

Characteristics of Cirrus Clouds in the Central Amazon region during the Intensive Observational Period in the dry season 2014 as part of the GOAMAZON experiment.

Boris Barja^(1,2), Henrique Barbosa⁽²⁾, Diego Gouveia⁽²⁾, Eduardo Landulfo⁽³⁾ and Paulo Almeida⁽³⁾.

(1) Centro Meteorológico Camagüey, Cuba.

(2) Lab. Física da Atmosfera – Universidade de São Paulo.

(2) Centro de Lasers e Aplicações, IPEN.



*Grupo de Óptica
Atmosférica de
Camagüey*



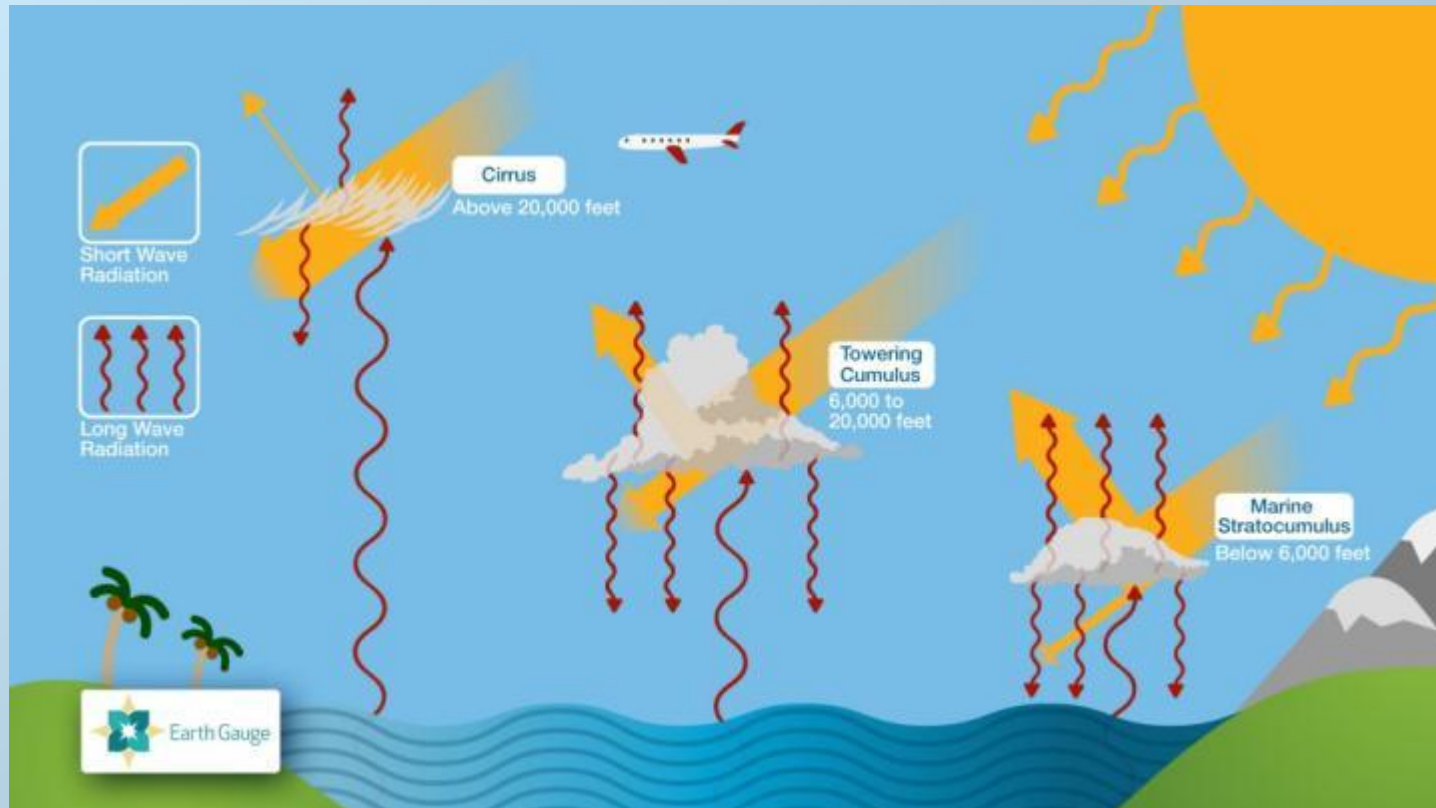
*Lab. Física da Atmosfera.
Instituto de Física - USP,
São Paulo, SP, Brasil*



