

## Research for annual travel-route changes of reindeer living around the Arctic Circle using satellite remote sensing

\*Genta Suzuki<sup>1</sup>, Takeru Sakka<sup>1</sup>, Tatsuya Tashiro<sup>1</sup>, Hiroshi Kawamata<sup>1,2</sup>, Nobuyasu Naruse<sup>3</sup>, Yukihiro Takahashi<sup>1,4</sup>

1. Global Science Campus, Hokkaido University, 2. Institute for the Advancement of Higher Education, Hokkaido University, 3. Shiga University of Medical Science, 4. Graduate School of Science, Hokkaido University

There are nomads who hunt wild reindeer for a living in the Arctic Circle around Siberia. Recently, the reindeer has been changing the travel-route, having an animal behavior going along the conventional route for pasture. Thus, the livelihood of nomads who hunt them has been menaced. To solve this problem, Tatsuzawa investigated the travel-route of some groups of wild reindeer by installing GPS transmitter on them. Almost all travel-route of reindeer groups, however, remain unclear, because the area of Arctic Circle is large. Previous works reported that the reason of changing the travel-route must be a global warming, forest fire, thunder, and flood, however they only discuss their circumstances. The purpose of this study is to research for annual travel-route changes of reindeer living around the Arctic Circle using satellite remote sensing. At first, we supposed that an annual change of summer-growing pasture affects the changes of reindeer travel-route. we have analyzed images of Landsat7,8(Resolution;30m) using typical vegetation index of NDVI (Normalized Difference Vegetation Index) to compare with travel-route taken with GPS transmitter. Our results show that reindeer travels in vast field when the value of NDVI is higher in the north area(~100km), away from staying in summer, on the basis of data obtained in July and August 2010-2012. The changes of NDVI can be related to the amount of snow in winter near Siberia. Landsat series has a temporal resolution of 16 days, however, errors can be occurred by the image calculation due to the amount of moisture in the air, species of the vegetation, etc. Thus, we have also analyzed annual changes of NDVI using MODIS satellite images, which the temporal resolution is one day.

Keywords: Arctic Circle, reindeer, satellite remote sensing