

Vida, reprodução e morte das nuvens

Danilo Lessa Bernardineli
<http://fap.if.usp.br/~danlessa/>

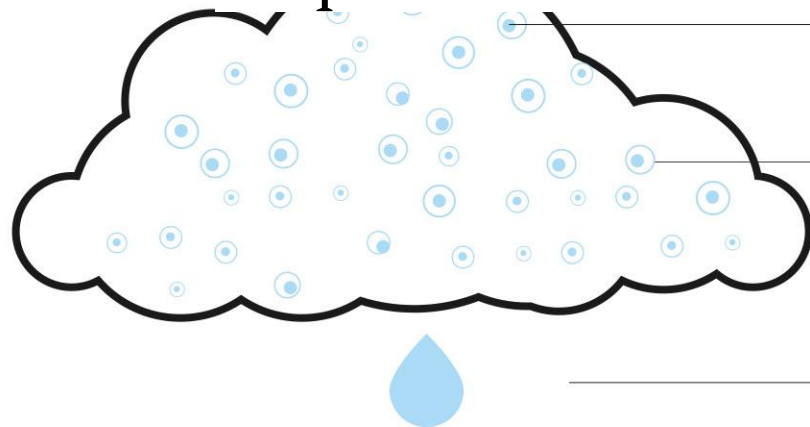
O que é uma nuvem???



O que não é uma nuvem



O que é uma nuvem!!!



CCN (CLOUD CONDENSATION NUCLEUS)

CLOUD DROPLET (CONDENSED AROUND CCN)

RAINDROP (CONTAINS AROUND 1 MILLION CLOUD DROPLETS)

.2 μm



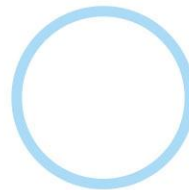
CONDENSATION NUCLEUS

20 μm



CLOUD DROPLET

2000 μm (2mm)



