



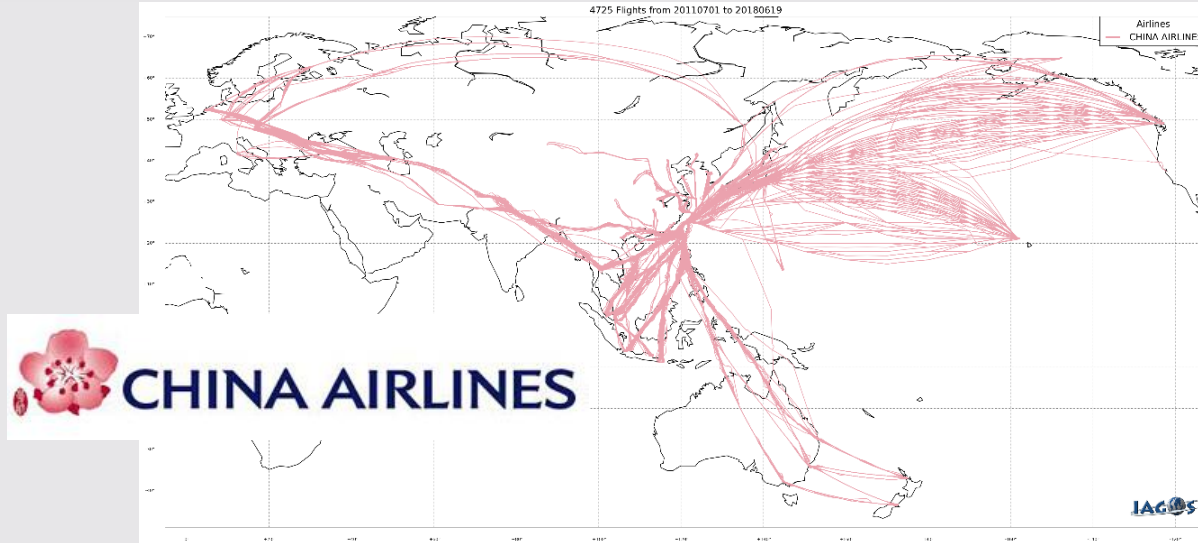
IN-SERVICE AIRCRAFT FOR A GLOBAL OBSERVING SYSTEM

IAGOS over the Pacific

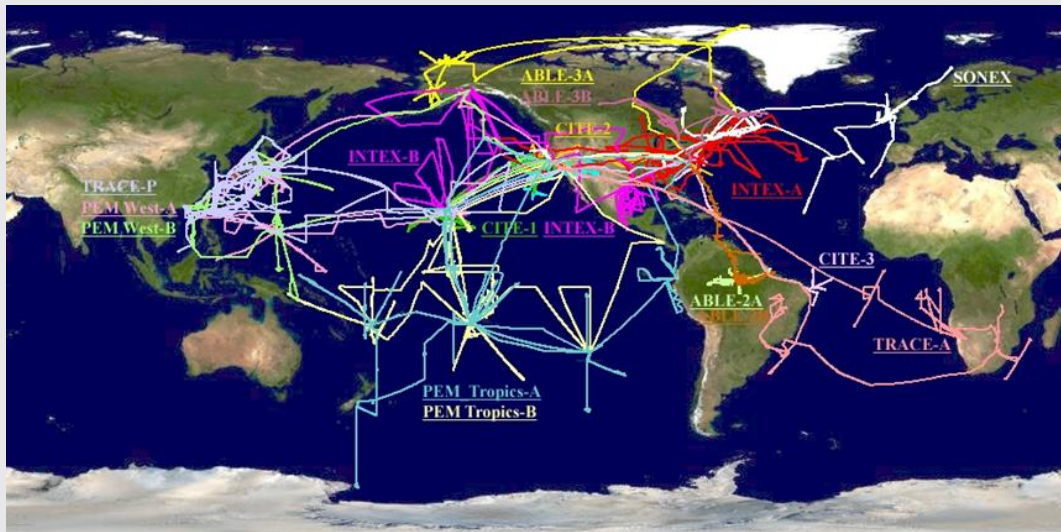
Hannah Clark, Bastien Sauvage, Frank Roux, and the IAGOS Team



