

A Multinational Study of Night Sky Brightness (NSB) Patterns: Preliminary Results from the Globe at Night – Sky Brightness Monitoring Network (GaN-MN)

Study of Cloud Amplification on NSB

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Background & Summary

The **Global at Night - Sky Brightness Monitoring Network (GaN-MN)** is an international project for long-term monitoring of night sky brightness (NSB) around the world (Project website: <http://globeatnight-network.org/>).

- Over 105 million NSB data entries collected up to May 2021
- As at May 2021, there are 62 stations in 17 countries/regions in 5 continents
- **Sky Quality Meter - Lens Ethernet (SQM-LE)** was adopted for its modest cost and robustness
- Database allows for studies of **temporal and geographical variations of light pollution** and their correlations with various natural and artificial factors:

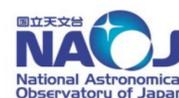
➤ Huge variations in the night sky worldwide

- Urban night skies are significantly brighter than night skies in pristine national parks
- Urban night skies get progressively darker with time over the night due to reduction in light usage

➤ Amplification of NSB due to cloud highly correlated with location's NSB

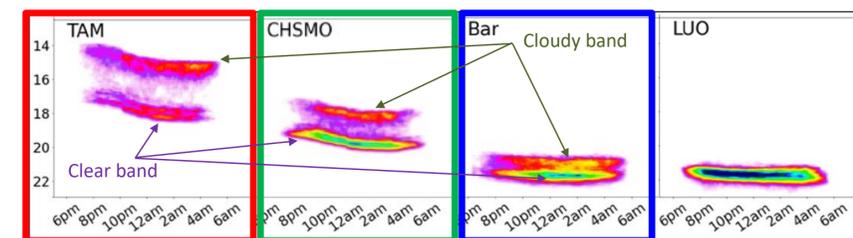
- Valid over a wide range (over 400x in radiance) of light pollution levels

Co-organizers:

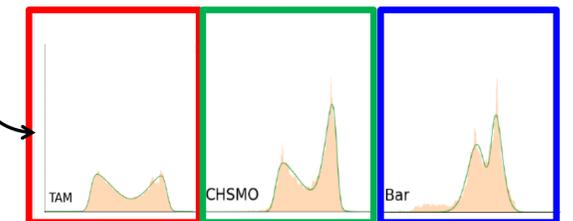


Effects of Cloud on NSB

Observations (NSB vs time density distribution):

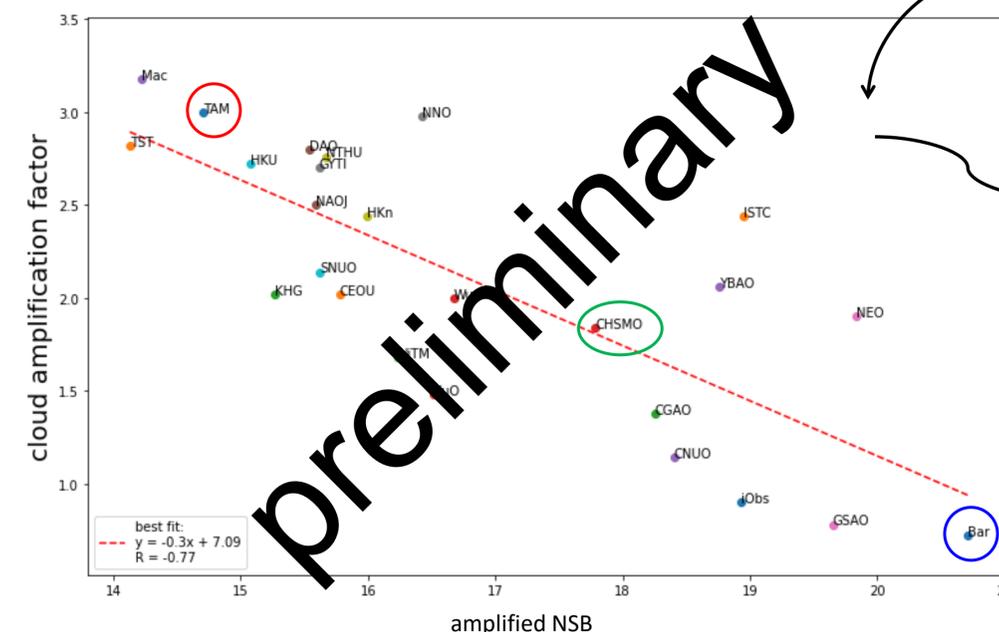


Analysis (skew Gaussian model fitting):



Peak separation (adjusted for nightly variations) measured for 25 sites

Preliminary results (cloud amplification):



Conclusion:

Cloud amplification factor ($NSB_{\text{clear}} - NSB_{\text{cloudy}}$) correlated ($R = -0.77$) with location's NSB

→ the brighter the night sky of the location is, the more the clouds impact the NSB