

# Potential subjects for Master Theses 2024-2025

- *Nightjar Research Group* -



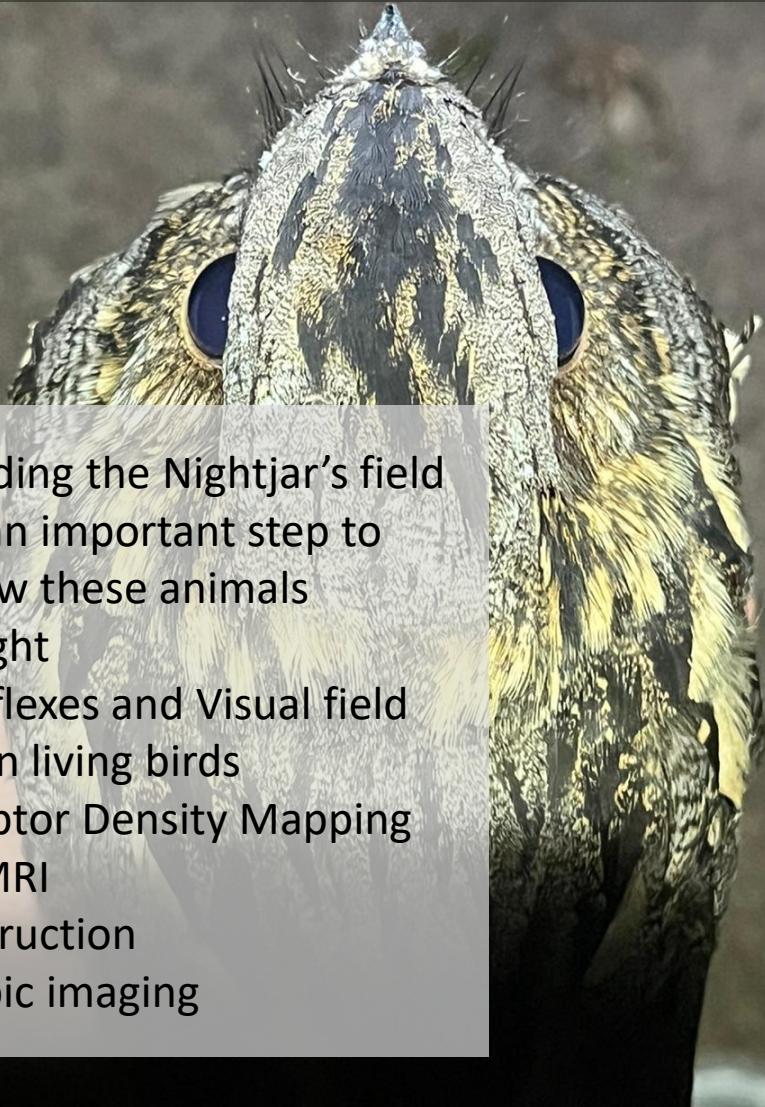
1. A formal demarcation of a Nightjar's territory based on their song posts.  
- *Where does a Nightjar sing with respect to its nest?* -

- Methodological study to aid in the prediction of nest sites
- Combine GPS + accelerometer to define song posts
- Link location of song posts to nest location
- Correlate the frequency of song post visits to distance from nest