First Trans-Pacific IAGOS measurements

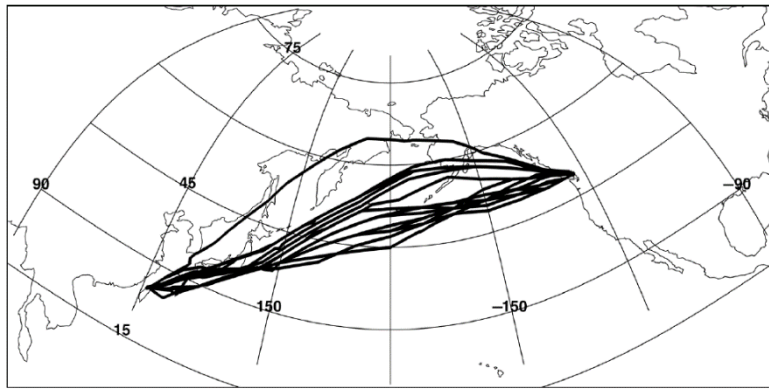


China Airlines
flights since
2012

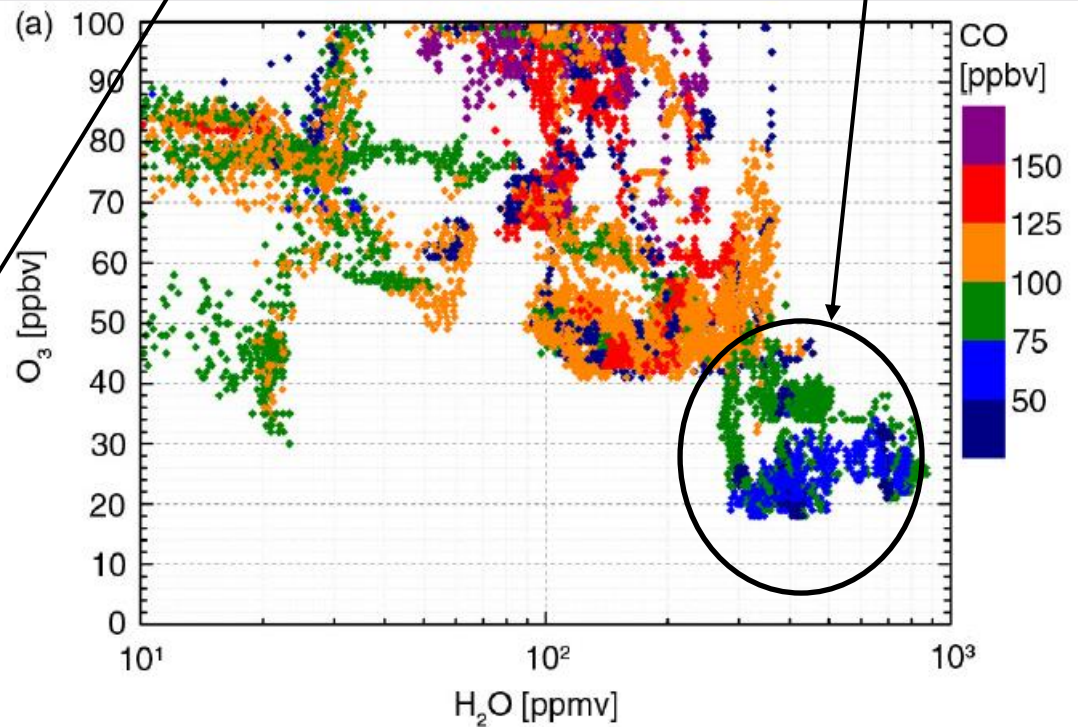
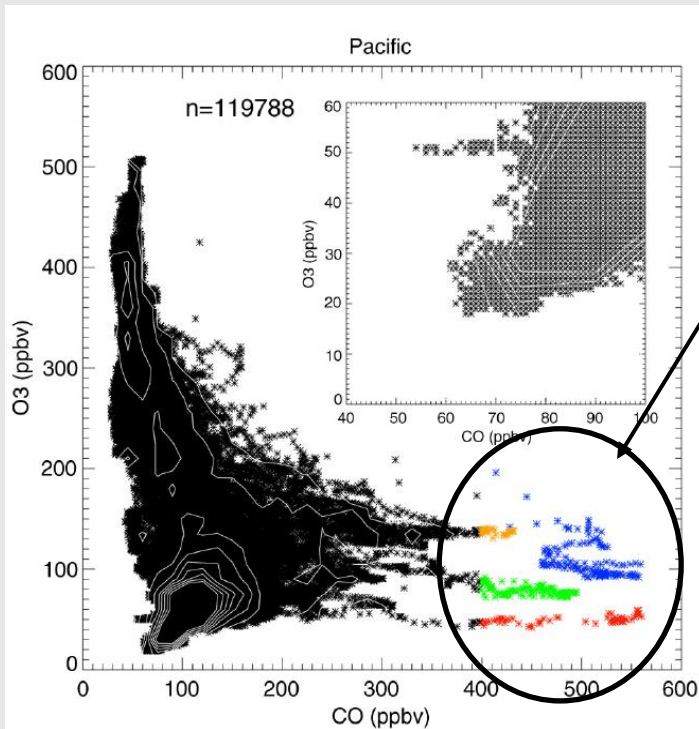


