

3D visualization and outreach of geological information using finely detailed miniature.

Akihiko Shibahara^{1*}

¹Geological Museum, National Institute of Advanced Industrial Science and Technology

In recent years, people can access to geological information quickly and easily with the help of information technologies. However, it is difficult to recognize three dimensional distribution of geological structure without professional training of map reading. To solve this problem, we established several techniques to build up finely-detailed miniature. This miniature is suitable for verifying research finding, and also for outreach activities in museums, schools, geoparks etc.

To build up 3D miniature, we use 3D modeling machine called 3D-plotter and 5m-meshed digital elevation model (DEM) published by Geospatial Information Authority of Japan (GSI). A number of geological datasets, such as borehole datasets, 3D subsurface structure model published by Geological Survey of Japan (GSJ) are also used to modeling interior structure of the model. DEM are converted into 3D-CAD data format (DXF, STL, etc.) and added contour model using shape information and molded into real 3D model by the 3D plotter.

To visualize geological information, we projected geological maps, hazard maps, etc. on these 3D miniatures by optical projector. While this technique is known commonly as 3D projection mapping, we projected geological information more accurately than ever before by using projected markers. These modeling and matching techniques are patent pending (Japanese patent application No. 2012-172692). These 3D miniatures can be separated laterally into several parts to show subsurface structure. We use this miniatures to visualize geological and disaster information of Unzen Volcano, Kobe City, etc.

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