

令和3年度 環境科学院 修士論文内容の要旨

A study of landslide detection using aerial photographs and tourism decline analysis
in the Tenninkyo area, Hokkaido

(北海道, 天人峡地域における航空写真を用いた地滑り検知と観光衰退分析に関する研究)

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The Tenninkyo area, which is situated in the northwestern area of Daisetsuzan National Park, used to be one of the most popular hot spring resorts in Hokkaido. Landsliding has been a significant issue in this area, and local tourism has greatly declined in recent years. This study aims to gain more insights into the landslide disasters and the tourism downturn in this area and to investigate the relationship between the disasters and the decline in the tourism, which can provide a reference for future sustainability.

For the long-term changes of the bare land surface, a series of aerial photographs (1987, 1997, 2007, 2012, and 2017) were georeferenced and the area of bare land was manually measured. An interview survey was carried out with the owner of Hotel Shikishimasou (the only hotel in the area), the Secretary-General of the Higashikawa Tourism Association, an officer from the Commerce, Industry, and Tourism Promotion Office of Higashikawa Town, who are intimately related to the tourism development of the Tenninkyo area, to learn about the changes of tourism in the area and their attitudes towards the tourism promotion in the future.

The results from the aerial photograph interpretation suggest that there were large changes in the area of the bare land due to landslides and vegetation recovery. The calculation results show that the area of the bare land was 86,895.07 m² in 1987, decreased to 76,652.70 m² in 1997, increased to 104,774.48 m² in 2007, increased again to 108,768.35 m² in 2012, and decreased to 102,729.98 m² in 2017. Through the analysis of rainfall data and slope degree, it is suggested that steep slopes and heavy rainfall are likely to be the major triggers of the landslides in the area.

The interviewees indicated that two factors resulted in the decline in the tourism in the Tenninkyo area, including (1) the frequent occurrences of landslides, which are related to heavy rainfall and (2) the closure of the hotels. The local town and tourism-related organizations have no concrete future plans to develop tourism in the area, which can be assumed that the further decline of the tourism in the area will continue to weaken sustainability in the local tourism. More attention should be taken to disaster prevention and the construction of tourism infrastructure to provide safe tourism for future sustainability in the area.