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Retrieval of cloud optical properties using airborne hyperspectral cameras during the VOCALS campaign.

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A set of two hyperspectral imaging sensors have been used to analyze the optical properties of stratocumulus cloud off the coast of Northern Chile within the framework of the VAMOS Ocean Clouds Atmosphere Land Study (VOCALS) during September-October 2008. The SPECIM Aisa Eagle & Hawk are tandem pushbroom-type hyperspectral imagers scanning in the 400-970 and 970-2500 nm range, respectively. The instruments were mounted onboard the National Environmental Research Council's (NERC) Dornier DO-228 aircraft, based in Arica, northern Chile during the campaign. An area approximately 600 x 200 km was surveyed off the northern coast of Chile and a total of 14 science flights were carried out where hyperspectral data were successfully collected over the stratocumulus deck at altitudes varying between 10000 and 15000 ft. Cloud optical properties, such as cloud optical thickness, cloud effective radius and liquid water path can be retrieved which can then be compared with space-borne hyperspectral imagers' retrievals. Atmospheric corrections have been applied to enable the comparison between the different type of sensors and the analysis requires, amongst other, solving the back-scattering problems associated with off-nadir views. The high resolution, both spatial and temporal, of these airborne sensors makes them ideal to validate satellite retrievals of cloud optical properties.