

Weather & Climate Science



Ms. Alison Rockwell
NCAR/Earth Observing Laboratory
Education & Outreach Coordinator

AT&T M-Cell 7:28 99%

Boulder

Partly Cloudy

-17°

Wednesday	Today			10	-2
Now	08	09	10	11	12
-17	-2	0	1	3	7
Thursday				19	10
Friday				37	25
Saturday				34	21
Sunday				37	28
Monday				39	21

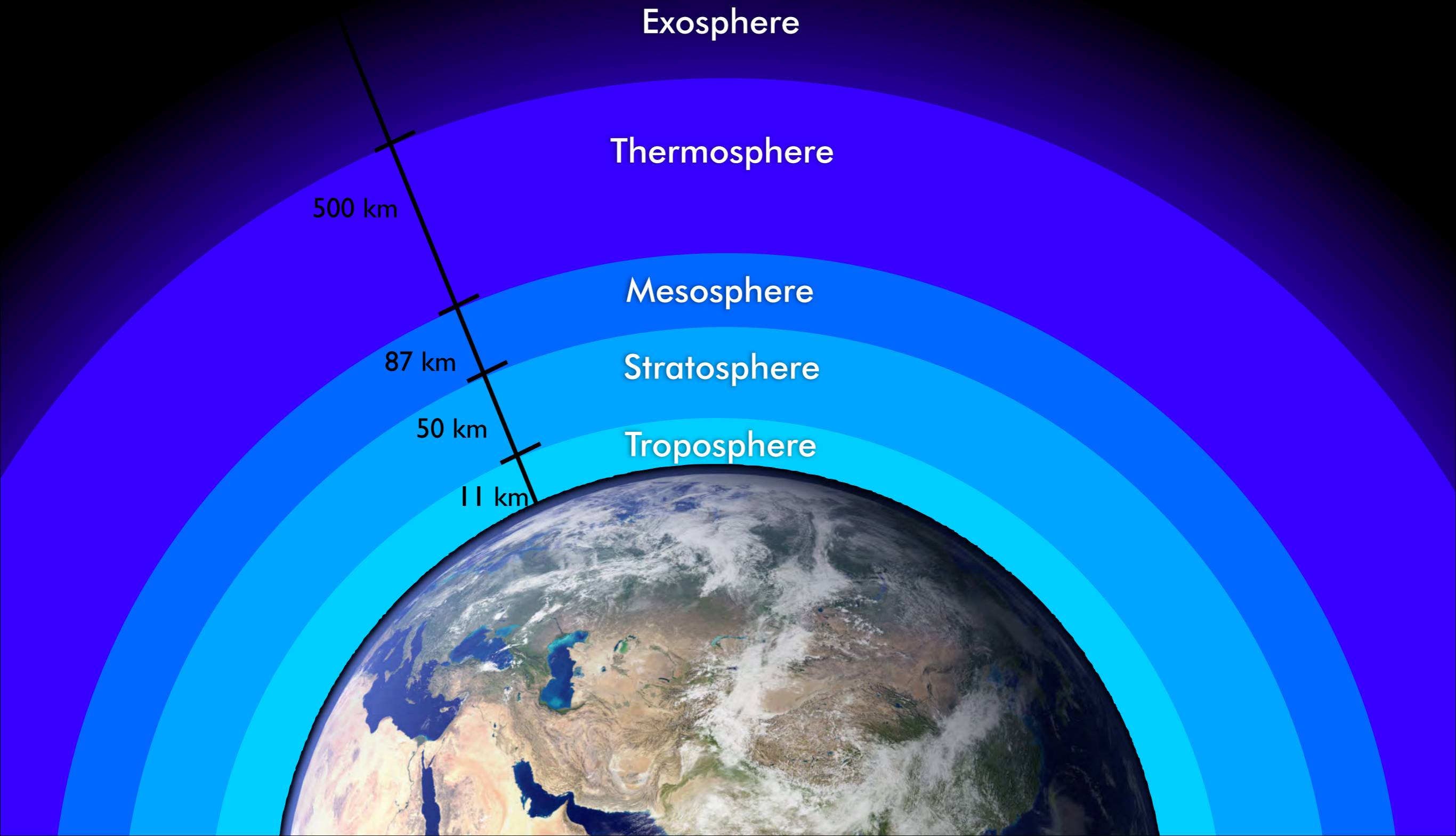
YAHOO!