RAINDROP

#CloudIsMade

Fumaça de
queimadas

Spray
marinho

Núcleos de condensação

Pólen, fragmentos
de folhas e insetos

Poeira do
solo e de
desertos

Emissões
naturais de
florestas

Cinzas
vulcânicas

Interior da nuvem

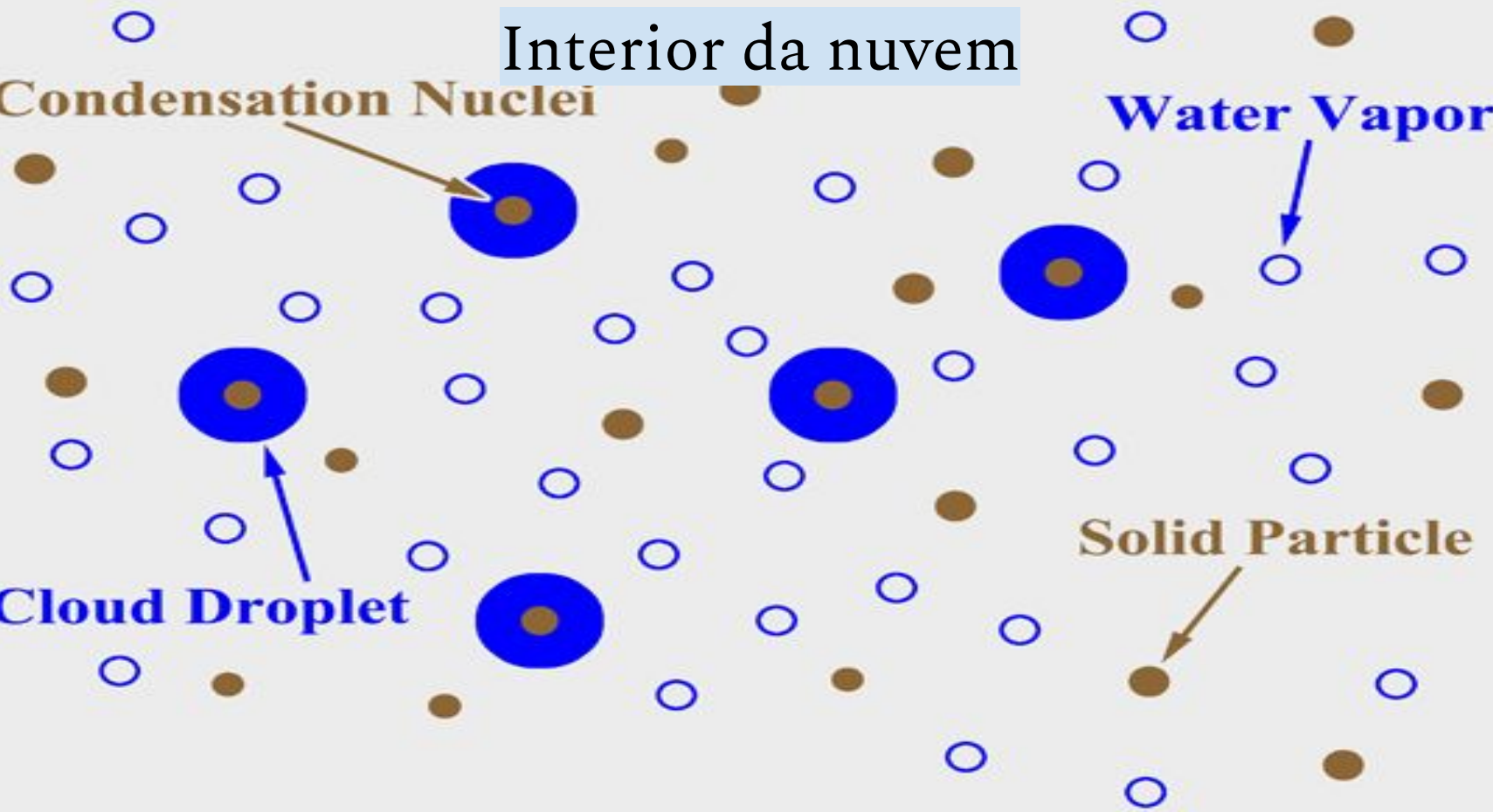
Condensation Nuclei

Water Vapor

Cloud Droplet

Solid Particle

Note: Object Sizes Not to Scale



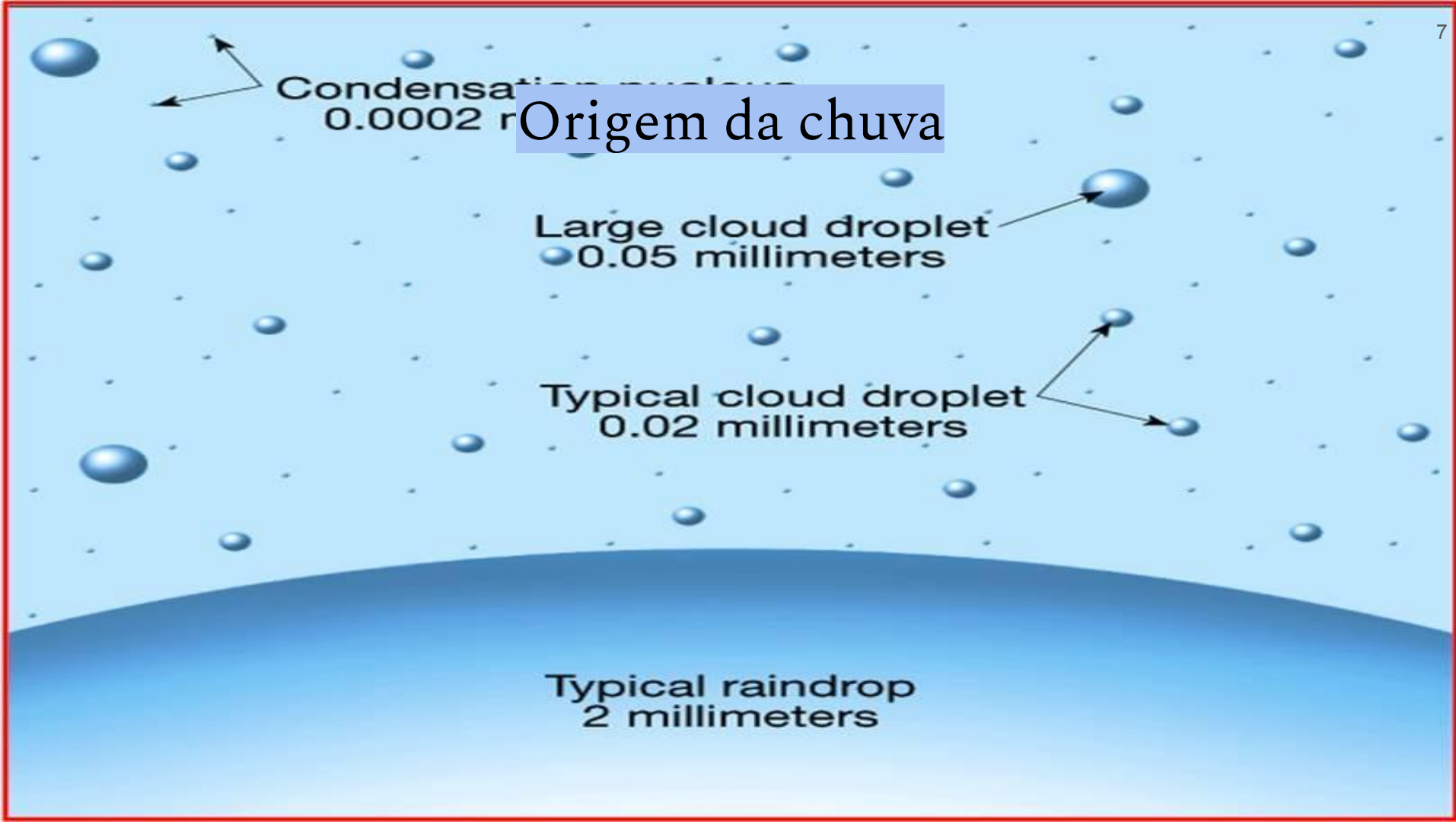
Condensation nucleus
0.0002 millimeters

Origem da chuva

