

# The Study of Moon Albedo by Using Lux meter

Supinya Poonperm

Supinya7051@gmail.com

Teacher Boonsong Henngam

“Piboonpumpen” Demonstration School, Burapha University

## Abstract

The current study investigates the moon albedo by operating lux meter. The purpose of the study is to examine the moon albedo by comparing the moon luminosity received from the sun and the moon luminosity reflected from the sun to the earth. The findings of the study revealed the calculated moon albedo value of 0.11 with the error from the true value of 8.33%.

**Keywords:** Moon albedo, Luminosity, Flux

## Introduction

Currently, moon albedo has become the topic of interests for the astronomers all around the world. Accordingly, the understanding about moon albedo may lead to more knowledge about the moon’s surface energy and its chemical conditions. Whereas most of studies about the moon albedo have obtained their data from the high-tech and costly instruments such as satellites and superior telescopes, this study used lux meter to obtain the data. Therefore the results of the study may not be as accurate as those obtained from other studies.

## Methodology

### Data Collection

A spherical black cylinder with a height of 1 inch and 1.5 inches in diameter was made and then was connected to the sensor of the lux meter. After measuring the flux of the sun and moon by using telescope to gather the moon light, the data was collected during the full moon day at altitude 30, 45 and 60 degrees from August to November, 2014 at 67/4 Moo 7. Klang Dist. Rayong, Thailand.

### Calculation Procedures

1. Calculate the luminosity of the moon reflected from the sun to earth ( $L_M$ ) from  $L_M = F_M 2\pi r_M^2$

When  $F_M$  is the flux of the moon reflected from the sun to earth. The unit is Lux.

$r_M$  is the distance from the earth to the moon. The unit is Meter.

\*Notation Must be divisible the moon flux by the light gathering power ratio earlier. From  $\left(\frac{\text{Telescope diameter}}{\text{Lux meter diameter}}\right)^2$

2. Calculate the luminosity of the moon which receives from the sun ( $L_m$ ) from  $L_m = \pi R^2 F_s$

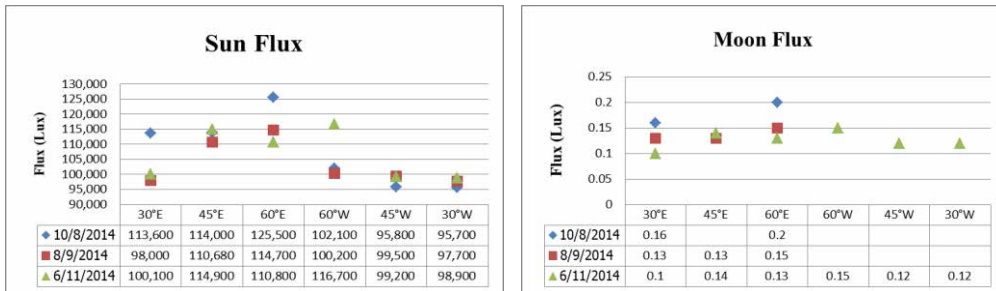
When  $F_s$  is sun flux. The unit is Lux.

$R$  is moon radius. The unit is Meter.

3. Calculate the moon albedo ( $A$ ) from  $A = \frac{L_M}{L_m}$

## Results

From the collect data of sun and moon flux can show in the graph.



\*Notation Cannot collect the data in 8 Oct 2014

From the calculate moon albedo can show in the table.

Times	Altitude (Degree)	Day/Month/Year				Average
		10/08/57	08/09/57	08/10/57	06/11/57	
1	30	0.12	0.11	N/A	0.10	0.11
2	45	N/A	0.10	N/A	0.11	0.11
3	60	0.13	0.11	N/A	0.12	0.12
Total Average						0.11

## Conclusions

The moon albedo calculation revealed the value of 0.11 with the error from the true value of 8.33%.

## Discussions

The results from the calculation show the moon albedo is 0.11. It may be said the moon has the same ability to reflect the light as coal, because the albedo is close to another. The calculated moon albedo was found less than the real. The difference may be because of the clearness of the sky, at the time the data was collected and the telescope light absorption. In addition, another constraint of the study is the weather changes in each month which caused some data missing. Instead of the constraints mentioned, more studies under this topic should be conducted to enrich the pull of comprehension about the moon albedo.

## Acknowledgments

This study would not be possible without the kind help and support of the National Astronomical Research Institute of Thailand, and "Piboonpumpen" Demonstration School, Burapha University. The author would like to give special thanks to the teachers; Mr. Boonsong Henggam, Miss Apinya Chaikun, and Mr. Pisit Nitiyanun for all their invaluable advice.

## References

- Matipon Tangmatitham. (2013). **The Handbook of Astronomic Workshop**. Chiang Mai: Educational Astronomic Information Service Center.
- Pisit Nitiyanun. (2012). **Study of giant planets' Geometric Albedo via direct observations of their reflected sunlight at Sirindhorn observatory**. Independent Study. Department of Physics, Chiang Mai University.