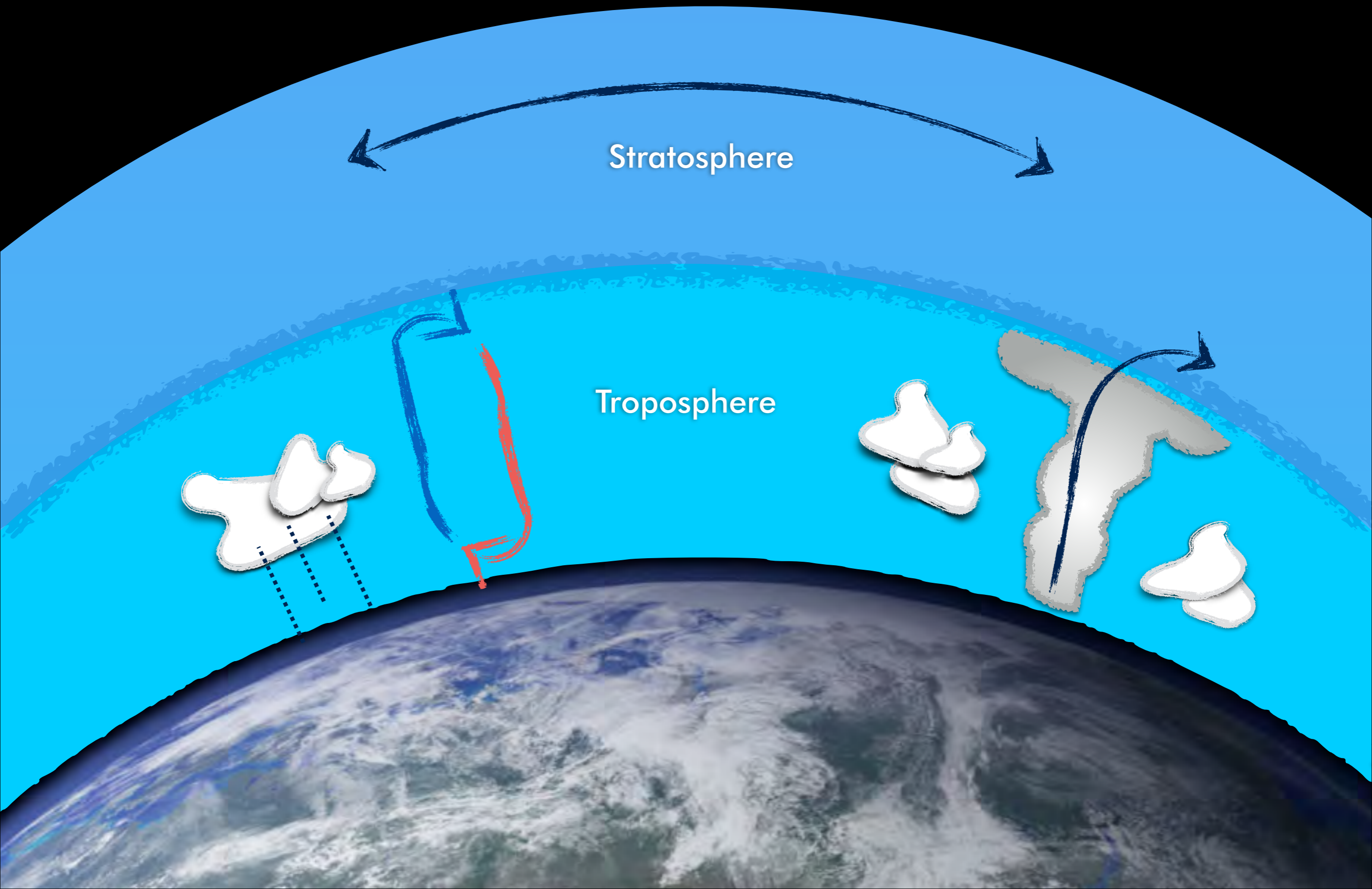


Photo by Adam Sobel

What is the Atmosphere?



A Closer Look at the Troposphere & Stratosphere



CONTRAST

CONvective TRansport of Active Species in the Tropics
Guam :: 15 January - 28 February 2014

Long-lived chlorofluorocarbons + sunlight + hydroxyl (OH)
→ chlorine monoxide (ClO)

Long-lived bromocarbons + sunlight + hydroxyl (OH)
→ bromine monoxide (BrO)

BrO and ClO react, leading to stratospheric ozone (O₃) depletion

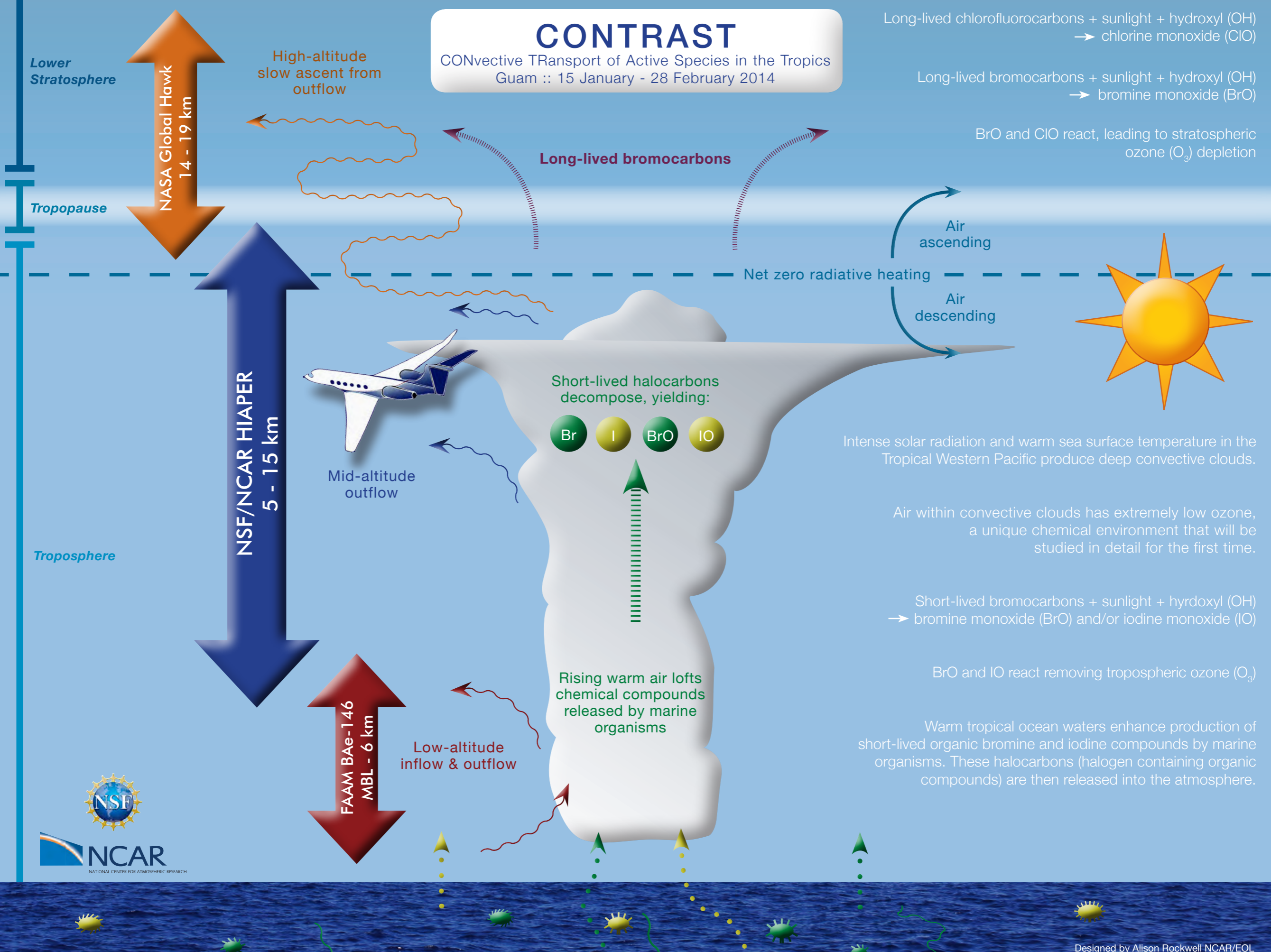
Intense solar radiation and warm sea surface temperature in the Tropical Western Pacific produce deep convective clouds.

Air within convective clouds has extremely low ozone, a unique chemical environment that will be studied in detail for the first time.

Short-lived bromocarbons + sunlight + hydroxyl (OH)
→ bromine monoxide (BrO) and/or iodine monoxide (IO)

BrO and IO react removing tropospheric ozone (O₃)

Warm tropical ocean waters enhance production of short-lived organic bromine and iodine compounds by marine organisms. These halocarbons (halogen containing organic compounds) are then released into the atmosphere.



