

Visualization of terrain by Red Relief Image Map(RRIM) and geoscience education

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1. Introduction

Three-dimensional understanding of terrain in geoscience education is fundamental and important. For that, the reading of contour lines is a big problem. The contour line shows the planar position of the line of intersection between the topography and the plane as a representation method of the terrain. By altering the altitude at equal intervals, it is visualized as a striped pattern. In principle, horizontal and vertical planes can't be visualized. It is possible to objectively express the topography without individual skill. It is possible to transform mesh data, which is a wonderful invention. This skill is indispensable in order to read topography such as topography map of the GSI.

2. Numerical terrain data and terrain representation

Digitization of terrain had gradually become advanced since the 1980s. The national land numerical information started at 250 m, 50 m, 10 m, 5m. On the other hand, the technology for visualizing this method has remained around the time of low data density, there is no change, and the problem that detailed data can't be fully expressed can also be raised. It was difficult to read all the data in the shadow map, the gradient map, the advanced gradation diagram, and the like. Shaded figures had problems such as irregularities reversed depending on the light source direction, and there was a problem that it was impossible to distinguish between steps and grooves.

3. Principle and advancedness of RRIM

Chiba invented RRIM triggered by the topography survey of the Aokigahara ocean in Mt. Fuji in 2002. This was to visualize detailed data of a 1 m mesh by aerial laser measurement and complex topography of the lava surface where the irregularities are distributed complicatedly and to capture a large topography. The expression that it is redder as steep slope, brighter as a ridge and darker as a valley has the feature that it can be understood immediately even by ordinary people who do not receive special training and education. In addition, this figure could be overlapped with conventional contour diagrams, overlapped with advanced steps, and the understanding of the topography was greatly promoted. In many cases, it is used in media such as BURATAMORI, and recently it has become possible to select it as one of the backgrounds in geological map NAVI and GSI map.

4. JPGU and RRIM

In Asia Air Survey, as a place to transmit the goodness of the red 3D map, I regarded the exhibition of JPGU as a very good opportunity and have held a booth exhibition every year. For the first time here, some high school students also saw the red stereoscopic maps as an opportunity to be interested in topography and geology. It also leads to a series of work with JAMSTEC based on the idea that the exhibition here can be applied to the ocean bottom topography, and its submarine topographical map is bringing the further effect of geoscience education. Also, analog model experiments that flow shampoo lava on the topographical model of red 3D map repeated every year was very effective for understanding the hazard map. I would like to continue exploring what I can do for geoscience education through the activities of JPGU.

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