Toward restoration of Geosites damaged by natural disaster with reaching consensus in local community: a case of Suzaki Coast in Seiyo City, Japan.

*Takumi Sakakiyama[1], Kazunari Kimura[2], Yuya Kato[3], Masahito Ono[1], Tsukasa Takahashi[1]

1. Seiyo City, 2. NAIBA Co. Ltd., 3. Noyama Company

In Japanese archipelago located in the deformation zone, we are always in the risk of catastrophic natural disasters that cause serious and widespread damage to society. The measures for these disasters will be carried out based on risk assessments and disaster prevention plans led by the government and institutes. The National Research Institute for Earth Science and Disaster Resilience (NIED) and the Volcanological Society of Japan cooperated to compile Database on Volcanic Hazard Maps and Reference Material.(1) The risk of huge earthquake occurrence is evaluated at Nankai Trough Earthquake Evaluation Study Group(2) sponsored by the Japan Meteorological Agency. On the other hand, it should be promoted the disaster prevention and reduction for Landslide Disaster in local communities by creating the Community Disaster Management Plan. However, the collapsed slopes are quickly covered because of ensuring lifeline and safety are taken the priorities during emergency. Therefore, it is difficult to educate inhabitants through field observations for slope failures. In this case, the slope failures occurred at a distance from the living area, such as natural heritage and geological heritage may be a good opportunity to understand the mechanism and talk about the restoration and utilization.

There is acidic tuff layer with vertical stripes in the Kurosegawa Tectnic Zone on the outcrops of the Suzaki Coast in Mikame, Seiyo City, Ehime Prefecture, Southwest Japan. The Suzaki Coast is one of the Geosites conservated by the Shikoku Seiyo Geopark. There are a cliff-shaped outcrops along the coast, and the path is maintained at this foot. Due to the rain from July 6th to the morning of 7th, 2020, The slope collapse occurred on a part of the slope on the mountain side of the path on the Suzaki Coast. The width of the slope failure is about 10 m, and the height from the coast to the collapse head is about 55 m. In addition, according to the results of a simple survey conducted in August, the amount of sediment deposited was estimated to be about 800 m^3. Although the collapsed sediment contains some acidic tuff gravel, it is considered to be a surface collapse of the sediment part existing at the upper part of the cliff because the weathered soil originating from the acidic tuff is the main component. The path is still restricted. It is difficult to remove the collapsed soil by heavy machinery or human power because the location of the path is not suitable to berth ships. Here, we have taken aerial photographs about once a month using a small drone, and simply monitored change in the amount of collapsed soil. As a result, after the passage of Typhoon Haishen in September, the collapsed soil deposited under the path moved due to the waves, and the collapsed soil deposited on the path also decreased slightly. In contrast, the amount of change was insignificant from October to February. Consequently, it is supposed that the movement of colluvium is more affected by waves than rainfall. If we experience waves caused by typhoons that reach the upper part of the path several times in the future, it is expected that the amount of soil will be reduced to a scale where restoration of the original can be started.

Furthermore, our group is going to present the educational program named "Seiyo Nature and Culture College" at March 13th, 2021 and the reactions of the participants and staffs. This program is going to plan the excursion to watch the collapsed soil mass in the Suzaki Coast and take the meeting about this.

Referred websites

(1) NIED "Database on Volcanic Hazard Maps and Reference Material":

http://vivaweb2.bosai.go.jp/v-hazard/ (last access on 2021.02.08)
(2) Japan Meteorological Agency "Nankai Trough Earthquake Evaluation Study Group":
https://www.data.jma.go.jp/svd/eqev/data/nteq/assessment.html (last access on 2021.02.08)

Keywords: Shikoku Seiyo Geopark, Suzaki Coast, Slope Failure, Drone, Disaster Prevention and Reduction