Flying Laboratory

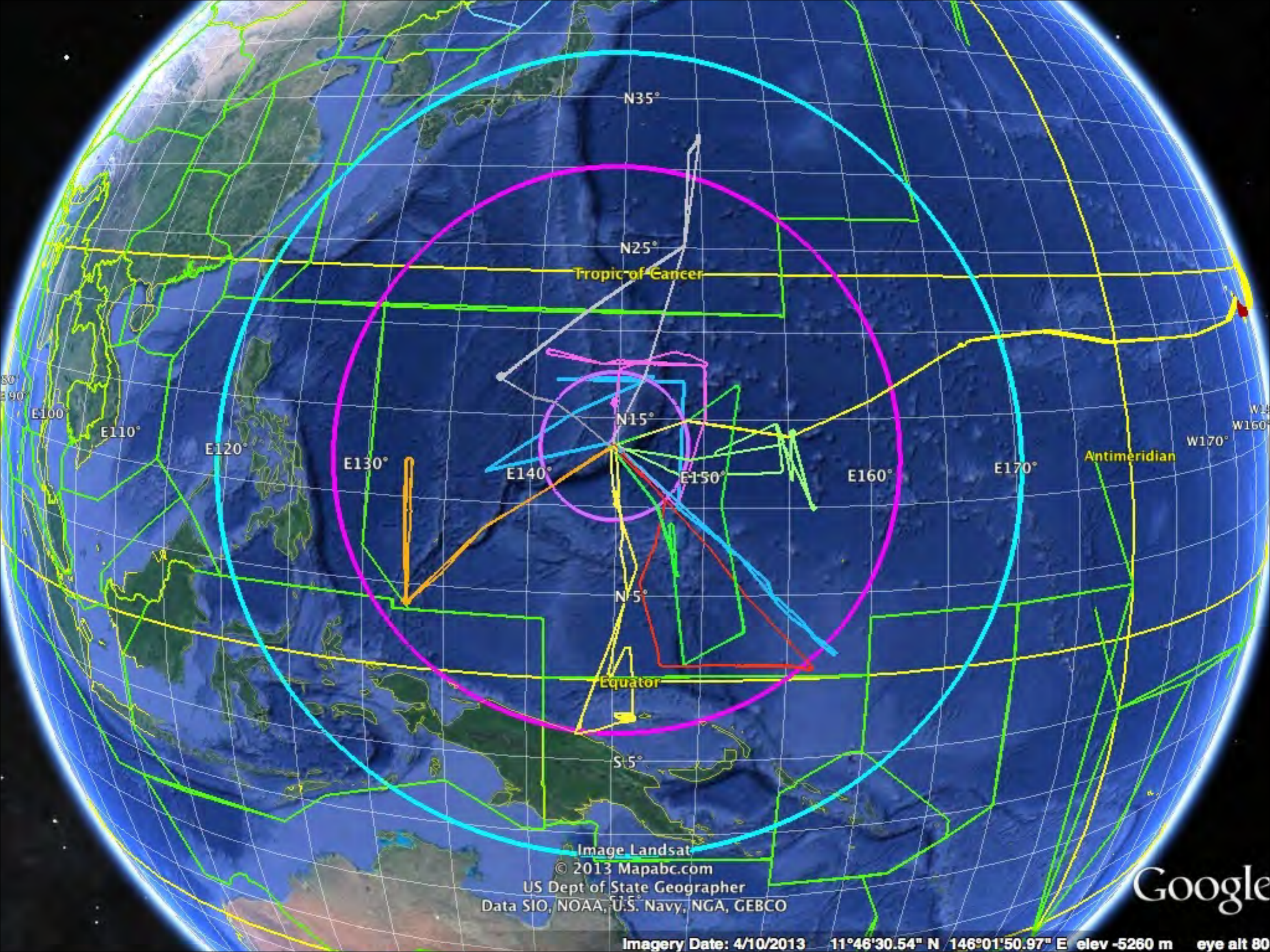


NSF/NCAR HIAPER Research Aircraft

Flying Laboratory



NSF/NCAR HIAPER Research Aircraft



N35°

N25°

Tropic of Cancer

N15°

N5°

Equator

S5°

E130°

E140°

E150°

E160°

E170°

Antimeridian

W170°

W160°

Image Landsat

© 2013 Mapabc.com