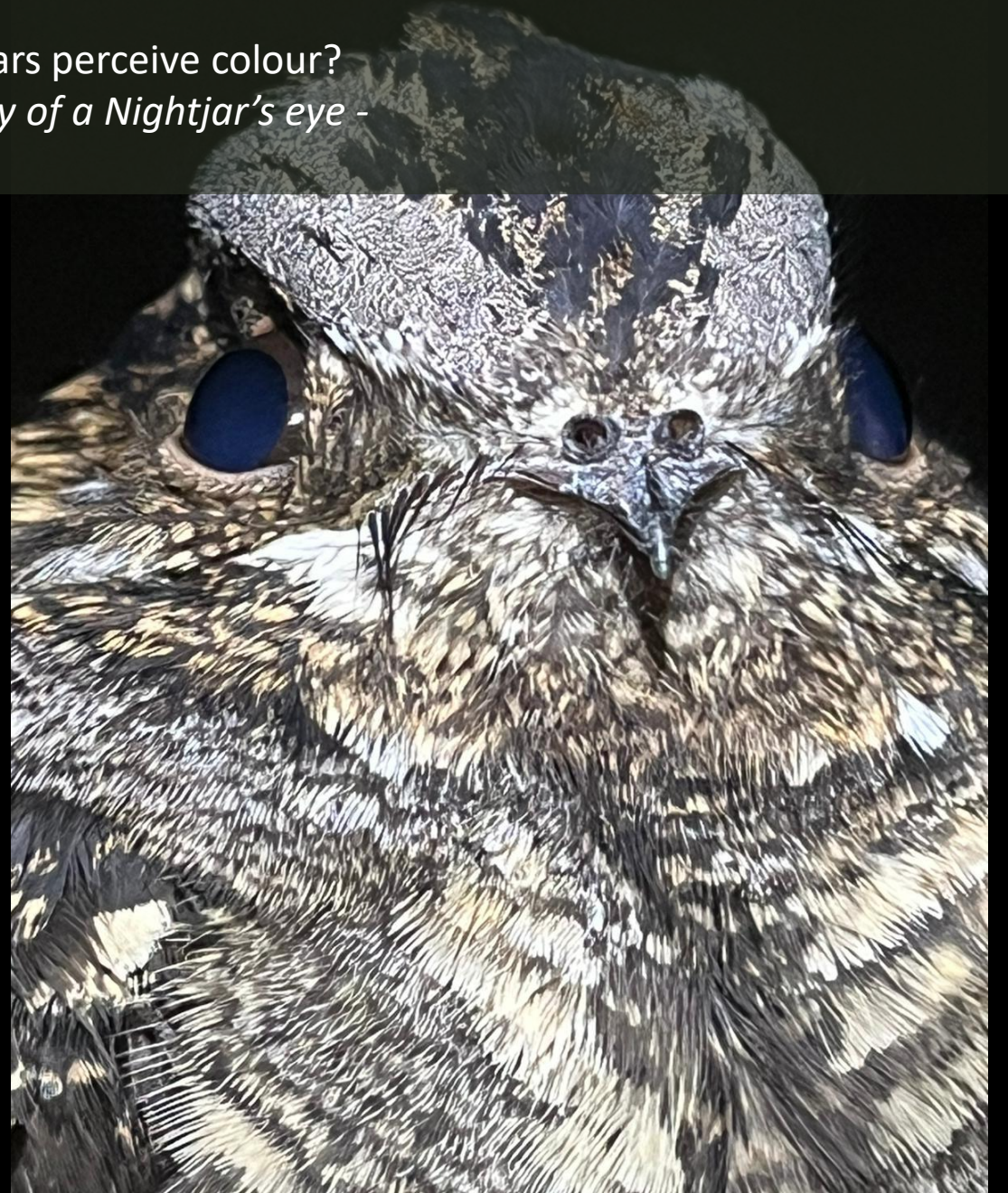
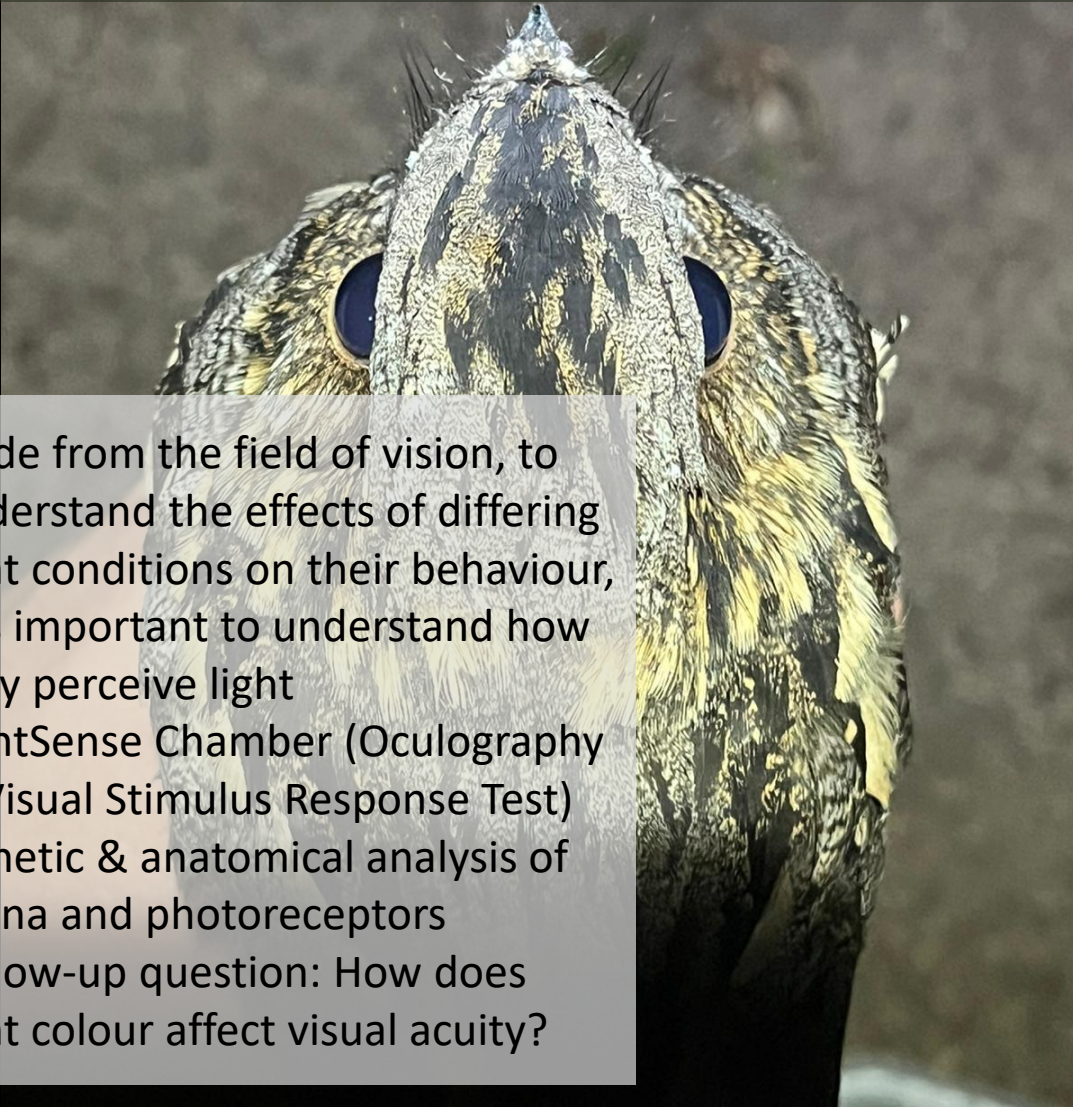
2. What is the extent of a Nightjar's field of vision?  
- *An analysis of the anatomy of a Nightjar's eye* -

