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P16 - Dark Sky Tanay: Assessing the Night Sky Brightness of Tanay, Rizal using VIIRS Nighttime Lights and Vertical Plane Imaging

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Tanay, Rizal has become one of the most frequented destinations for camping, stargazing, and outdoor recreation in the Philippines due to its relatively dark skies, elevated terrain, and accessibility from Metro Manila. However, increasing tourism development, expanding infrastructure, and the growing use of artificial outdoor lighting pose potential threats to the quality of its nighttime environment. As light pollution continues to increase globally, the preservation of naturally dark areas has become an important concern for astronomy, ecology, sustainable tourism, and environmental conservation. This study aims to establish a baseline assessment of the light pollution conditions and dark-sky potential of Tanay through the integration of satellite-based and ground-oriented imaging techniques.

The study utilizes VIIRS Suomi-NPP Cloud-Free Moonlight-adjusted Nighttime Lights data to quantify artificial light emissions and evaluate spatial patterns of nighttime radiance in and around candidate observation sites. Temporal and spatial analyses are conducted using zonal statistics, confidence intervals, and radiance trend assessments to identify areas experiencing increasing levels of artificial illumination. To complement the satellite analysis, vertical plane imaging employing fisheye-lens photography is used to characterize the distribution, intensity, and color temperature of local lighting sources and to identify potential contributors to skyglow and light trespass. The combined methodology follows established approaches in astronomical site assessment and light pollution research, allowing both large-scale and localized evaluation of nighttime lighting conditions.

The research provides a preliminary characterization of the night-sky environment of Tanay and identifies areas where increasing artificial lighting may affect the visibility of celestial objects and the quality of outdoor nighttime experiences. By combining remote sensing with site-level imaging, the study offers a framework for monitoring light pollution in emerging astrotourism and ecotourism destinations. The findings are expected to support future efforts in responsible lighting management, dark-sky conservation, astronomy education, and sustainable tourism planning. Furthermore, the study highlights the importance of proactive monitoring and mitigation measures to preserve the remaining dark skies of Tanay as a valuable scientific, environmental, and cultural resource for future generations.

Keywords: *Light Pollution, Dark-Sky Conservation, Tanay Rizal, VIIRS Nighttime Lights, Vertical Plane Imaging, Astrotourism, Night Sky Brightness, Sustainable Tourism, Astronomy Education.*

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