

The efficiency test of Lunar dust test by comparison of lunar color with the value of dust particle in the air (Case study from Phetchaburi province, Thailand)

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Abstract

The purpose of doing this project is to allow people to observe the color of the moon and then be able to initially determine how much dust is in the air, whether it is suitable for outdoor activities, or has negative health impact. The researcher photographed the moon using Canon Powershot SX 430 IS camera from April to May 2022. Then, analyzed the color of the moon, and compared it to Air Quality Index (AQI) based on PM 2.5 concentration using the application AirVisual. The researcher created a Lunar Dust Test Sheet, an indicator that has a color index, based on the color of the moon observed from high to low light. This was used to compare the concentration of particulate matter according to AQI criteria set for Thailand. After using the Lunar Dust Test Sheet, 92% of the respondents were able to correctly determine the AQI values.

Introduction

The moon's different colors are caused by dust particles or clouds in Earth's atmosphere. As a result, the researcher came up with the idea of comparing the color of the moon to air quality so that people can observe initially determine how much dust is in the air, whether it affects their health, or whether it is suitable for outdoor activities. Higher concentration of dust and air pollution harms the respiratory system and lungs. Therefore, if people can recognize the initial amount of pollution in air, they will be able to protect themselves from these risks.

Method

Part 1: Compared the color of the moon with the Air Quality Index.

1. Photographed the moon over a period of approximately 2 months (April–May 2022) with a Canon Powershot SX 430 IS camera, capturing the moon every hour.
2. Collected Air Quality Index data from Application AirVisual at the same time the first photo was taken.

Part 2: Created a Lunar Dust Test Sheet (AQI indicator) and tested its efficiency.

1. Using the captured image of the moon, the largest color code was identified using the Color Palette

Generator on the Canva website, and repeated this pattern for all images, sorting the colors in groups.

2. Then, analyzed the color range similar to the air quality index level. This data was used to create the Lunar Dust Test Sheet.
3. To test the efficiency of the test sheet, the respondents held the test card and observed the color of the moon with their naked eye. The respondents were asked to predict the AQI level using the test sheet and compared it to the Air Quality Index of Thailand set at 5 levels - very good air quality, good air quality, moderate air quality, unhealthy air quality, very unhealthy air quality.

Result

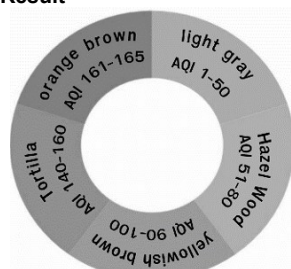


Fig 1. Shows the difference in color of the moon and AQI.



■ Can identify AQI level in the area
■ Can't identify AQI level in the area

Fig 2. shows data on the efficiency of the use of the test strips.

From Fig 1. Shows the difference in color of the moon and AQI at 5 levels – Light gray AQI 1-50 (very good air quality to good air quality), Hazel wood AQI 51-80 (moderate air quality), Yellowish brown AQI 90-100 (moderate air quality), Tortilla AQI 140-160 (unhealthy air quality), Orange brown AQI 161-165 (unhealthy air quality). From Fig 2. Shows data on the efficiency of the test strips (Lunar Dust Test Sheet) from a sample of 25 people that with the use of the test sheet, 92 percent correctly identify the AQI level. 8 percent incorrectly identified.

Conclusions and Discussion

The study found that the Lunar Dust Test Sheet can be used as an indicator of the Air Quality Index by observing the color of the moon. Results show that with the use of the test sheet, 92 percent correctly identify the AQI level. A probable reason for the remaining 8 percent incorrectly identified may be due to the cloudy nature of the air that usually happens before it rains at night.

Acknowledgments

I would like to thank Mr. Thawatchai Suwanwong and Ms. Salidda Jutiwetch, the project advisors, who helped and provided useful suggestions. Thank you to the Astronomical Research Institute (a public organization) for giving me the opportunity to present. Finally, I would like to thank my family for their encouragement and support in the fulfillment of this project.

References

- Pattida Punyaruk. (2018). comparison of the moon's color during the day and night, as well as the level of different elevation angles at night. The 5th Astronomy Conference of Thailand. pp. 43-45.
- Atitiya Noppasakul and Pawarawan Omchomphu. (2019). A Study of the Color and Characteristics of the Moon. The 6th Astronomy Conference of Thailand. pp. 178-181.
- Matipol Tangmatitham. (2020). Practical Astronomy Study Guide. 5th edition. Academic Service Center and communication in astronomy astronomy research institute (Public Organization)