- Understanding the Nightjar's field of view is an important step to explore how these animals perceive light
- Corneal reflexes and Visual field mapping on living birds
- Photoreceptor Density Mapping (OCT) & sMRI
- 3D reconstruction
- Stereoscopic imaging

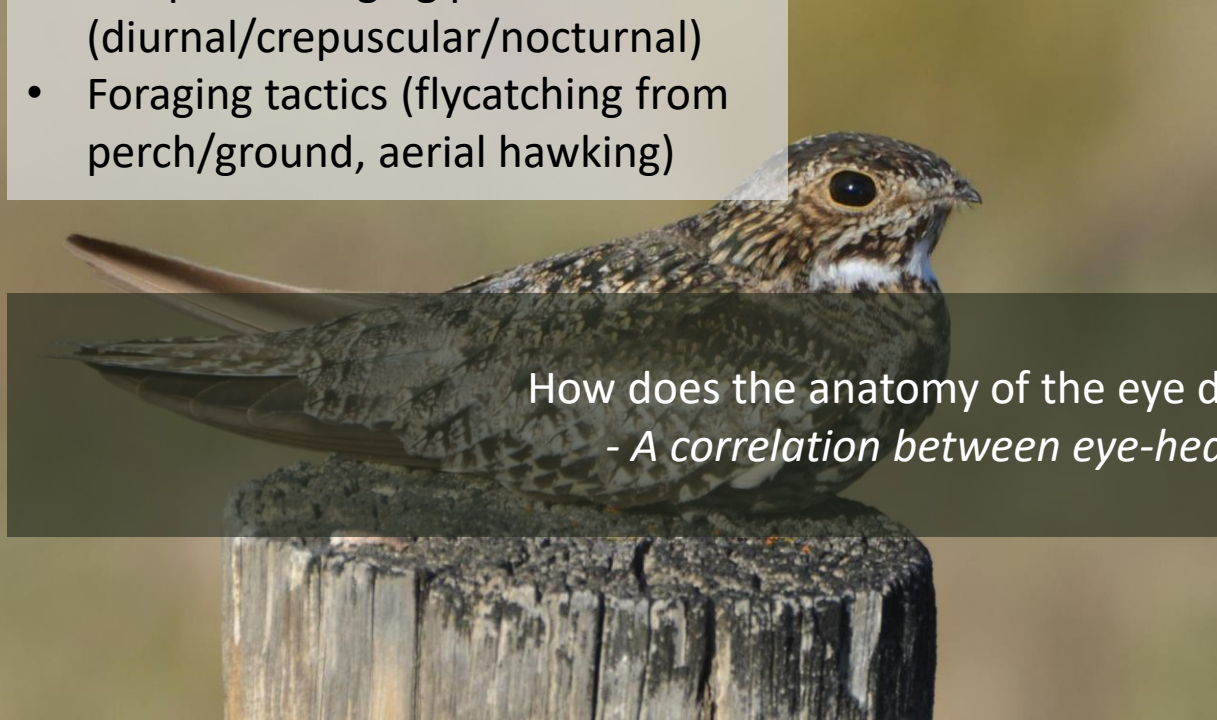


Follow up: How do Nightjars perceive colour?  
- *An analysis of the anatomy of a Nightjar's eye* -

- Aside from the field of vision, to understand the effects of differing light conditions on their behaviour, it is important to understand how they perceive light
- LightSense Chamber (Oculography & Visual Stimulus Response Test)
- Genetic & anatomical analysis of retina and photoreceptors
- Follow-up question: How does light colour affect visual acuity?



- How do different eye shapes affect the foraging of different Caprimulgid species?
- Google Images (or 3D scans)
- Eye-head ratio of different species
- Temporal foraging patterns (diurnal/crepuscular/nocturnal)
- Foraging tactics (flycatching from perch/ground, aerial hawking)



How does the anatomy of the eye differ between Caprimulgid species?  
- A correlation between eye-head ratio and temporal patterns -