Large cloud droplet
0.05 millimeters

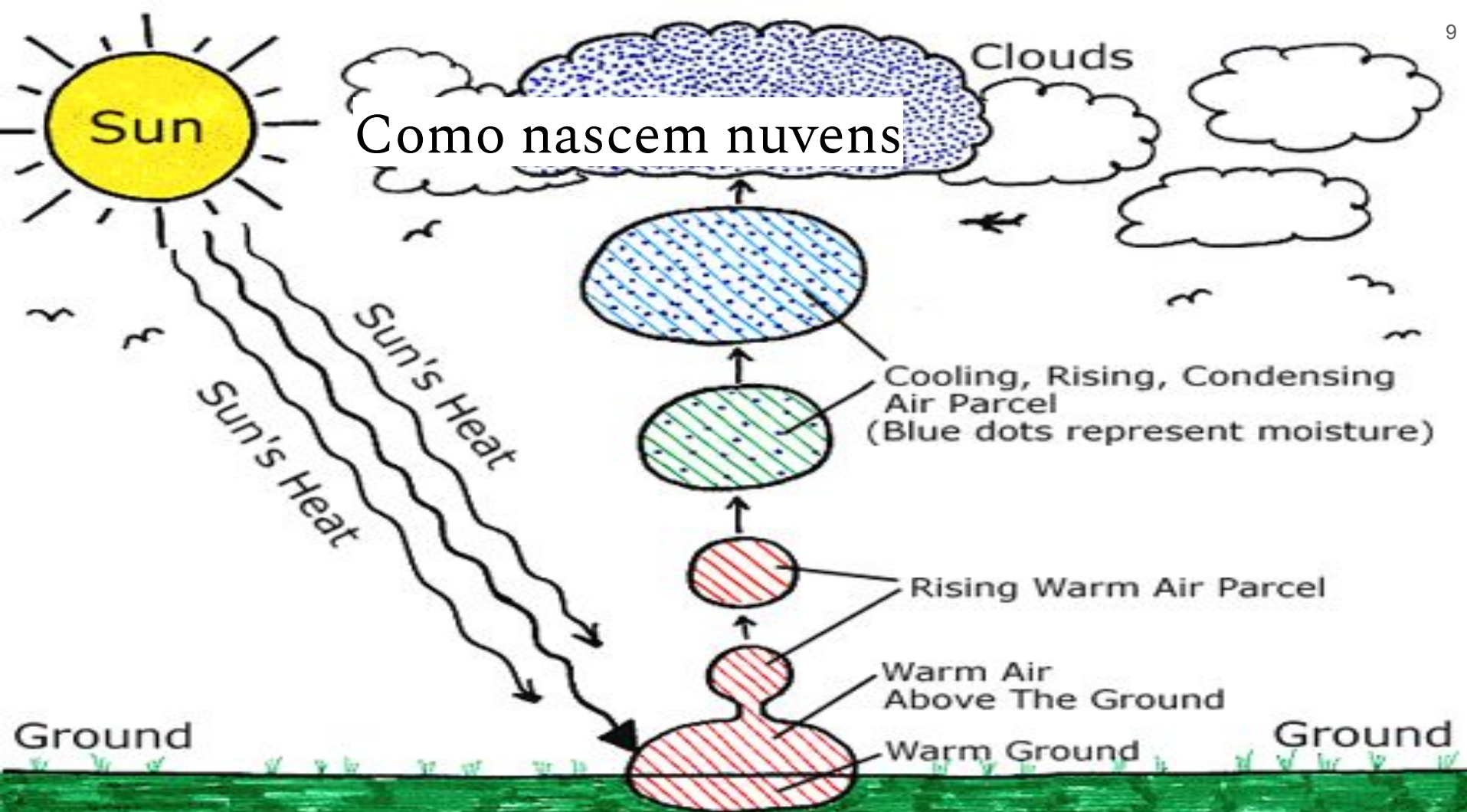
Typical cloud droplet
0.02 millimeters

Typical raindrop
2 millimeters



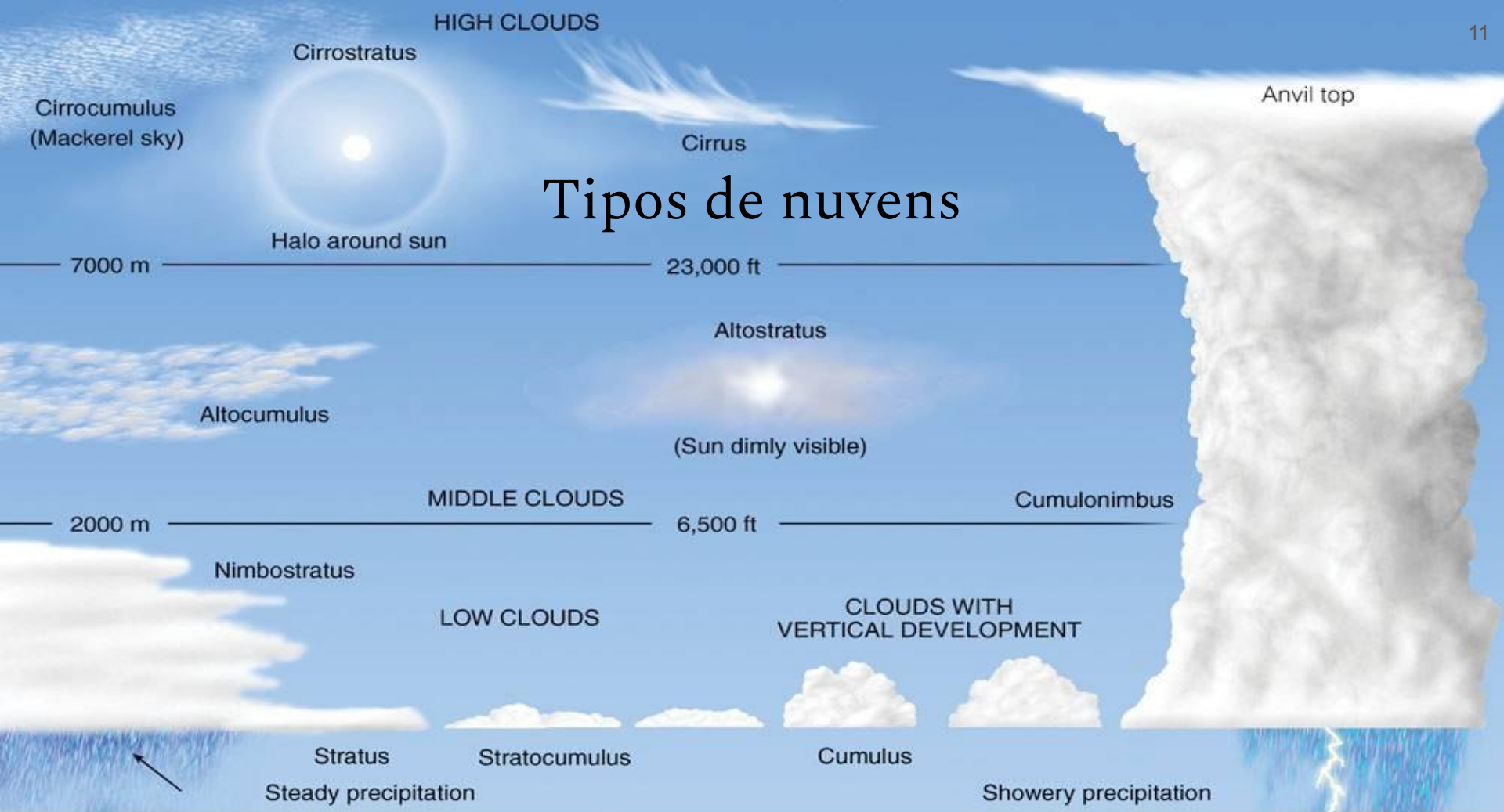
Anedota sobre chuva