*Centro de Lasers e
Aplicações, IPEN.
São Paulo, SP, Brasil*

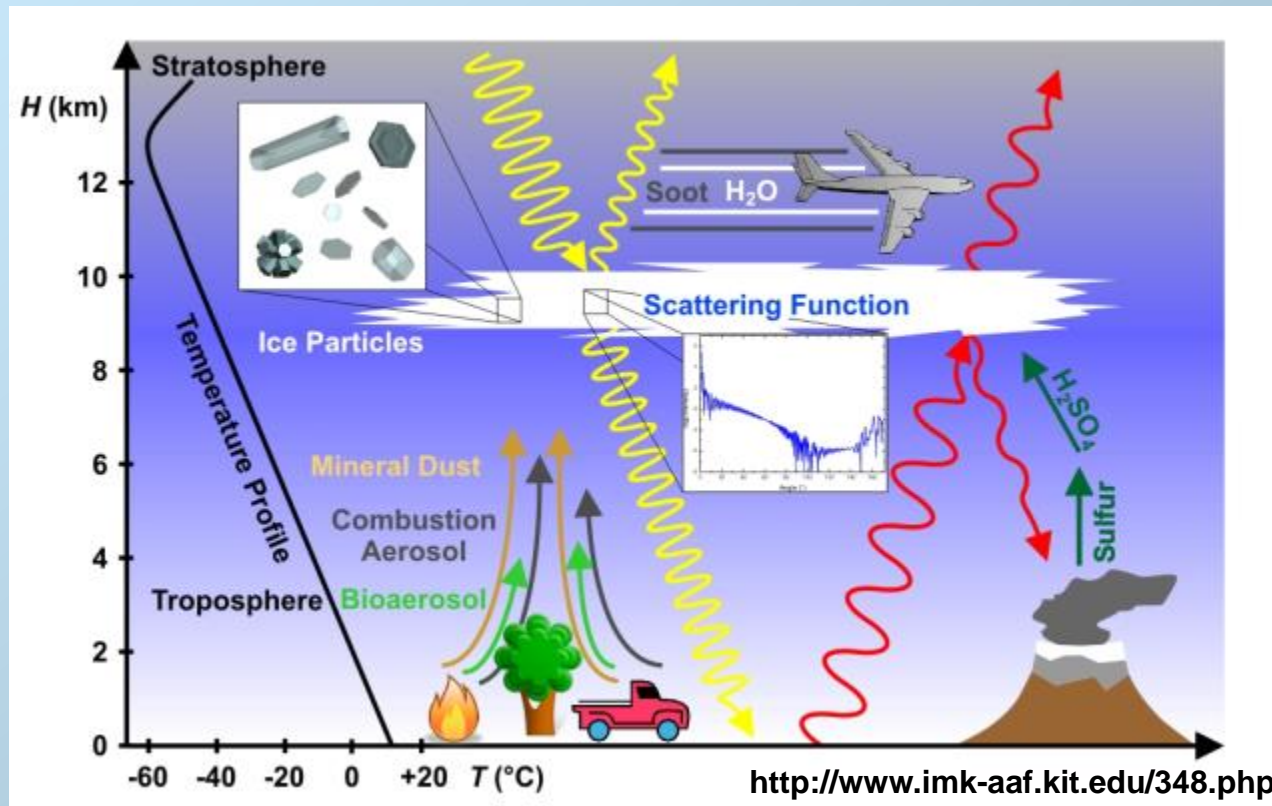
Motivation

1. Cirrus can affect the atmospheric radiation budget by reflecting the incoming solar radiation and absorbing the outgoing terrestrial radiation
2. Cirrus are involved in the dehydration of the upper troposphere and lower stratosphere.