### 3. When and how do Nightjars use direct forms of light pollution for foraging?

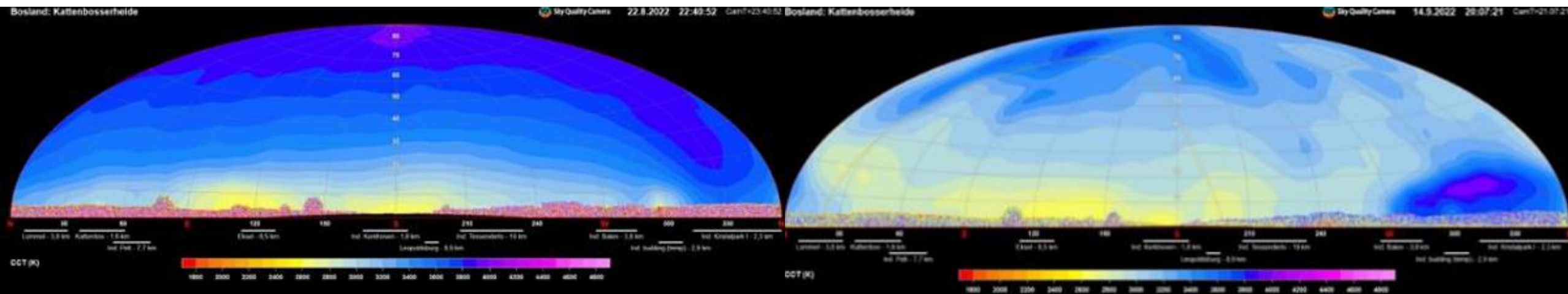
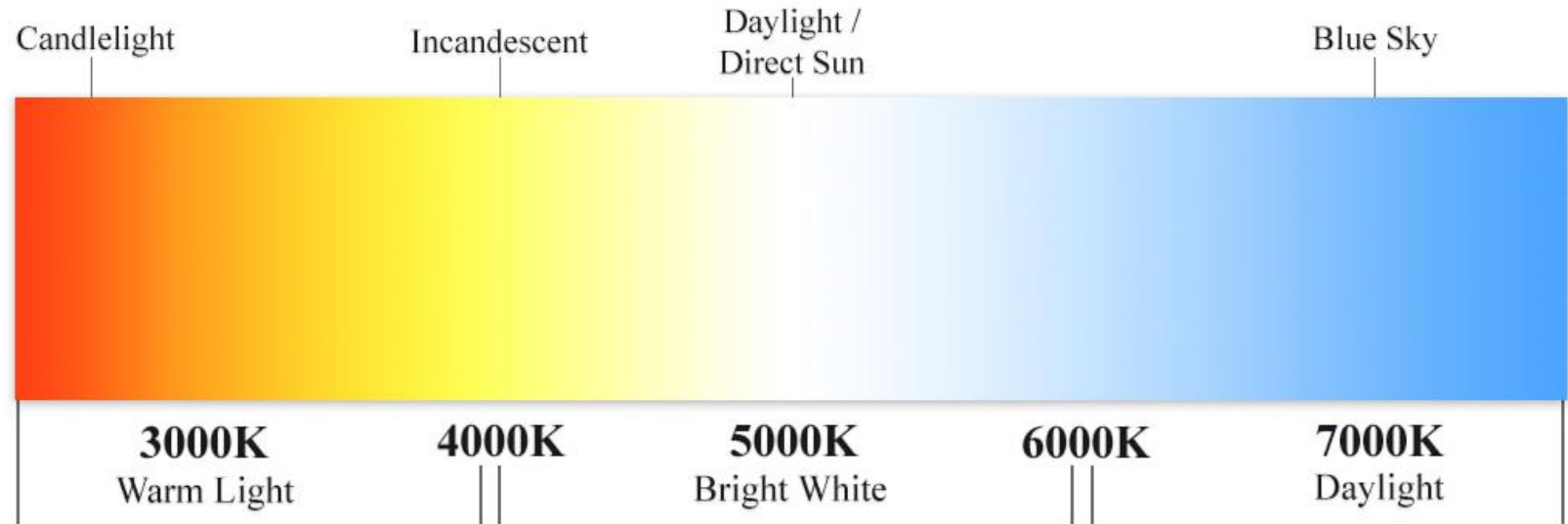
*- The use of streetlights to aid in foraging under dark atmospheric conditions -*

- In our GPS tracks we often observe nightjars foraging close to streetlights
- Distant light source or prey attractant?
- Under dark atmospheric conditions or also other conditions?



Follow up: How does correlated colour temperature reflect different wavelengths of colour?  
*-Measuring colour from all-sky photography -*

- Sky Quality Camera measures Correlated Colour Temperature (CCT)
- Measures how warm or cold white light is
- Enough for skyglow analysis?
- Spectral analysis based on pixel images?



