Development of web application for polarizing microscope observation

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It is essential to handle actual natural phenomena and natural samples to cultivate the scientific view of nature through geoscience education. At the same time, from the viewpoint of assisting and promoting achievement of the purpose, good quality geoscience materials that anyone can access anytime, anywhere is also necessary. For example, rocks and minerals show various diversity, so to acquire these appraisal methods it is necessary to observe while comparing multiple samples. Among them, concerning the appraisal using a polarization microscope, the cost, and labor required to prepare microscopes and rock slices can be a barrier, especially in self-study. To solve this problem, the speaker has developed a web application that can interactively observe the observation of rocks and minerals by polarizing microscope (“SCOPin rock,” URL is https://microscope.fumipo-theta.com). At the present stage, I have implemented sample selection, rotation, and enlargement of the field of view, switching between open Nicol and cross Nicol, and displaying variable scale.

This application's unique attempt as a polarizing microscope simulator is to deal with various devices including smartphones and tablets and to reduce the amount of data transfer. First of all, you can use this application regardless of the machine as long as you install a modern browser (such as Google Chrome, Safari, and Microsoft Edge), and you can use it in the excellent layout according to the screen size of the device. Second, while maintaining the smooth rotation of the visual field image, the number of images required for one sample is limited to 12 to 24 images. As a result, when using JPEG images of 1280 ×1280 px, the data size is about 2 to 3.5 MB, and the number of requests to the server is only one.

I assume the following use cases for this application.

1. In class, teachers can project polarized microscope images on the screen if there is a projector.

2. In the class, all the students can view and operate the same rock slice picture at hand.

3. In the geological excursion, you can share rock slice photos at the time of guidance.

In the future, I would like to realize content expansion and response to various use cases by publishing the upload function of polarization microscope image data by users and providing private repository creation service of image data.

Keywords: polarizing microscope, Web application, teaching materials

Link to SCOPin rock

https://microscope.fumipo-theta.com