US Dept of State Geographer

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

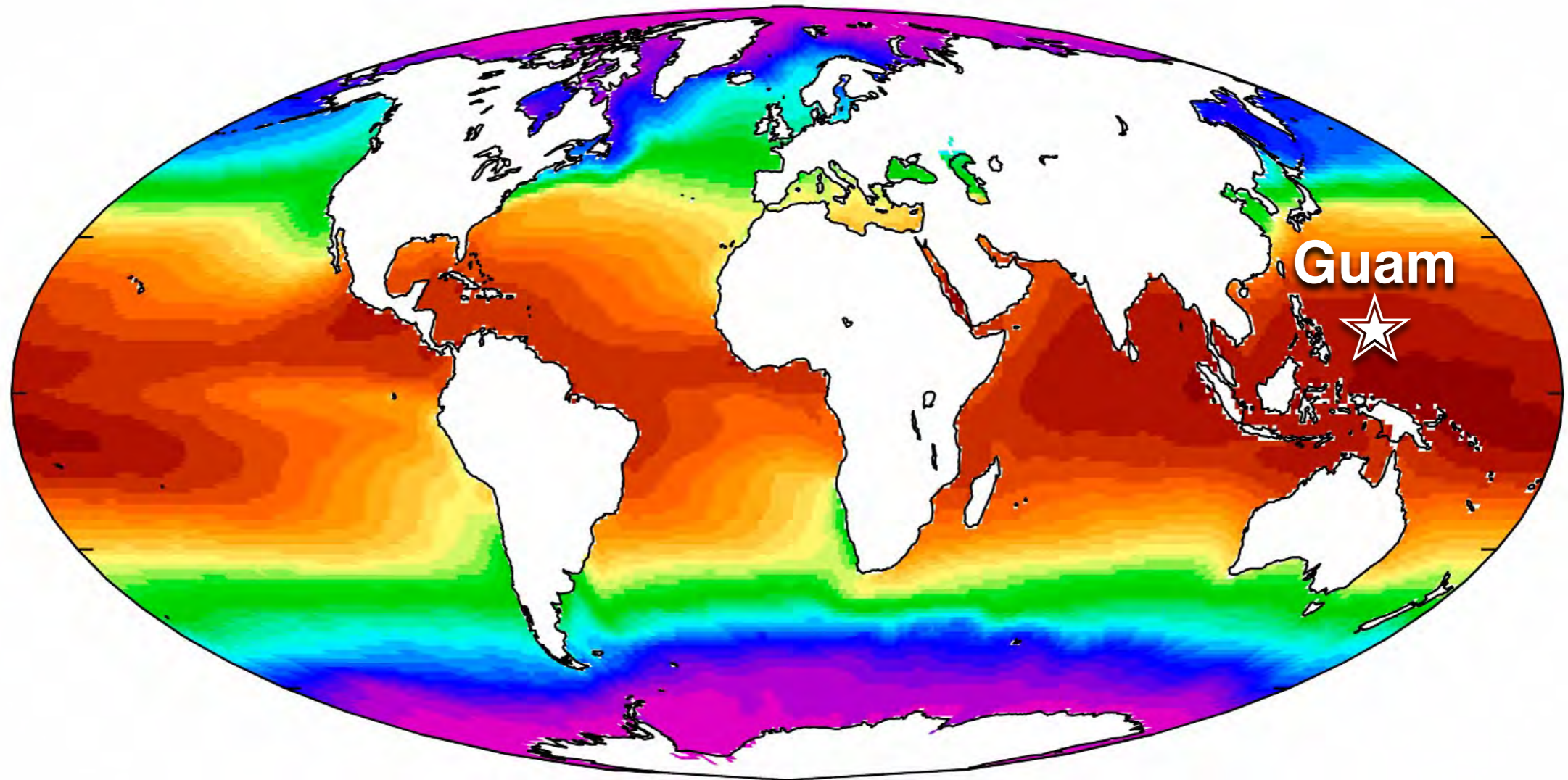
Google

Imagery Date: 4/10/2013

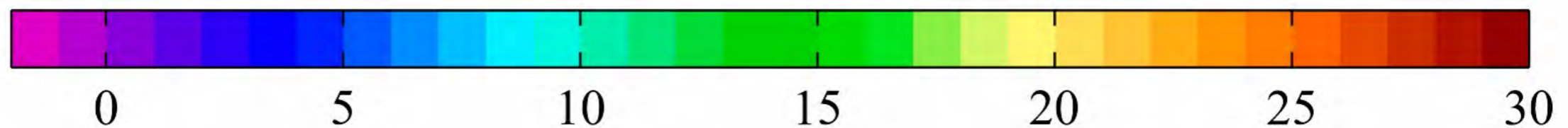
11°46'30.54" N 146°01'50.97" E elev -5260 m

eye alt 80

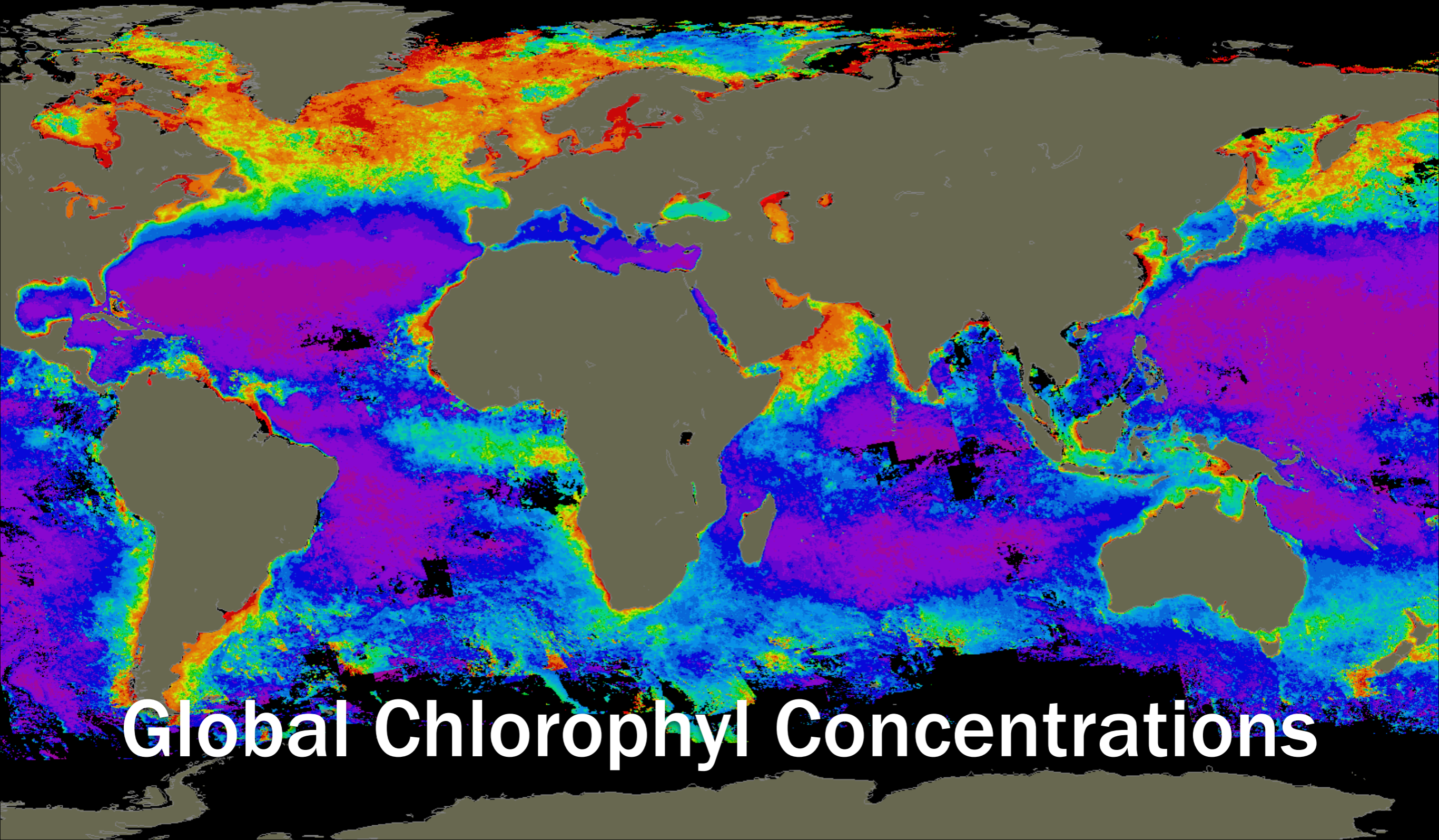
Why Guam?



