

Project acronym: ANSOC

Project title: Arctic Night Skies as an Orientation Cue—Quantifying the Effects of Light Pollution on Lunar and Stellar Orientation

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Discipline: Life Sciences & Biotech

Station(s): Pallas-Sodankylä Research Station (Finland)

Many animals use the position of the sun and the skylight polarization pattern as frames of reference for movement and migration. In their place, nocturnal animals must rely on the positions of the moon and the stars, as well as the faint lunar polarization pattern. Before the modern era, the extremely sensitive eyes of nocturnal animals allowed them to use the night sky as an orientation cue for both local foraging and long-distance migration. At present, however, light pollution obscures the night sky partially or even completely throughout most of the world. The Arctic is one of the few regions in which light and air pollution do not strongly affect measurements of starlight and lunar skylight.

Using a custom high-sensitivity calibrated camera system and image processing software, we intend to measure and characterise the starlight and polarized lunar skylight patterns visible in the night sky at Sodankylä. These will then be processed and simulated for the visual systems of a range of animal species that rely on the night sky as an orientation reference, in order to estimate how they should perform under natural conditions in comparison with when light pollution is present.