Research aircraft accumulated coverage, NASA Airbourne tropospheric chemistry field campaigns (1983-2006), http://www-gte.larc.nasa.gov/trop_map.htm

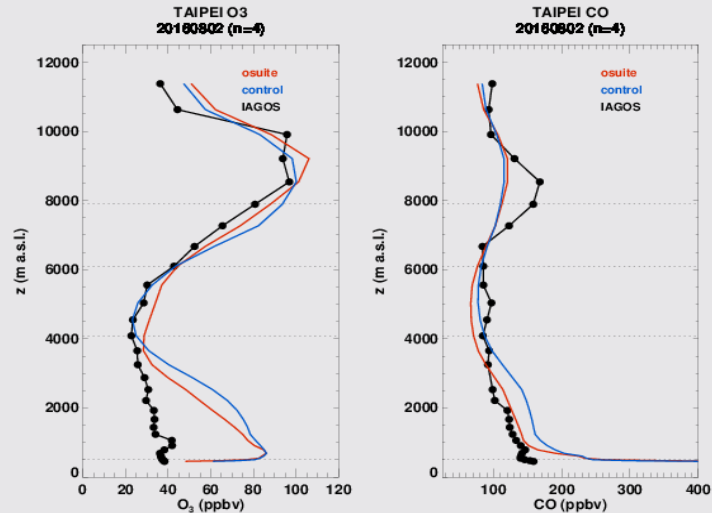
Composition of the Northern Pacific UTLS



First Pacific routes,
Taipei to Vancouver
2012 (Clark et al 2015)

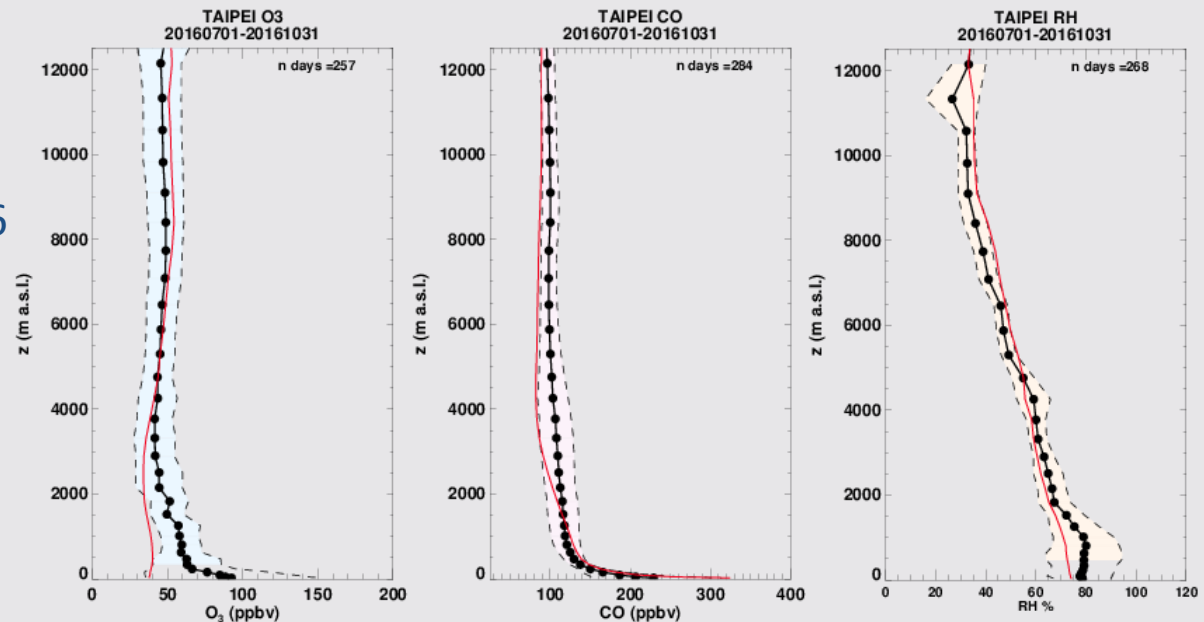


Daily Profiles at Taipei (25°N)