Sea-surface temperature [$^{\circ}\text{C}$]



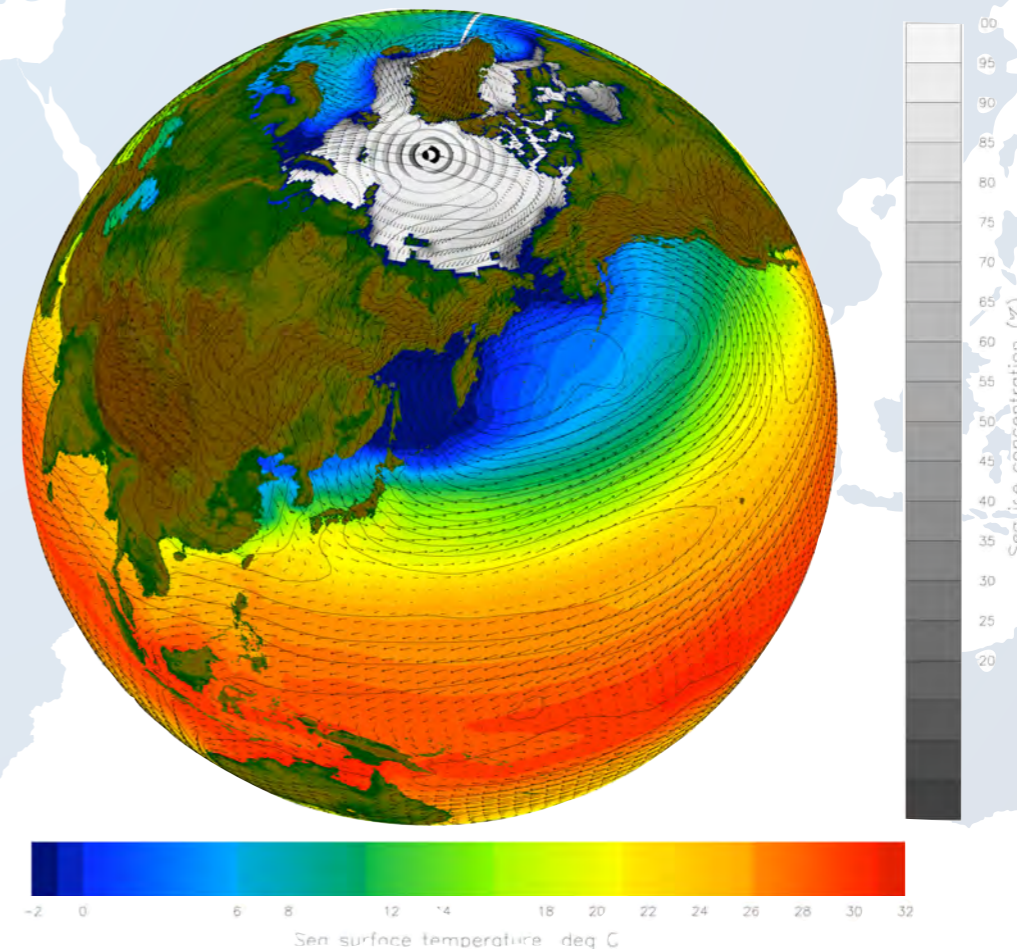
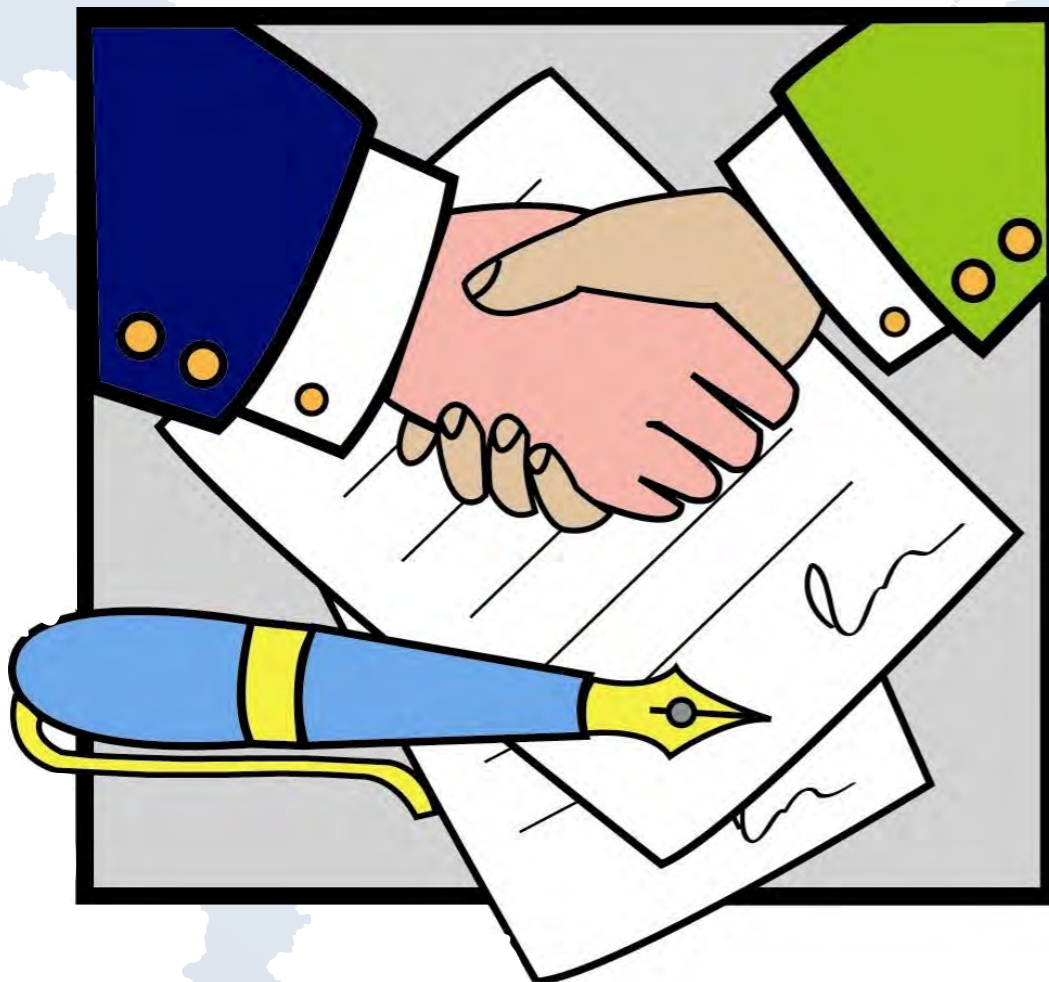
Why Guam?



Global Chlorophyll Concentrations

Why are we studying this?

