令和元年度　環境科学院　修士論文内容の要旨

Seasonal changes in the distribution of marine litter in the coast of World Natural Heritage “Shiretoko”
（世界遺産知床における海岸漂着ゴミ分布の季節変動）

北海道大学大学院　環境科学院
環境起学専攻　国際環境保全コース
Yu Sugita

Global attention on marine litter and plastic pollution has surged recently but scientific knowledge on marine plastic litter and effective countermeasures remain insufficient (UNEP, 2019). The coast of the Shiretoko Peninsula was designated as the World National Heritage by UNESCO in 2005 from the unique and intergraded ecosystems. In 2008, Ministry of Environment of Japan invested money and the Shiretoko Nature Foundation conducted marine litter collection work over the peninsula and found that marine litter was seen over the peninsula. This study conducted a field work at Rusha area, the Sea of Okhotsk side, to find out the present status. This area is known to be most seriously polluted by the marine litter according to the previous studies.

We investigated the coast for three times, between November 2018 and November 2019, to clarify the distribution and seasonal difference of marine litter and coastal topography. Aerial photographs were taken by UAVs and classification surveys of drifted marine litter were conducted in the field. The aerial photographs and images were analyzed by using software (Metashape and QGIS) in the laboratory. The classification surveys were summarized according to the North Pacific Environment Cooperative research manual (NPEC, 2014); namely the marine litters were categorized into 8 large groups based on the materials and items.

The most distinctive topographic feature in this study area is a beach ridge stretching parallel to the shoreline, visible in both Ortho-images and DEMs. The ridge is composed of gravels and cobbles, drifted woods, and tangled up litters. In June 2019, a new ridge was accreted in the proximal slope of the beach ridge. Marine litters was occupied mainly by plastic and fishery items. They are distributed mainly at the distal slope of the ridge. This trend was confirmed in the classification surveys. A total of 5715 items were identified inside the surveyed areas. More marine litters were added between 2018 and 2019 in the southwestern half of the study area where we observed an accretion of new beach ridge.

Based on the above-mentioned observed results, I conclude that high tide(s) and drift ice in the winter between November 2018 and spring of 2019 are responsible for the accretion of new marine litters and formation of new beach ridge in the study area.