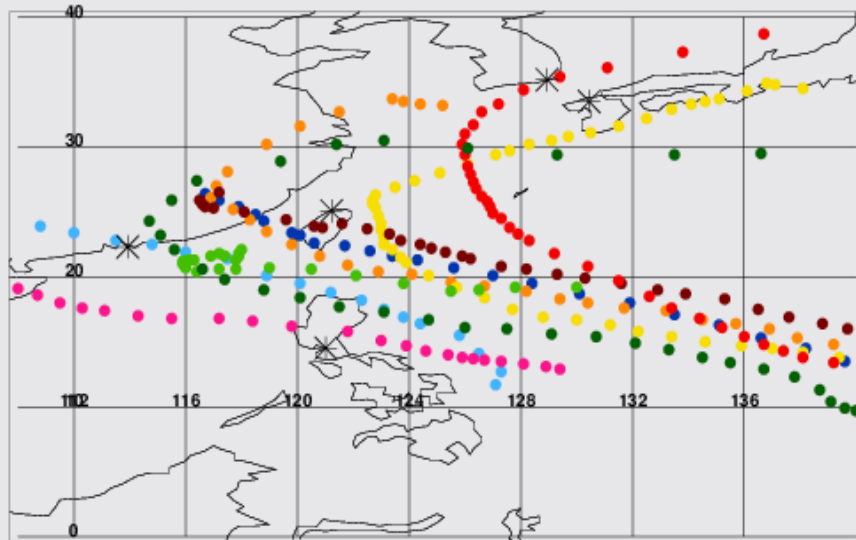


- 2 aircraft daily flights to and from Taipei in summer 2016
- Sudden large increases (c.f. climatology) in ozone in the upper troposphere
- Decreases in the amount of CO and ozone in the boundary layer, and throughout free troposphere

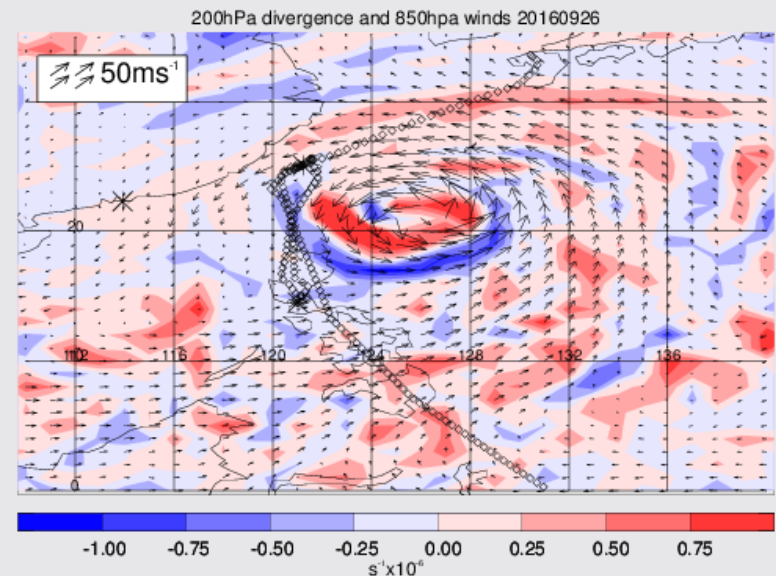
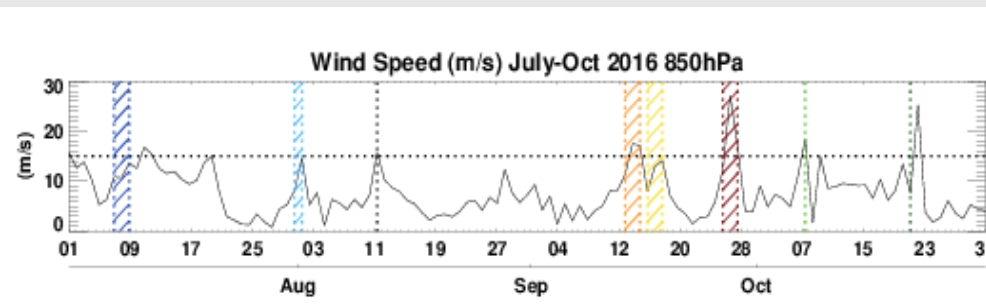
Climatology 2012-2016