Science Serving Society:
Impacts of human activity on atmospheric composition



The People of CONTRAST



The People of CONTRAST



The People of CONTRAST



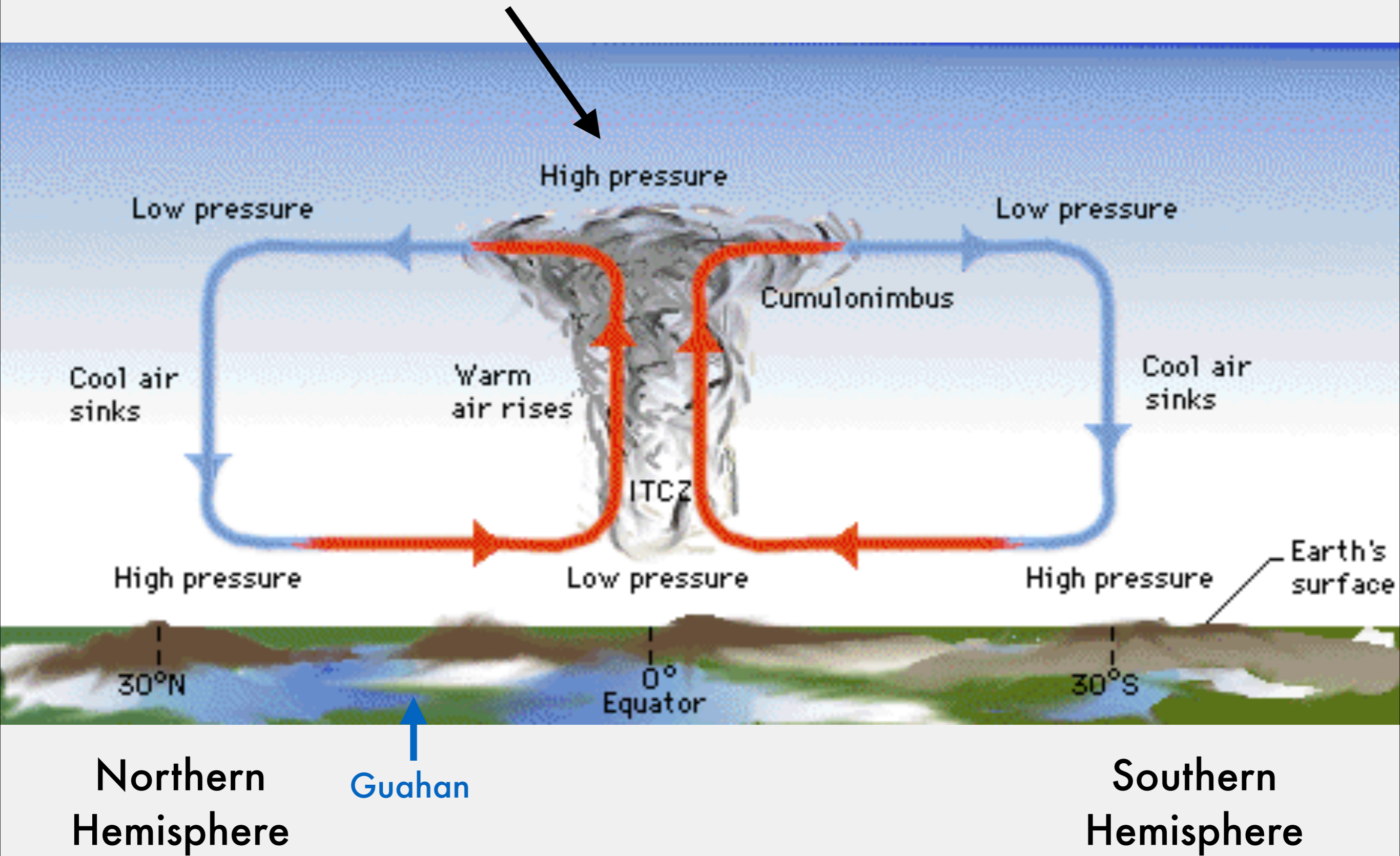