Porque as nuvens não caem?





Cirrus



Stratus



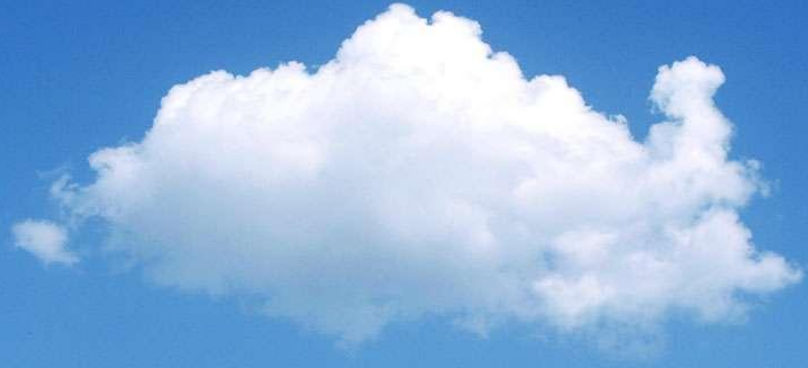
Cumulus



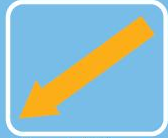
Cumulunimbus



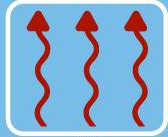
Porque as nuvens são brancas?