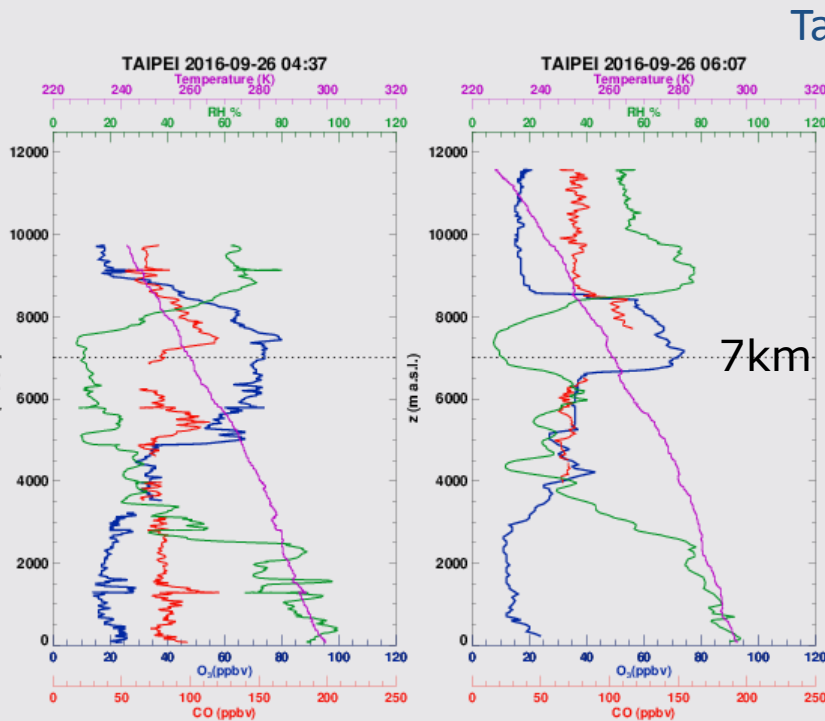
Identifying the Typhoons July-October 2016



NEPARTAK	20160704-20160710
NIDA	20160729-20160802
MERANTI	20160910-20160917
MALAKAS	20160912-20160920
MEGI	20160923-20160929
CHABA	20160929-20161005
AERE	20161004-20161010
SARIKA	20161013-20161018
HAIMA	20161015-20161023



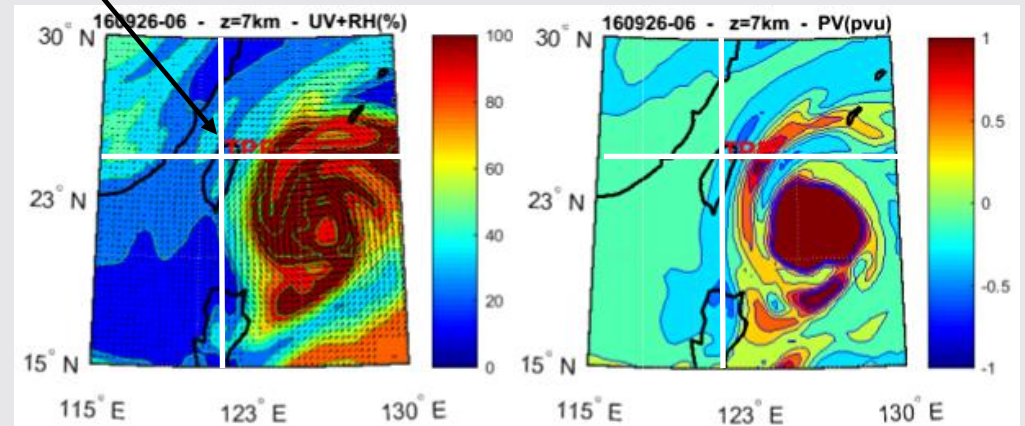
Downstream of Typhoon Megi 26th September 2016.



