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Internal errors of ground-based terrestrial earthshine measurements in 5 colour bands.

Peter Thejll (1), Hans Gleisner (1), and Chris Flynn (2)

(1) Danish Meteorological Institute, Climate and Arctic Research, Copenhagen, Denmark (pth@dmi.dk), (2) Centre for Astrophysics and Supercomputing, Swinburne University, Hawthorn VIC, Australia

Measurements of earthshine intensity could be an important complement to satellite-based observations of terrestrial visual and near-IR radiative budgets because they are independent and relatively inexpensive to obtain and also offer different potentials for long-term bias stability. Using ground-based photometric instruments, the Moon is imaged several times a night through a range of photometric filters, and the ratio of the intensities of the dark (Earth-lit) and bright (Sun-lit) sides is calculated - this ratio is proportional to terrestrial albedo. Using forward modelling of the expected ratio, given assumptions about reflectance, single-scattering albedo, and light-scattering processes it is possible to deduce the terrestrial albedo.

In this poster we present multicolour photometric results from observations on 10 nights, obtained at the NOAA observatory on Mauna Loa, Hawaii, in 2011. The Moon had different phases on these nights and we discuss in detail the behaviour of internal errors as a function of phase. The internal error is dependent on the photon-statistics of the images obtained and its magnitude is investigated by use of bootstrapping with replacement of observations.

Results indicate that standard Johnson B and V band equivalent Lambert albedos can be obtained with precisions (1 standard deviation) in the 0.1 to 1% range for phases between 40 and 90 degrees. For longer wavelengths, corresponding to broader bands on either side of the 'Vegetation edge'
at 750nm, we see larger variability in the albedo determinations and discuss whether these are due to atmospheric conditions or represent fast, intrinsic terrestrial albedo variations.

The accuracy of these results, however, appear to depend on method choices, in particular the choice of lunar reflectance model – this 'external error' will be investigated in future analyses.