A dança da luz dentro das nuvens



Short Wave
Radiation



Long Wave
Radiation

Cirrus

Above 20,000 feet

**Towering
Cumulus**

6,000 to
20,000 feet

**Marine
Stratocumulus**

Below 6,000 feet



Earth Gauge



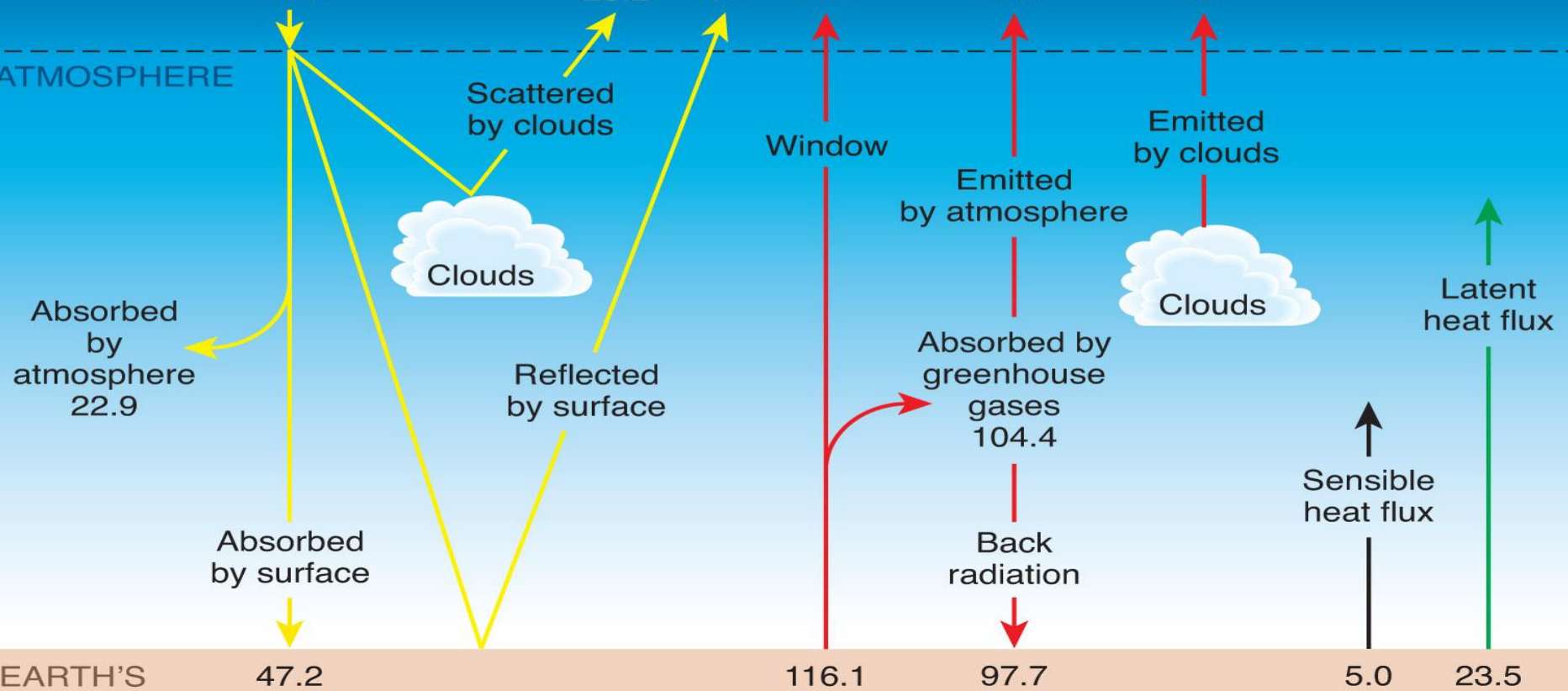
Incoming
solar radiation

Outgoing radiation

Nuvens são importantes para o clima

ATMOSPHERE

EARTH'S
SURFACE



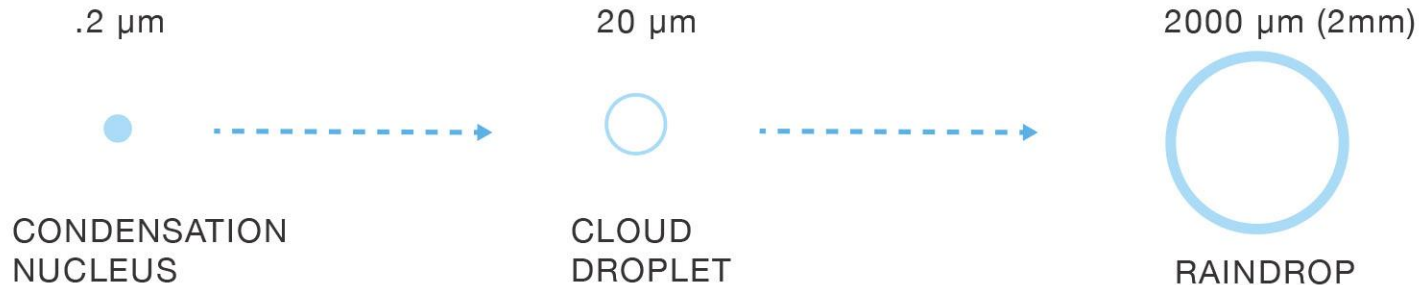
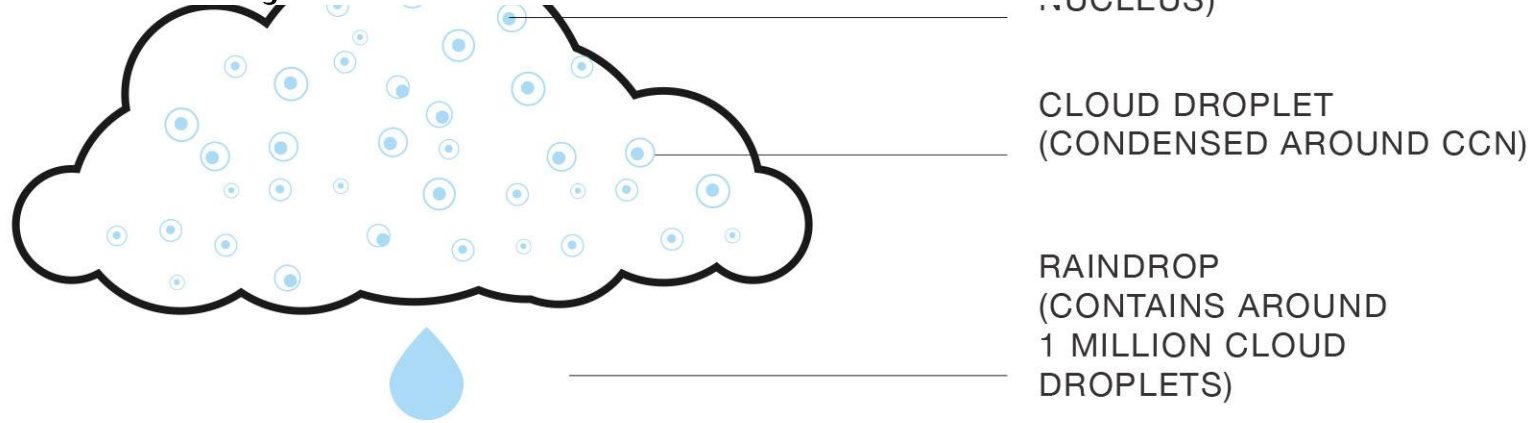
Importância das nuvens



Poluição muda as nuvens



Poluição interfere nas chuvas¹



Poluição interfere nas chuvas²



The Amazon effect: how deforestation is starving São Paulo of water



▲ 'Welcome to the Cantareira Desert' ... in January 2015 the city's main Cantareira reservoir was down to 5% – barely a month's supply of water. Photograph: Sebastiao Moreira/EPA

A drought two years ago triggered fighting, looting and official 'states of calamity' across the metropolis, with the army preparing to send in troops. Now, new warnings suggest it could happen again – and point to a surprising culprit

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Obrigado!

O arquivo de apresentação com anotações escritas das falas pode ser encontrado ~~no site do Avistar ou~~ em meu website pessoal: <http://fap.if.usp.br/~danlessa/talks/>

Agradecimentos especiais para o Prof. Dr. Alexandre Lima Correia, do Laboratório de Física Atmosférica da USP, o qual foi fundamental para a elaboração dessa apresentação.