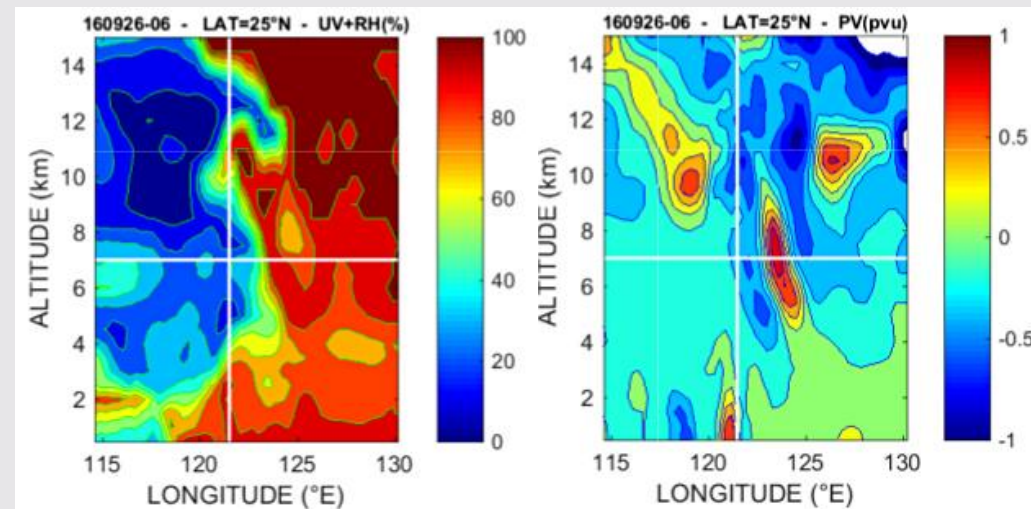
Taipei

RH %

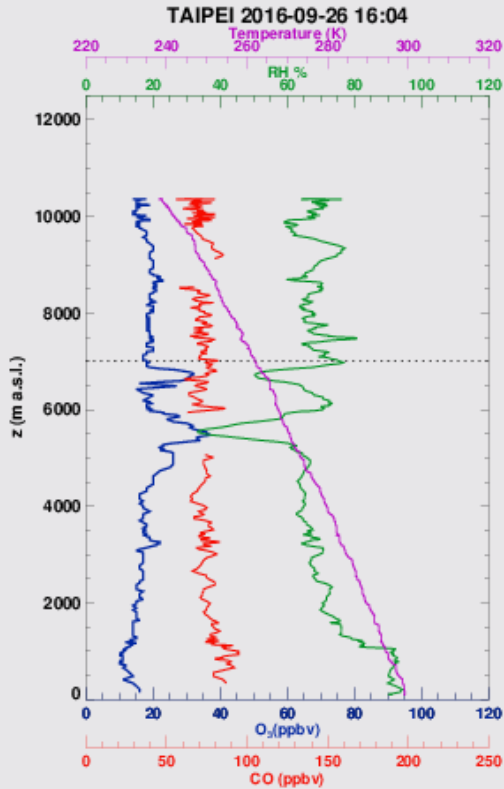
PV



- Stratospheric signature ahead of typhoon: Dry Air, high ozone, accompanied by descent and high PV
- Humid air from oceanic boundary layer
- Clean air (low CO, low O3) throughout mid troposphere



After Typhoon Megi 26th September 2016.

