

Applications of Stereoscopic viewer for the Seamless Geographical Information System and its Prospect

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1.Introduction

Stereoscopic Viewer (Ryoki,2019a), that displays the GSI Globe (Geospatial Information Authority of Japan,2017), facilitates understanding of geological information appearing in topographic maps and aerial photographs.This viewer displays a single image of a rotating object. It can display 3D images of mineral crystal structures, molecular models, civil engineering structures, etc. (Ryoki,2019b). Therefore, it is expected to be used in education or vocational development (Ryoki,2019c). It is described that An example of using the seamless geological map (Geological Survey of Japan,2019) or images shot from drones, etc. in this paper.

2.Overview of the stereoscopic viewer

Stereoscopic vision is perceived by displaying two images of the target from both pupil locations, one at a time, and performing high-order image processing in the brain (Tanabe and Fujita,2004). The video of the rotating body is recorded by one video camera. When the video is played as two images with a short delay and watched with left and right eyes, it enables stereoscopic vision (Ryoki,2019a). The viewer, called Stereoscopic Viewer (Fig.1), was coded in HTML and JavaScript in this study.

3.Stereoscopic viewing of geological information

When viewing long active faults expressed in GSI Globe, it is not possible continuously to watch stereoscopic viewing in a range beyond the PC monitor. This is because there are restrictions due to security issues in HTML describing Stereoscopic Viewer. In such a case, the following procedure is possible. First, display only a map of GSI Globe on some browser and move it horizontally with the mouse. At this time, the mouse can be moved to the full width of the monitor regardless of the browser. This window is recorded by a captor application and saved as a very long video file in the horizontal direction. And when this file is browsed with Stereoscopic Viewer, it is able to view seamlessly all of the saved sections in stereoscopic viewing. The same treatment can be used when displaying seamless geological maps.

4.Stereoscopic viewing of moving image

When the video taken from a drone horizontally or rotate, it can be viewed stereoscopically. Even when the video moves vertically, it can be viewed stereoscopically if it is converted horizontally by some video processing application (Fig.2). The animation tool "Google Earth Studio" can created a video file of geographic information image (Google LLC,2020). The file can be viewed with Stereoscopic Viewer. This is suitable not only for horizontal and vertical shooting but also for bird's-eye view or looking-up view.

5.Future plans

In GSI Globe, the map tiles are read from the GSI server each time when they are browsed. For this reason, it cannot be viewed in out of communication area. Therefore, it is planed to improve Stereoscopic Viewer so that the tiles of the required area are downloaded in advance.

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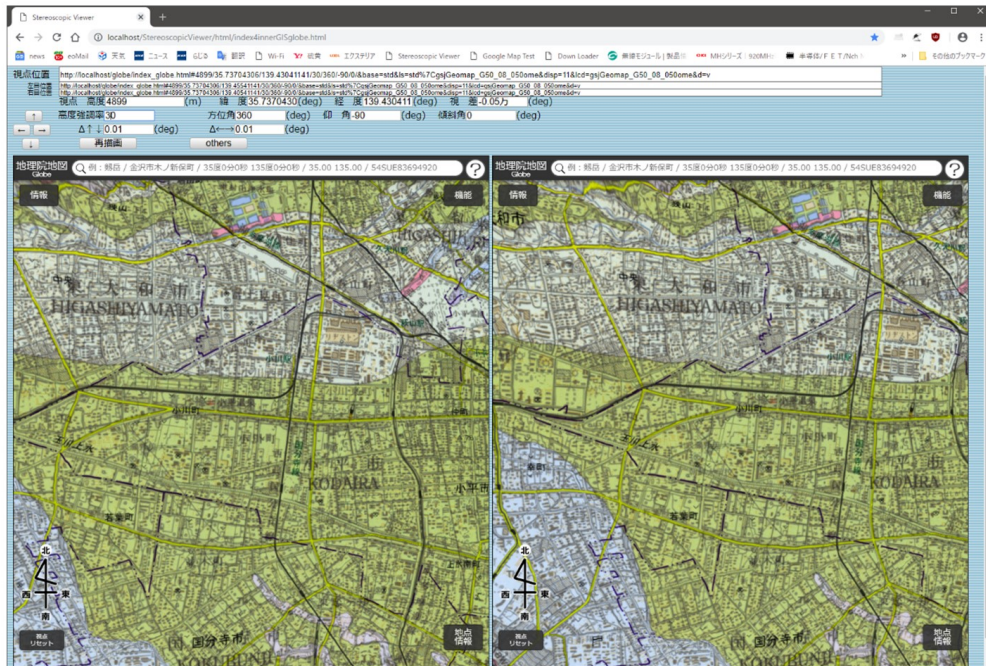


図 1 Stereoscopic Viewerによる地質図の立体表示例 5万分の1地質図福「青梅」(植木・酒井, 2007)の一部を地理院地図Globe(国土地理院, 2017)上に描いて用いた。交差法による。

Fig. 1 3D display of geological map by Stereoscopic Viewer A part of 1:50,000 geological map “Ome” (Ueki and Sakai, 2007) is drawn on GSI Map Globe (Geospatial Information Authority of Japan, 2017). See with intersection method.

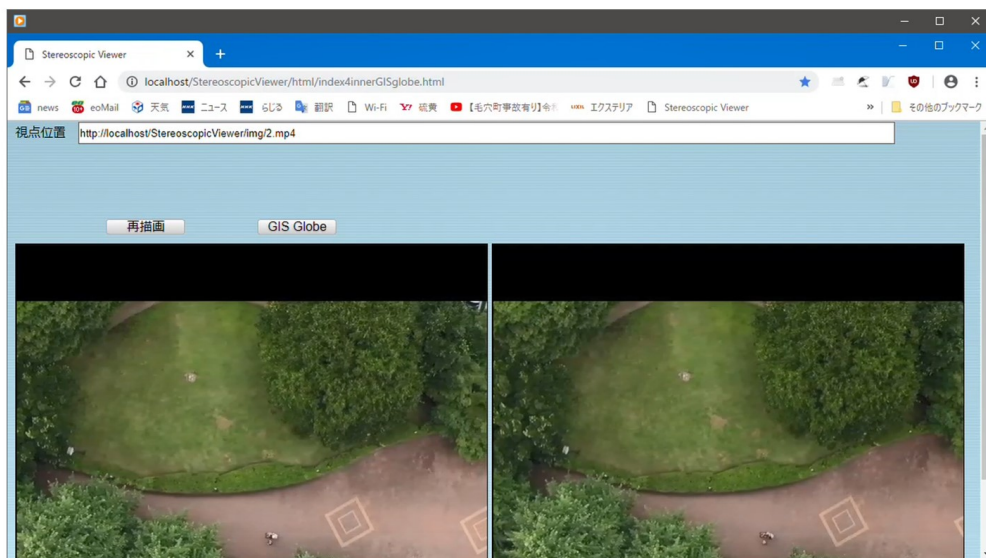


図 2 Stereoscopic Viewerによる空撮映像の立体表示例 渡邊(2019, 未公表)のドローンによる録画映像を描画。交差法による。

Fig. 2 3D display of aerial video by Stereoscopic Viewer These screens display the movie of view from a drone recorded by Watanabe (2019, unpublished). See with intersection method.