IMPACT OF THE ATMOSPHERIC CORRECTION ON INFRARED CAMERA MEASUREMENTS

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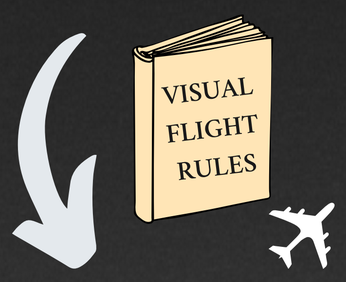
Introduction

Monitoring clouds is essential for many applications:

1) Climate change studies
2) Astronomical observation
3) Aircraft navigation

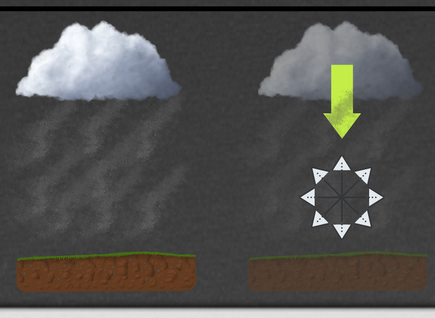


"The cloud-base height sets the altitude of the aircraft's obligatory instrumental control"

Cloud-Base Height Estimation

- Ceilometer
- INFRARED CAMERAS NEW!

CLOUD EMISSION + CO_2 & H_2O IR EFFECT



Objective

The principal objective of this study is to emphasize the **importance** of the atmospheric correction for accurately estimating the cloud-base height (CBH) with infrared estimations.

Methods

Atmospheric Standard Profiles (ASP)

50 m LEVELS

US Standard
Tropic
Mid-Latitude Summer
Mid-Latitude Winter
Subarctic Summer
Subarctic Winter

(T, P, RH) — For each ASP

RADIS

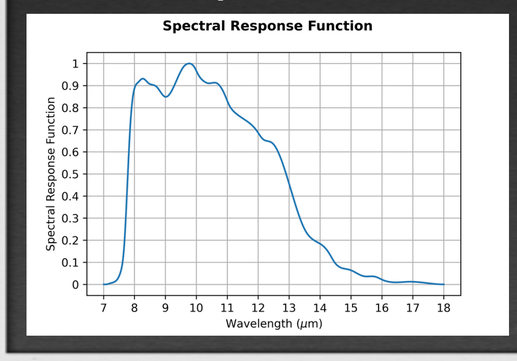
CO_2 & H_2O SPECTRUM

BLACKBODY CLOUD EMISSION

$\tau(\lambda)$

CO_2 & H_2O EMISSION

RADIANCE TRANSMITTED

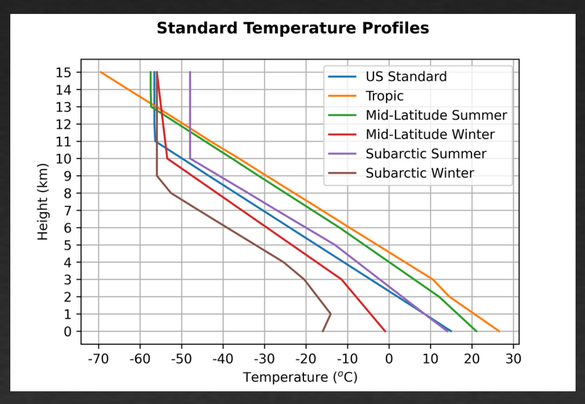


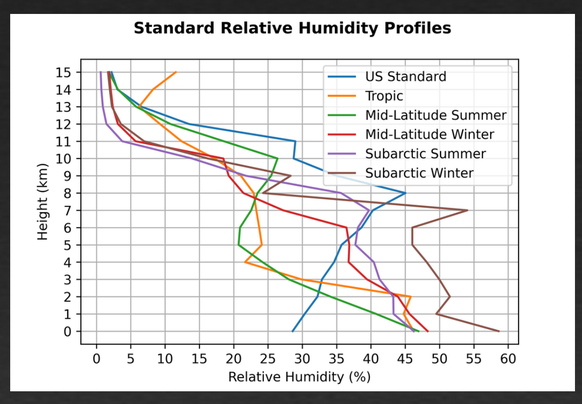
SRF

IR RADIANCE REGISTERED

Results and Discussion

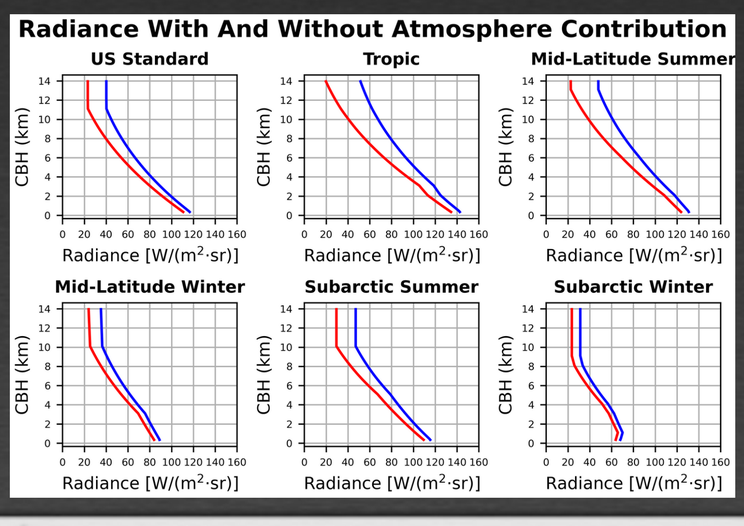
The atmospheric effect notably depends on the vertical gradient of the ASP and the height of the tropopause.





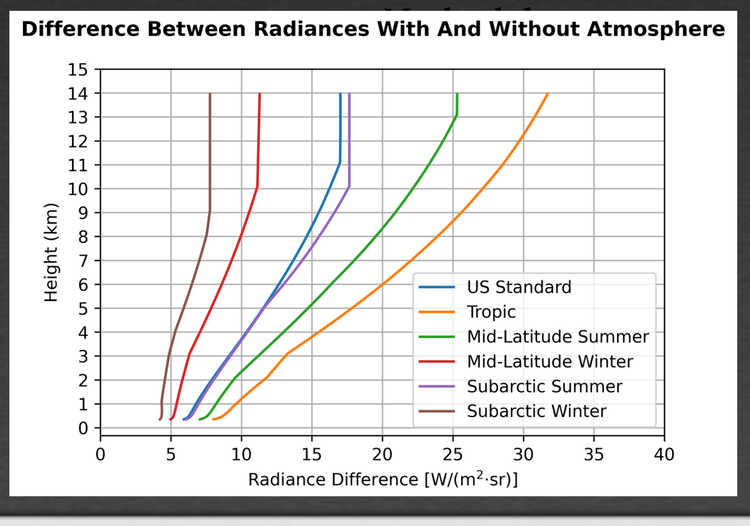
Significant variability of the RH profiles.

Prevents from proposing direct relationships between RH and the net atmospheric effect.



ATMOSPHERIC EFFECT

- Higher emission contribution compared to the absorption.
- Significantly depends on the specific atmospheric profile.
- More important for high clouds than for medium or low clouds.



Acknowledgements

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Conclusion

The main results revealed that atmospheric correction has to be taken into consideration for accurate estimations of cloud-base height.