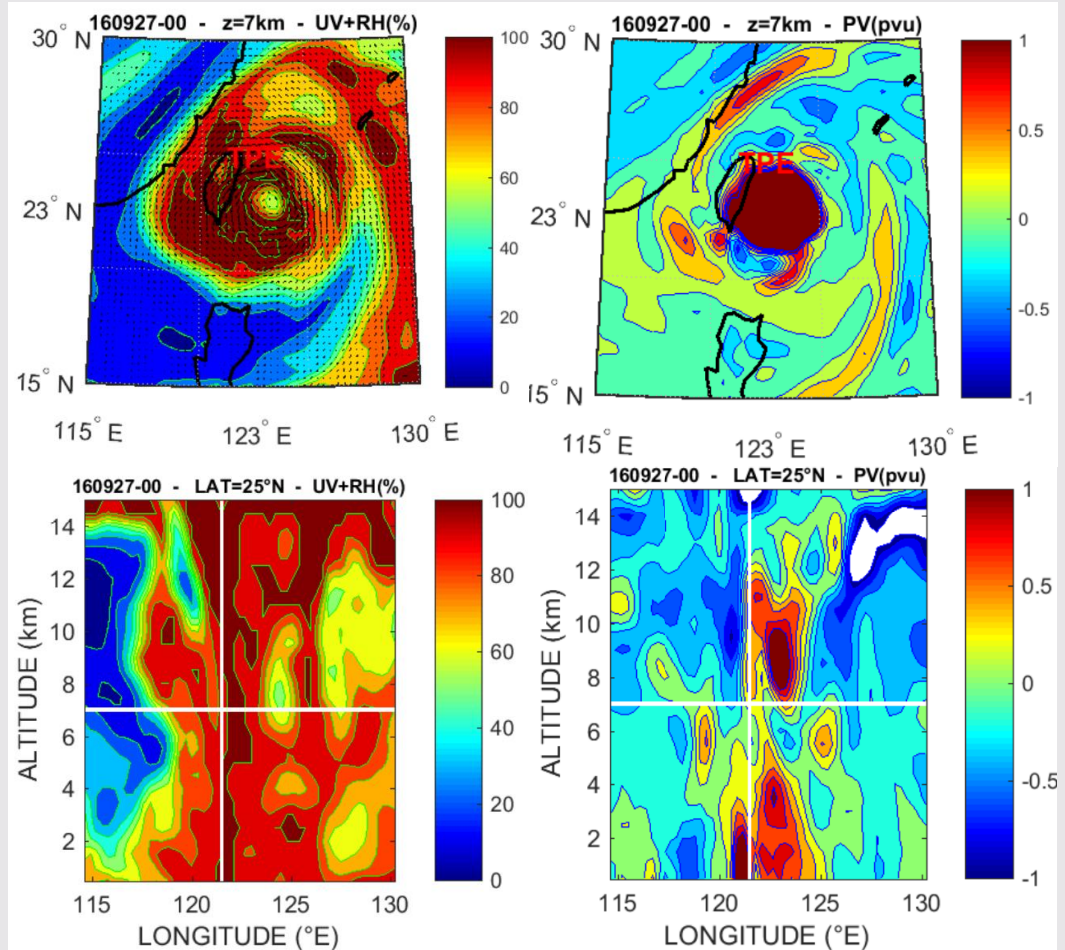


Upper Troposphere

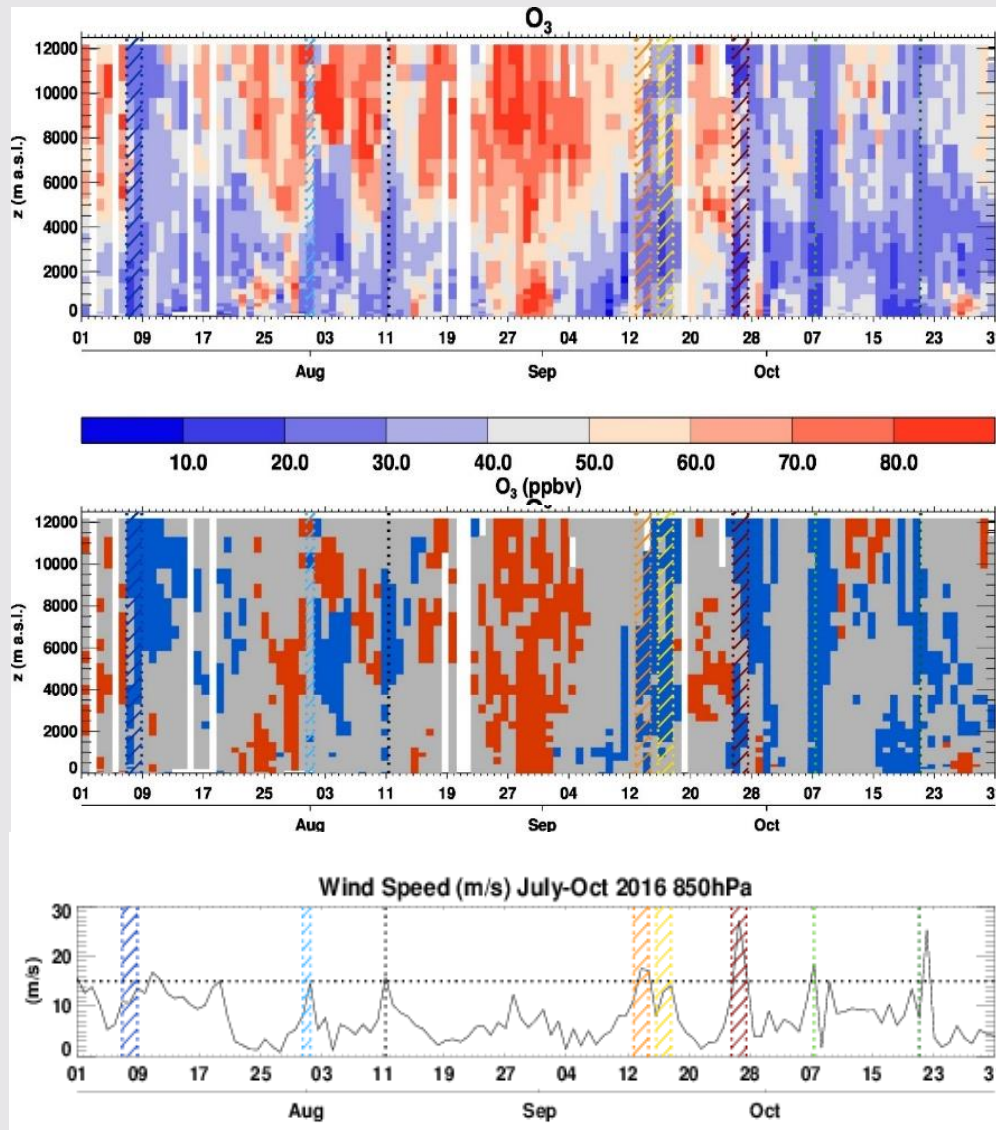
Boundary Layer

Ozone	-60ppbv
RHL	+50%
CO	-50ppbv

Ozone	-90ppbv
RHL	+20%
CO	-150ppbv