11.10.2023 20:49:14 CamT=20:49:14

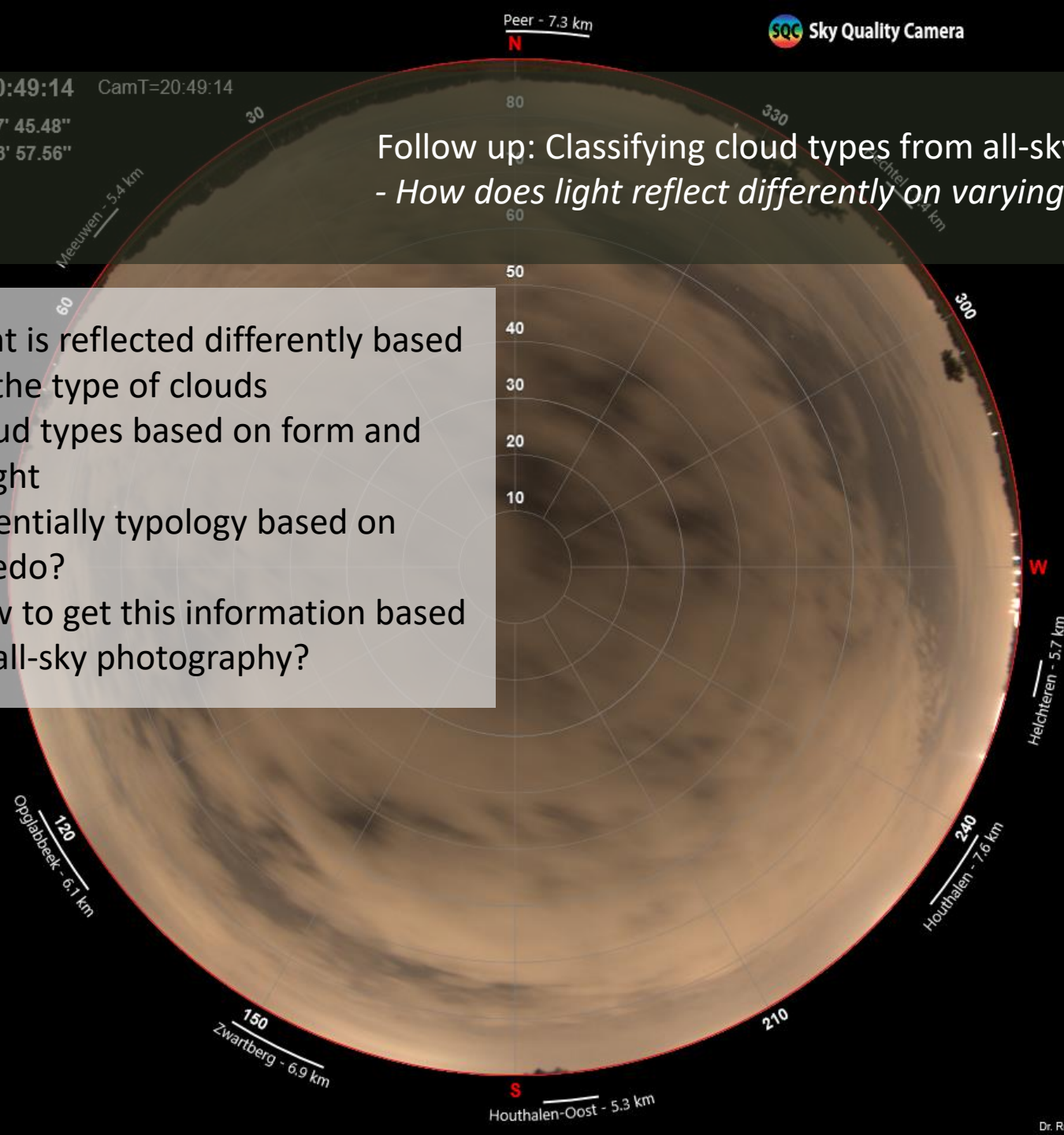
Longitude: E 5° 27' 45.48"

Latitude: N 51° 3' 57.56"

Elevation: 71 m

Follow up: Classifying cloud types from all-sky photography.  
 - How does light reflect differently on varying cloud types? -

- Light is reflected differently based on the type of clouds
- Cloud types based on form and height
- Potentially typology based on albedo?
- How to get this information based on all-sky photography?



Cirrus

[sir-uhs]

Cirrocumulus

[sir-oh-kyoo-myuh-luhs]

HIGH  
LEVEL  
above  
6,000m

Cirrostratus

[sir-oh-strat-uhs]

Altostratus

[al-toh-kyoo-myuh-luhs]

MID  
LEVEL  
2,000m-  
6,000m

Altostratus

[al-toh-strat-uhs]

Stratocumulus

[strat-oh-kyoo-myuh-luhs]

Nimbostratus

[nim-boh-strat-uhs]

LOW  
LEVEL  
0-2,000m

Cumulus

[kyoo-myuh-luhs]

Cumulonimbus

[kyoo-myuh-loh-nim-buhs]

Stratus

[strat-uhs]

#### 4. Prey abundance under different light conditions and different micro-habitats - *How do ambient light levels affect the spatial patterns of moths* -

- Nightjars often forage along the forest edge
- Moth abundance generally higher in forest than in open fields, so nightjars might exploit edge-effects of forested areas
- How do different light levels affect the spatial patterns of these moths



## 5. Foraging ecology of Red-necked Nightjars in Donana National Park

- *How does the sudden introduction of artificial light shape the foraging behaviour of nightjars* -

- Red-necked nightjars always perch on the ground to forage
- The introduction of artificial light in Donana National Park has attracted individuals that suddenly perch on poles to feed in a previously unsuitable site for foraging nightjars.
- What is happening? Which individuals come here? How does this affect population dynamics?....

