

## A large-scale evaluation of bamboo stand expansion using deep learning and its effect on ecosystem carbon storage

\*Yurika Oba<sup>1</sup>, Takeshi Ise<sup>2</sup>

1. Center for the Promotion of Interdisciplinary Education and Research, Kyoto University, 2. Field Science Education and Research Center, Kyoto University

The expansion of bamboo stands causes a serious problem in various parts of Japan. Especially in the warmer regions west of the Kanto region, the rapid expansion of bamboo stands in satoyama ecosystems has reduced ecosystem services such as conservation of biodiversity. Most of the bamboo species in Japan are considered to be exotic species. Until recently, bamboo stand has been planted and managed as a valuable resource that is used as a material for household goods such as baskets and colanders. With the rise of industrial products, bamboo stands have been left in satoyama without management. Bamboos reproduce mainly by the rhizome, thus the rate of shoot proliferation is extremely high. Consequently, bamboo overwhelms tree and shrub species common in satoyama and can significantly change the ecosystem in several years. In this research, low-cost, large-scale, near-real-time identification of bamboo stand for Google Earth is performed by using the chopped picture method of image identification technology based on deep learning, which has attracted attention in recent years. This allows us to quantify the dynamics of bamboo stand expansion in recent years. In addition, a scenario-based analysis was conducted to clarify changes in ecosystem carbon storages according to different management policies of bamboo stand.

Keywords: deep learning, bamboo stand, carbon storage