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Earth's colour unchanged since 1967: results from earthshine observations

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The colour of Earthlight is a function of atmospheric, surface and ocean conditions because each scatters light in a characteristic way. The colour of Earth can in principle be determined and monitored from satellites - but geostationary satellites do not observe in multiple visual bands, and low Earth orbit platforms do not provide instantaneous colour pictures of the terrestrial disc. Observations of the dark side of the Moon - illuminated by earthlight - can be used to determine the terrestrial colour, and was done accurately in 1967 with astronomical photometric techniques. Until now, such techniques have not been re-applied.

We report on multi-band visual photometry of the earthshine in 2011/2012. Scattered light in the atmosphere and the equipment is a difficult issue to circumvent - but for a unique pair of observations in the Johnson B and V bands we have a situation where scattered light cancels closely and thus we can estimate the Johnson B-V colours of the earthshine itself. By arguing on the basis of changes in reflected sunlight we can estimate the colour of the earthlight striking the Moon - and hence the colour of the Earth at that particular time. We find good agreement with the a measurement performed 47 years previously, and broad agreement with historic measurements from the 1920s and 30s. This similarity has fundamental consequences for the climate system feedback mechanisms, discussed in this poster.