

Bias and Scatter: error-budgets for determining terrestrial albedo from earthshine observations.

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

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

Terrestrial albedo is an important governor of Earth's radiation budget and therefore central to climate change considerations. Satellite observations provide good spatial information on the variations of albedo, but changes in instrument sensitivity, and the properties of current in-orbit instrument calibration methods limit the ability to track long-term change in albedo.

What is needed is an independent method to measure albedo - and this is offered by the earthshine technique: Light reflected from Earth onto the Moon can be observed photometrically from Earth, or space, and be interpreted to yield albedo information. Currently, direct imaging systems on Earth-based telescopes observe the Moon routinely. What levels of accuracy and precision can be expected from these methods?

In this work we consider in detail the data-reduction methods used in earthshine studies. We conclude with recommendations in observing techniques as well as data-reduction methods.