Motivation

1. Cirrus can affect the atmospheric radiation budget by reflecting the incoming solar radiation and absorbing the outgoing terrestrial radiation
2. Cirrus are involved in the dehydration of the upper troposphere and lower stratosphere.



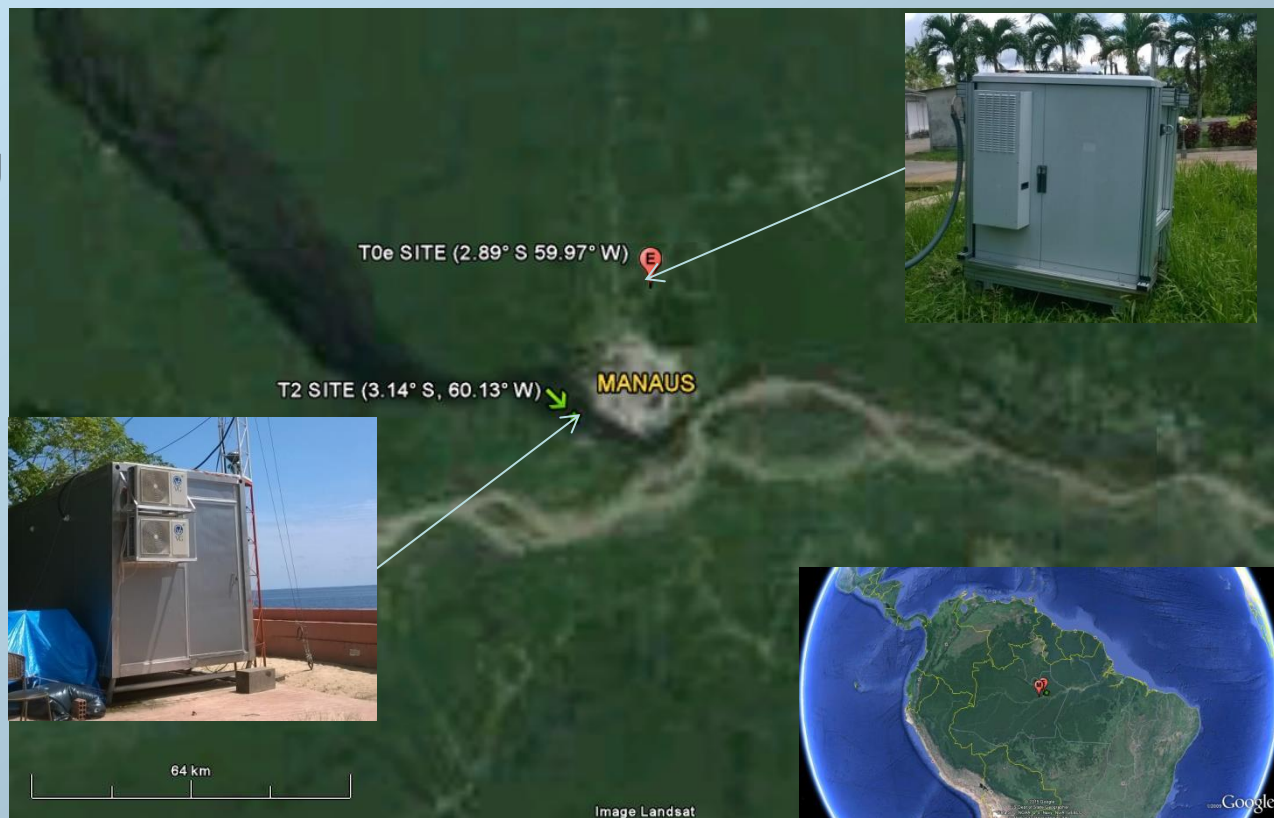
Data and measurement Sites

(T0e) Experimental Site ACONVEX (Aerosols, Clouds, Convection Experiment).