The People of CONTRAST



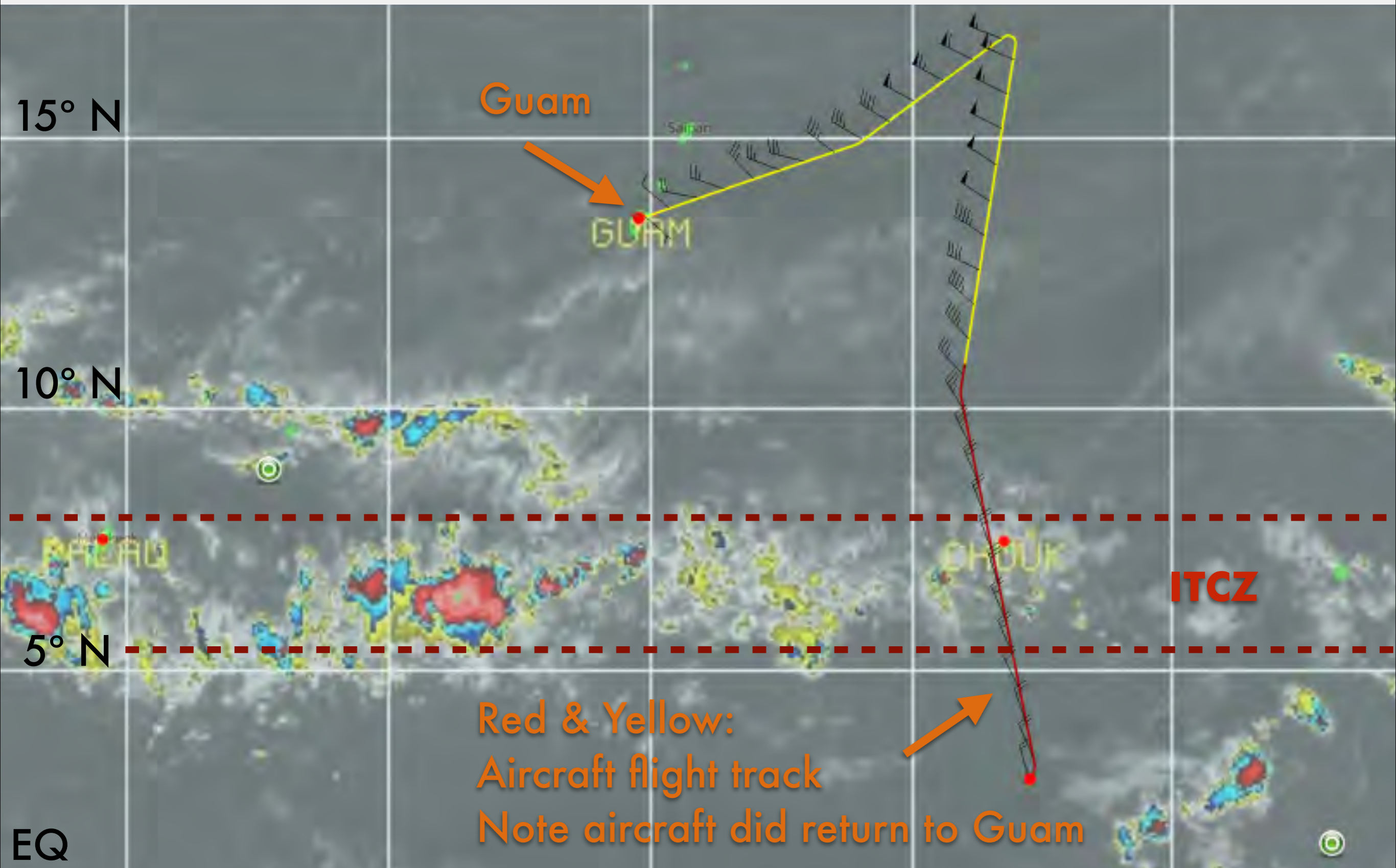
The People of CONTRAST



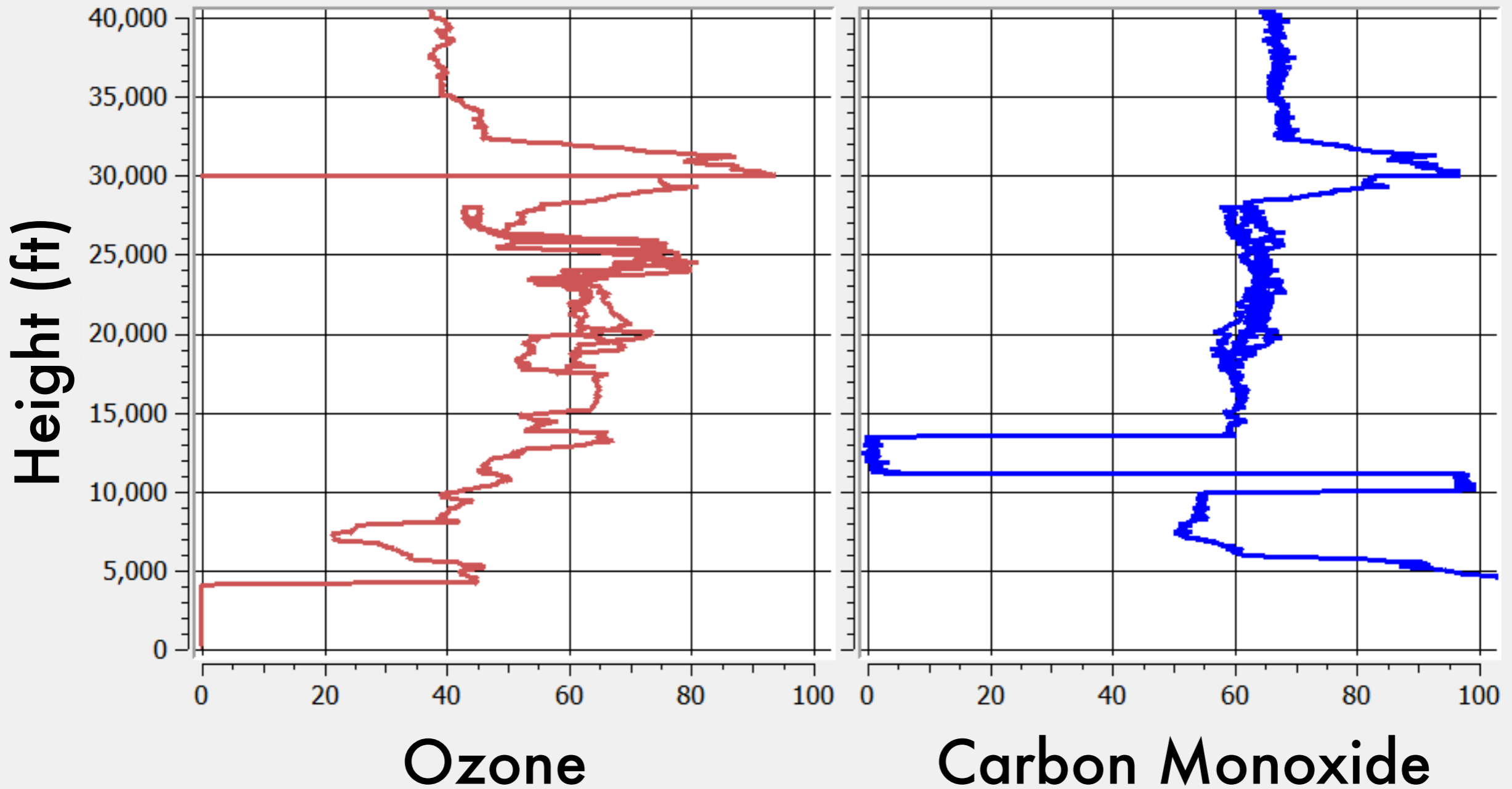
ITCZ: Inter-tropical Convergence Zone rainy region of the tropics



