

OBJECT-BASED DETECTING AND COUNTING PENGUINS IN UNMANNED AERIAL VEHICLE IMAGES

*Chang-Uk Hyun, Hyun-cheol Kim, Soon Gyu Hong, Jeong-Hoon Kim

Korea Polar Research Institute, KIOST, Republic of Korea

* cuhyuyn@kopri.re.kr

ABSTRACT... This study presents an application of unmanned aerial vehicle (UAV) images to detect and count penguins in Barton Peninsula, King George Island, Antarctica. The area around Narębski Point located on the southeast coast of the Barton Peninsula was designated as Antarctic Specially Protected Area No. 171 (ASPA 171), and Chinstrap and Gentoo penguins inhabit in the area. It is important to fulfill periodic wildlife monitoring in the ASPA 171, because variations of its population reflect climate and environmental changes and disturbance from human activities. In this study individual penguin was detected and counted in a part of the Barton Peninsula using images obtained from UAV and object-based image analysis technique. About 1,500 images acquired in January 2014, and about 360 images were selected and mosaicked as an image of about 3 cm spatial resolution. A subset of the mosaicked image including representative rookeries was segmented based on gradient of pixel values, and spectral and spatial attributes were assigned to each segment. The segments indicating individual penguins were effectively detected from adjacent ground segments with high contrasts in spectral and spatial attributes. It is expected that the very-high-resolution UAV image analysis approach can be applied to other wildlife habitats in Antarctica, and the results can be used to establish effective periodic wildlife monitoring plans.

KEY WORDS: UAV, object-based image analysis, Antarctica