Lidar 355 nm

(T2) Experimental Site TIWA . Lidar 532 nm

- Measurements were used: August 15 to October 15, 2014, during the Intensive Operating Period in GOAMAZON experiment.
- Cirrus cloud base and top heights, optical depths and lidar ratios were analyzed during this period in the three sites.



Instruments



Raman lidar Raymetric:

Nd:Yag - Quantel CFR 400 (95 mJ @ 355 nm)

Pulse: 8 ns, Rate: 10 Hz.



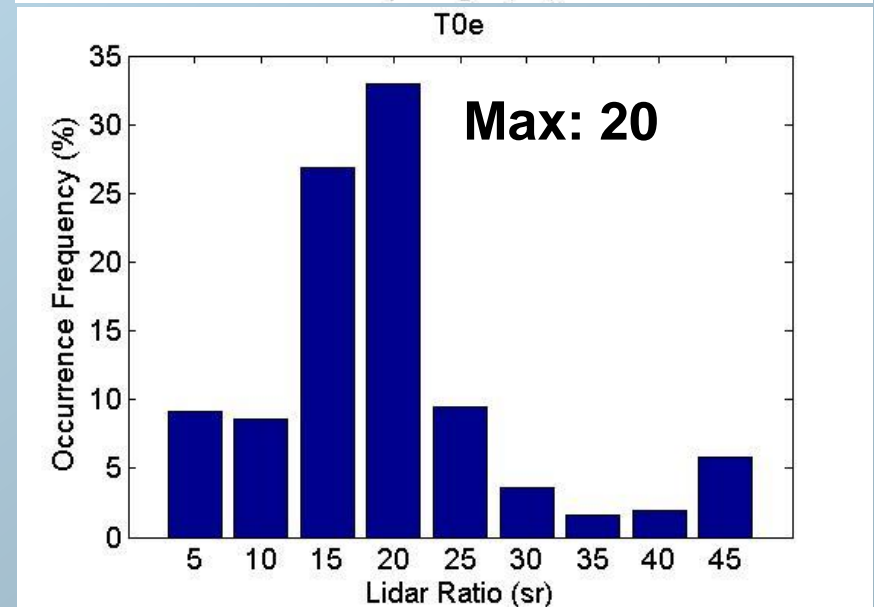
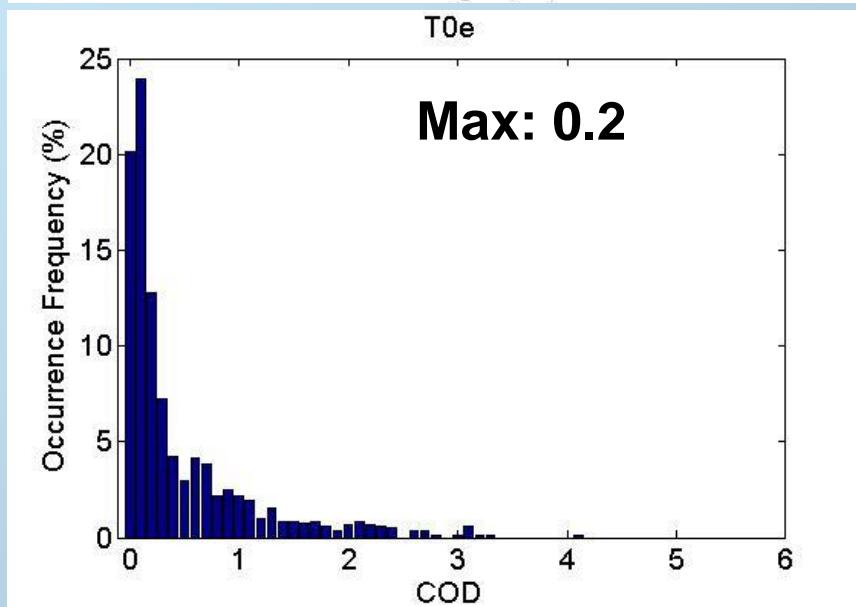
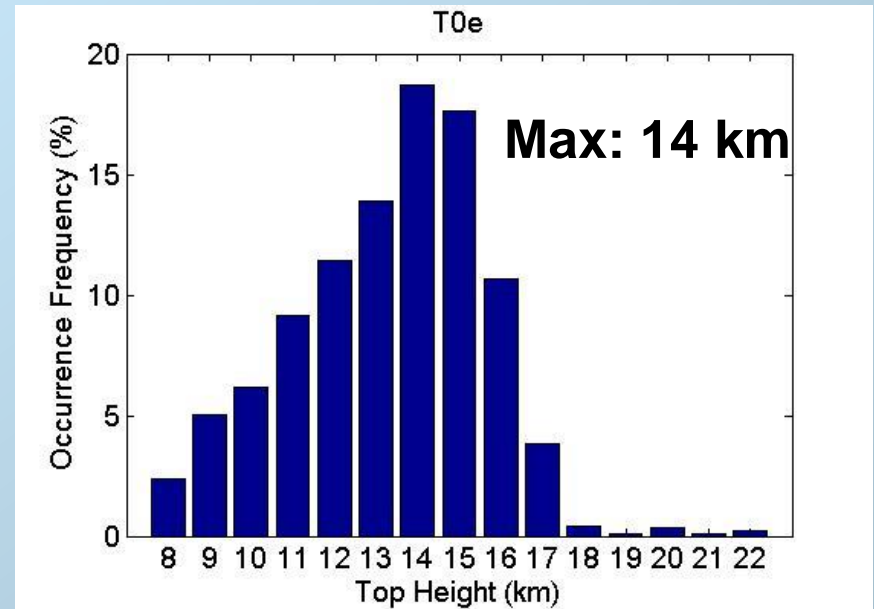
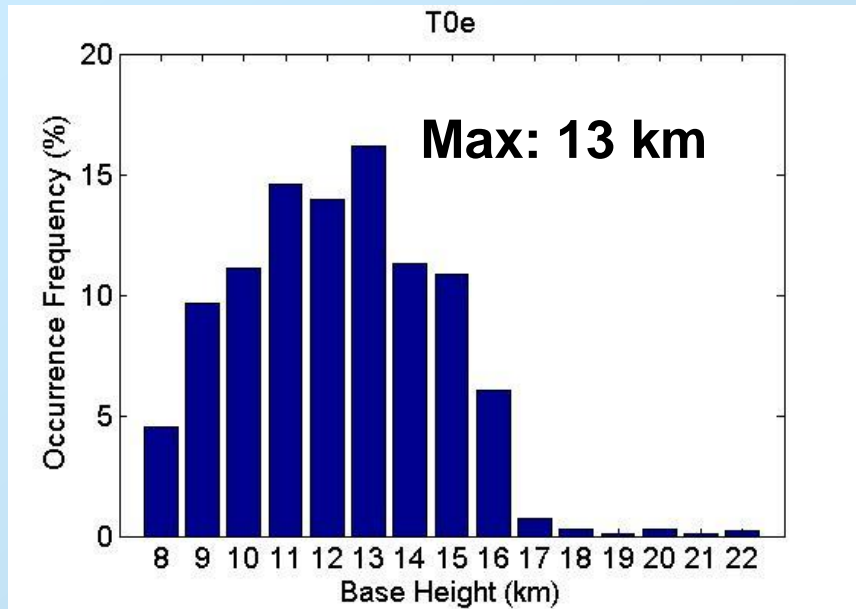
Raman lidar Raymetrics:

Nd:Yag - Quantel CFR 200 (150-330 mJ @ 532 nm) Rate: 20 Hz

The used method for the determination of the cloud base, top altitude, cirrus cloud optical depth and lidar ratio was implemented (Gouveia et al., 2014, Poster session).

