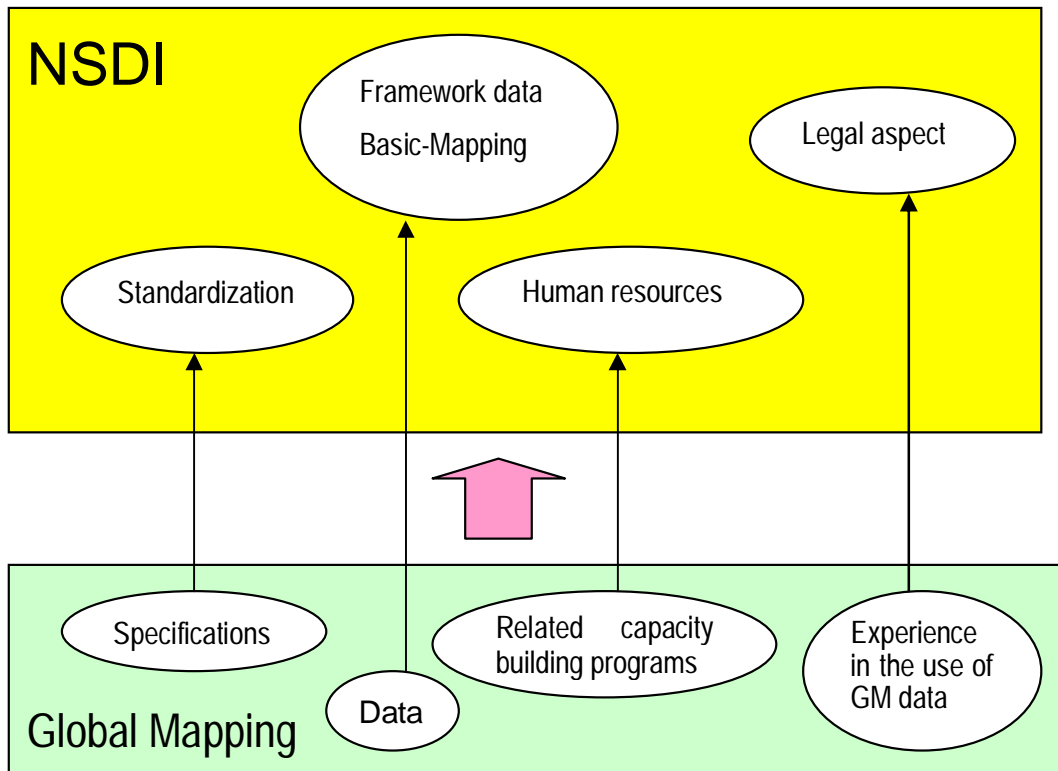


Figure 3: Relation with Global Mapping and NSDI

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