Aircraft track flown Sat, 8 Feb (yellow) on top of satellite cloud map



Northern Hemisphere



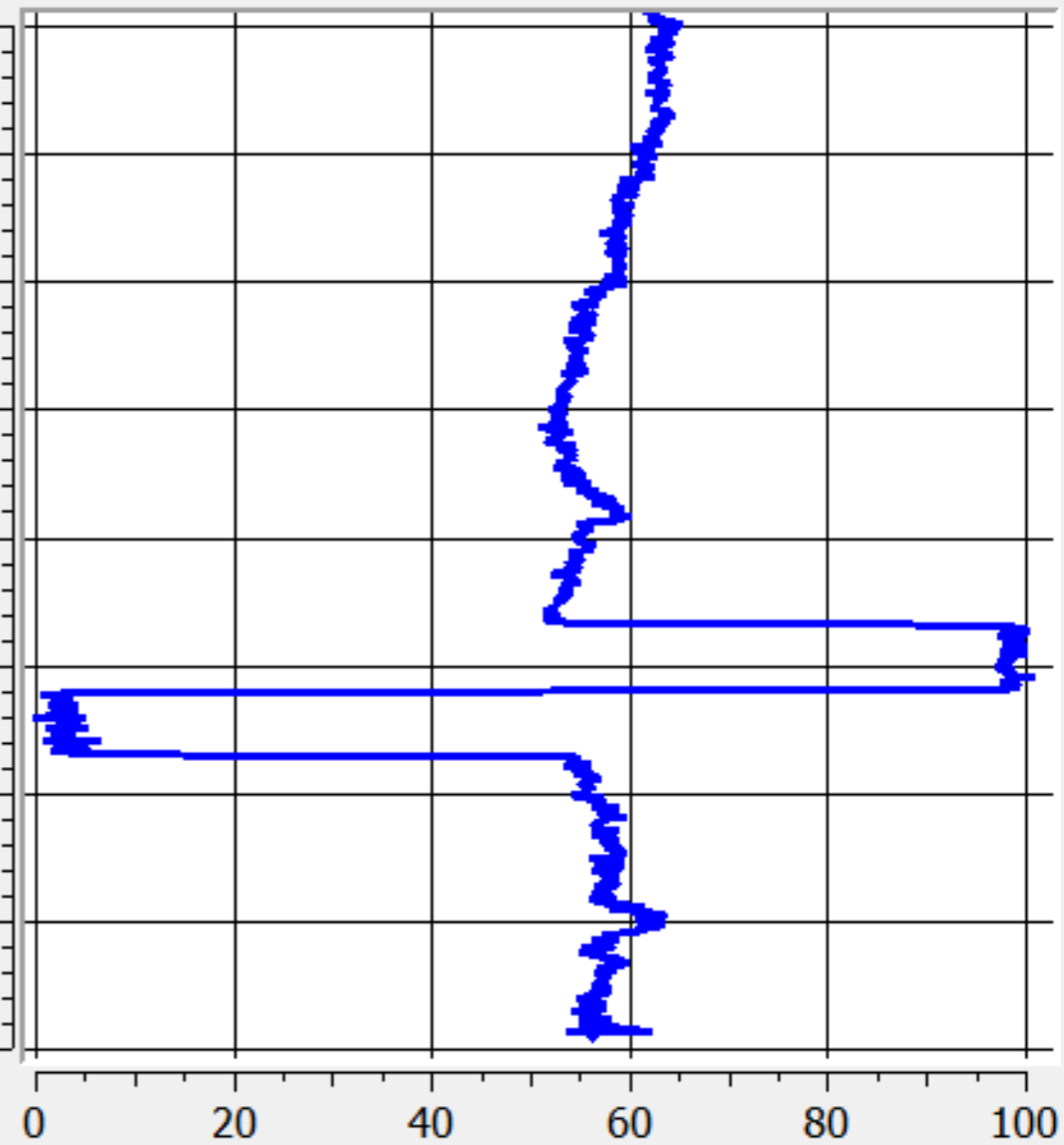
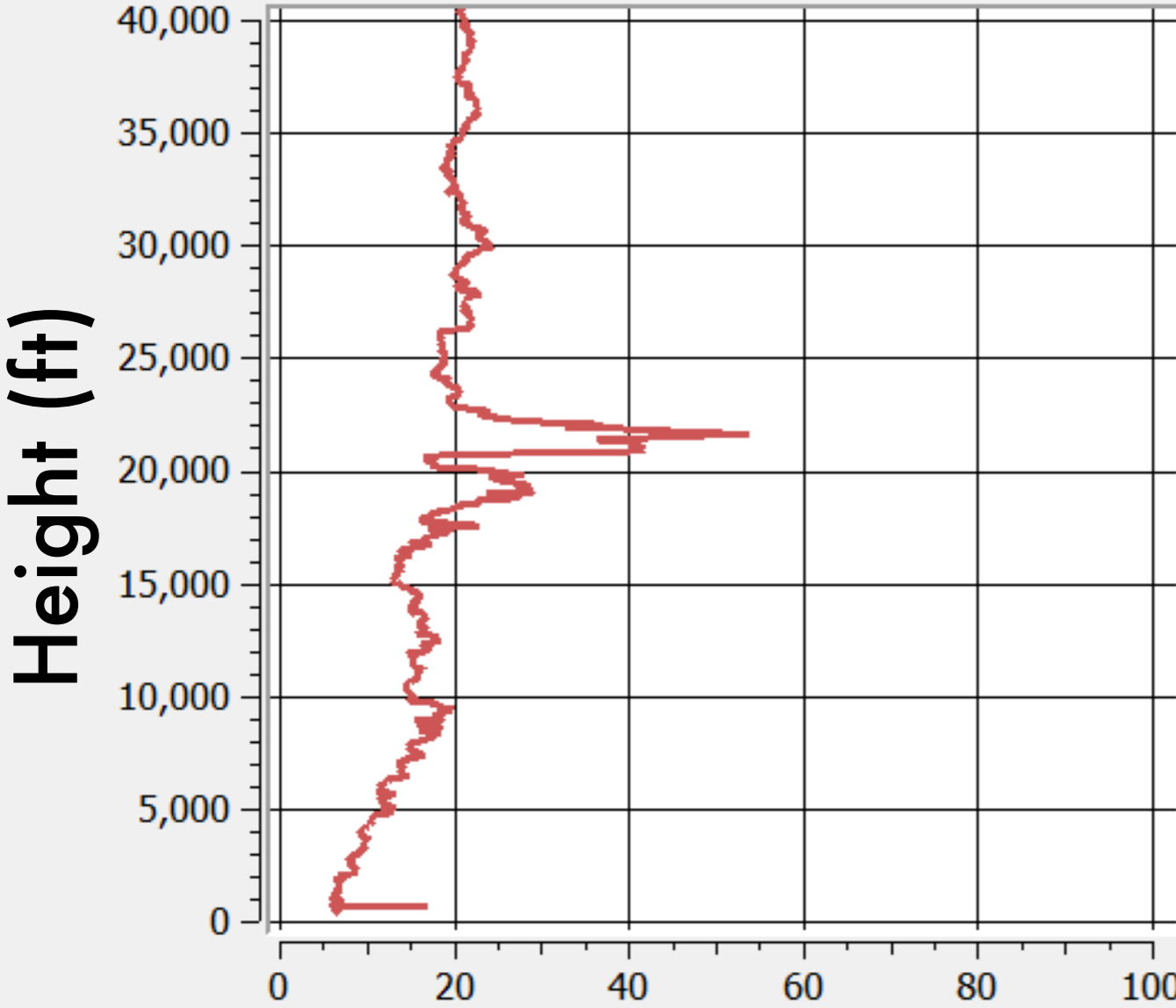
Ozone (O₃): Compromises air quality & causes global warming

Carbon monoxide (CO): Produced by combustion of fossil fuel & biomass burning

Southern Hemisphere

2014-Feb-08 03:00:00 - 04:00:00

2014-Feb-08 03:00:00 - 04:00:00



Ozone

Carbon Monoxide

Ozone (O₃): Compromises air quality & causes global warming

Carbon monoxide (CO): Produced by combustion of fossil fuel & biomass burning



Learn More



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Any Questions?