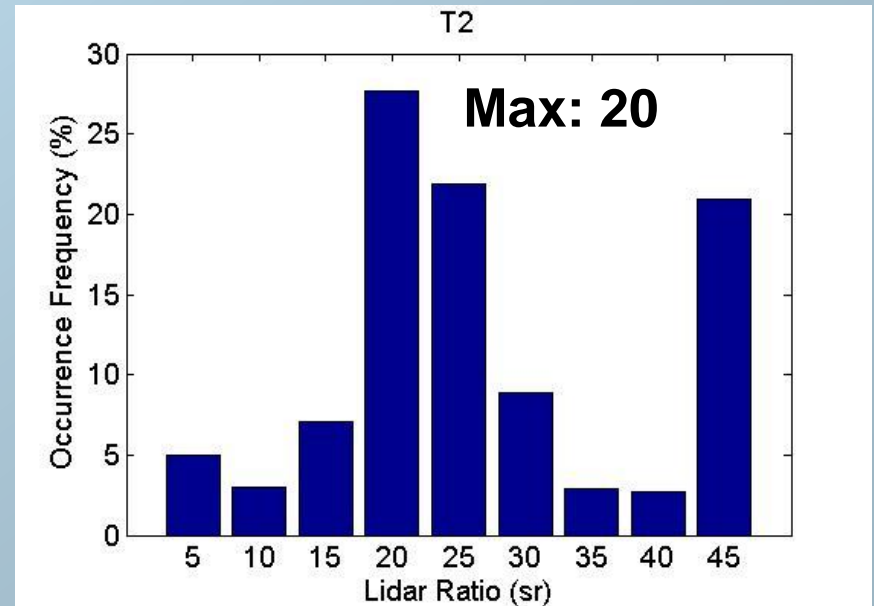
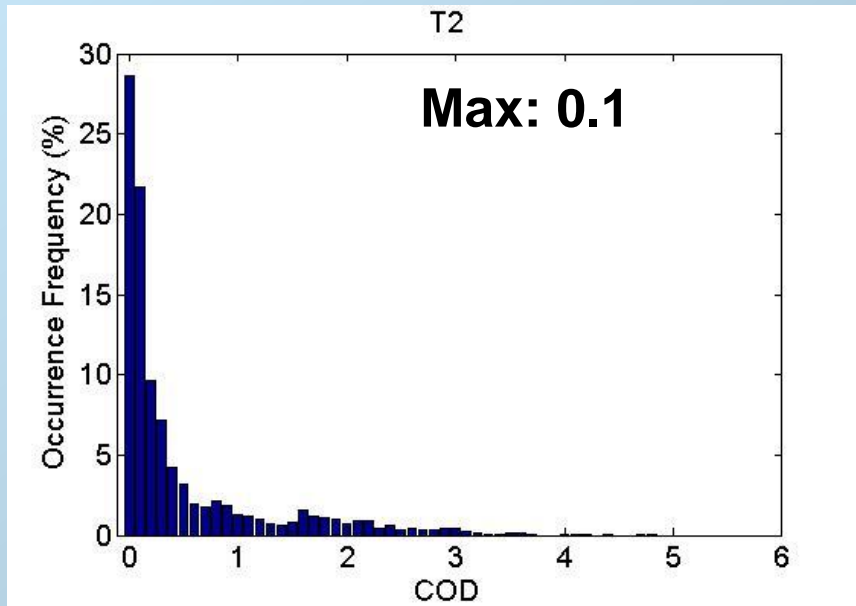
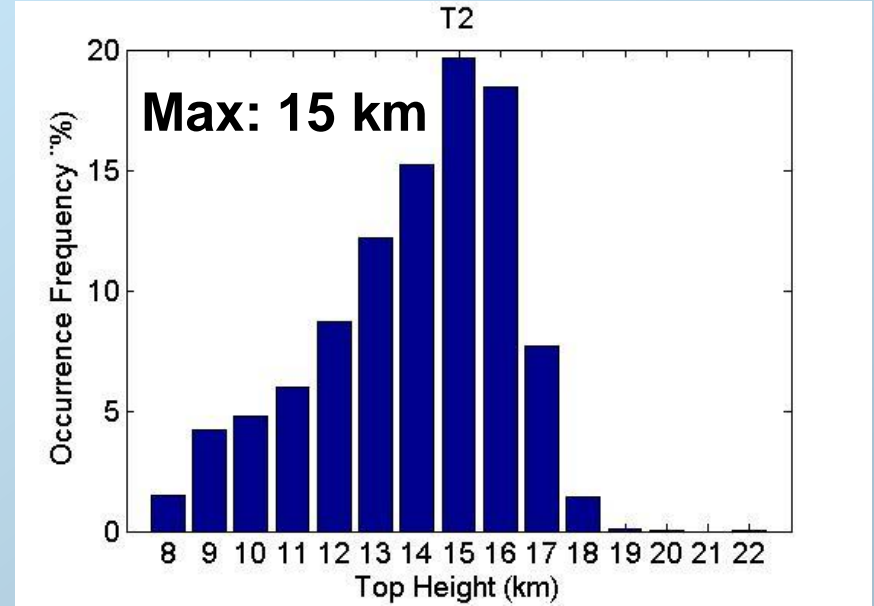
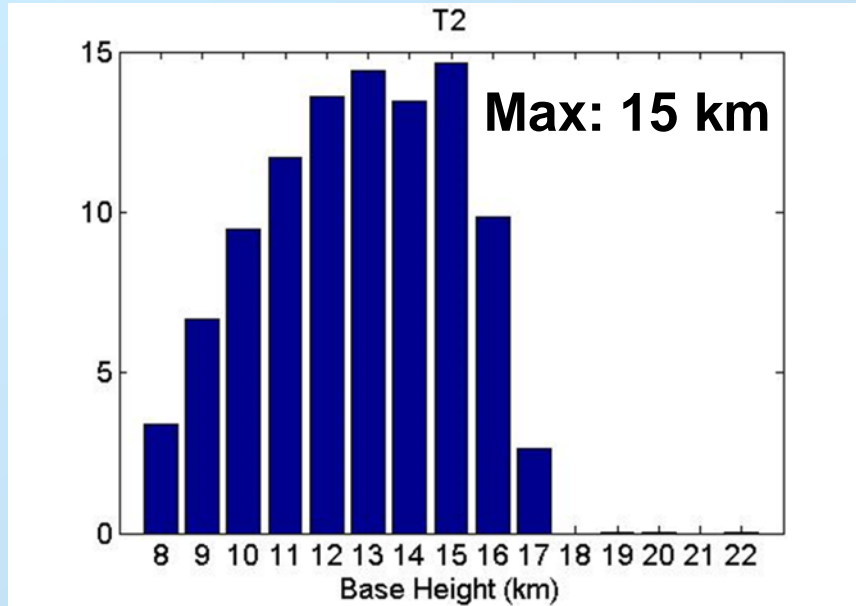
Results

T0e site August 15 to October 15 2014



Results

T2 site August 15 to October 15 2014



Results

Mean Values	T0e	T2
Occurrence (%)	69	77
Base (m)	12240	12761
Top (m)	13298	13901
LR(sr)	21	28
Optical Depth	0.8	0.5

There are similarities between the characteristics of the cirrus clouds in these two sites with 30 km of distance.

Conclusions

- Cirrus clouds was detected with lidar during the second IOP of Goamazon 2014.
- It was demonstrated the applicability of the method for the determination of the cloud base, top altitude, and cirrus cloud optical depth.
- The characteristics of cirrus clouds in the region was obtained with similar results in the different sites.

Perspectives

- Synergy between lidar measurements and other instruments.

Acknowledgment

- Work was supported by FAPESP under grant 12/16100-1.
- Organizing committee of VIII WLMLA