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### Investigation of Antarctic moss beds using high spatial resolution imaging spectroscopy

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## Investigation of Antarctic moss beds using high spatial resolution imaging spectroscopy

### Abstract

Abstract of the presentation at the Strategic Science in Antarctica: a Joint Australian and New Zealand Conference, 24-26 June 2013, Hobart, Tasmania.

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**Title: Investigation of Antarctic moss beds using high spatial resolution imaging spectroscopy****Presenter: Zbyněk Malenovský**

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**Abstract**

The most abundant photosynthetically active plants growing along the Antarctic rocky coast are mosses of three species: *Schistidium antarctici*, *Ceratodon purpureus*, and *Bryum pseudotriquetrum*. Recent changes in temperature, wind speed and stratospheric ozone are stimulating faster evaporation, which in turn influences moss growth rate, health state and spatial abundance. These environmental reactions make moss beds an ideal bio-indicator of Antarctic climate change. The very short growing season, lasting only about three months, requires a time efficient, easily deployable and spatially resolved method for monitoring Antarctic moss beds. Therefore, we used ground and/or low-altitude airborne imaging spectroscopy (also called 'hyperspectral' remote sensing) to investigate the actual spatial extent and physiological health state of moss turfs in the surroundings of the Australian Antarctic station Casey (Windmill Islands). Images of moss beds containing hundreds of narrow spectral bands between 399 and 998 nm were acquired with a Mini-Hyperspec spectroradiometer (Headwall Inc., USA) from the ground and from a remotely controlled multi-rotor helicopter (called the 'OktoKopter') during the Antarctic summer 2013. The specific optical vegetation indices computed from acquired hyperspectral data allowed automatic spatial separation of moss turfs from the rocky surrounding, but also provided us with qualitative maps of actual moss physiological state (vigour) and total moss chlorophyll content (i.e. indicator of local environmental stress). These results show that high spatial resolution airborne imaging spectroscopy of Antarctic mosses is an efficient spatially explicit approach suitable for regular monitoring of climate change impacts in Antarctica.