Influence of the Typhoons on Atmospheric Composition

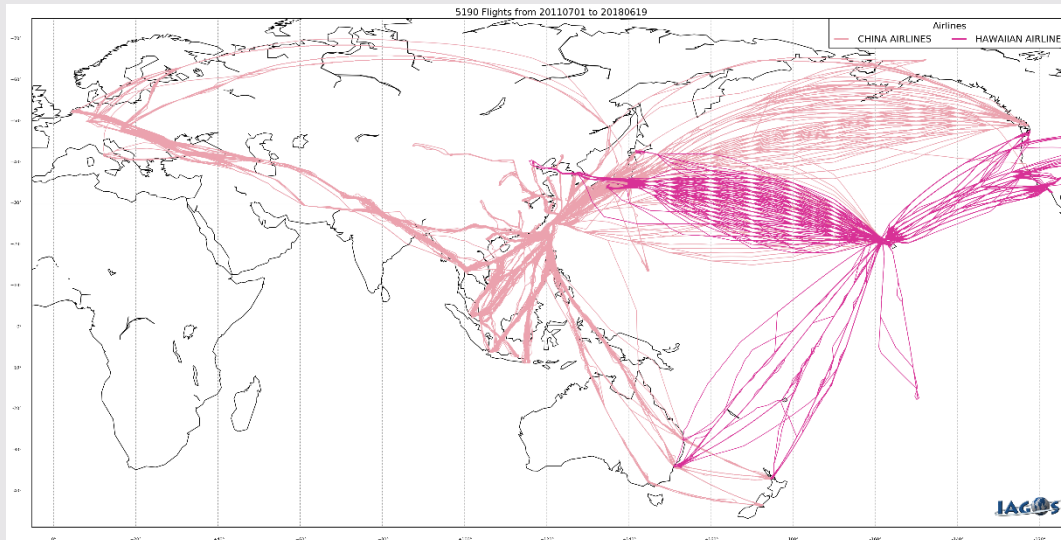
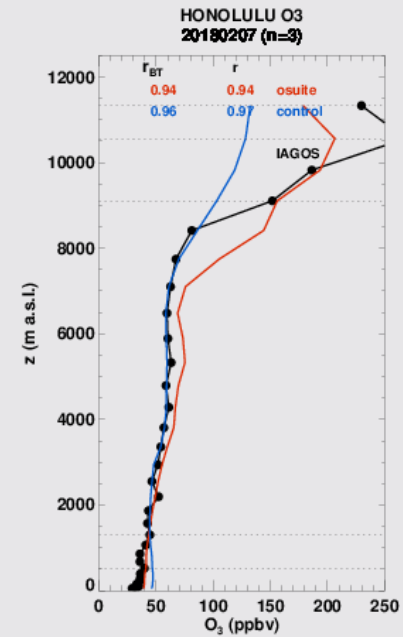
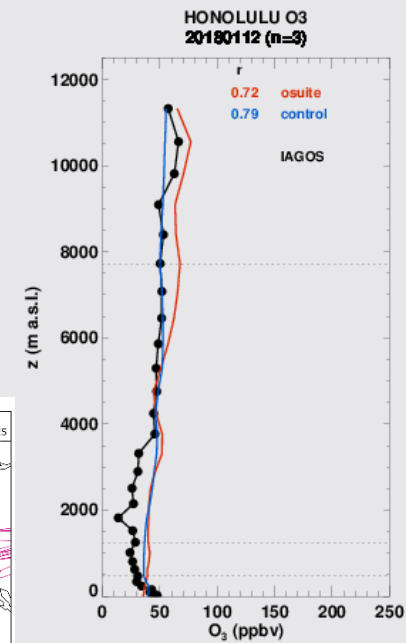


Absolute values ozone

± 1 standard deviation
from climatology

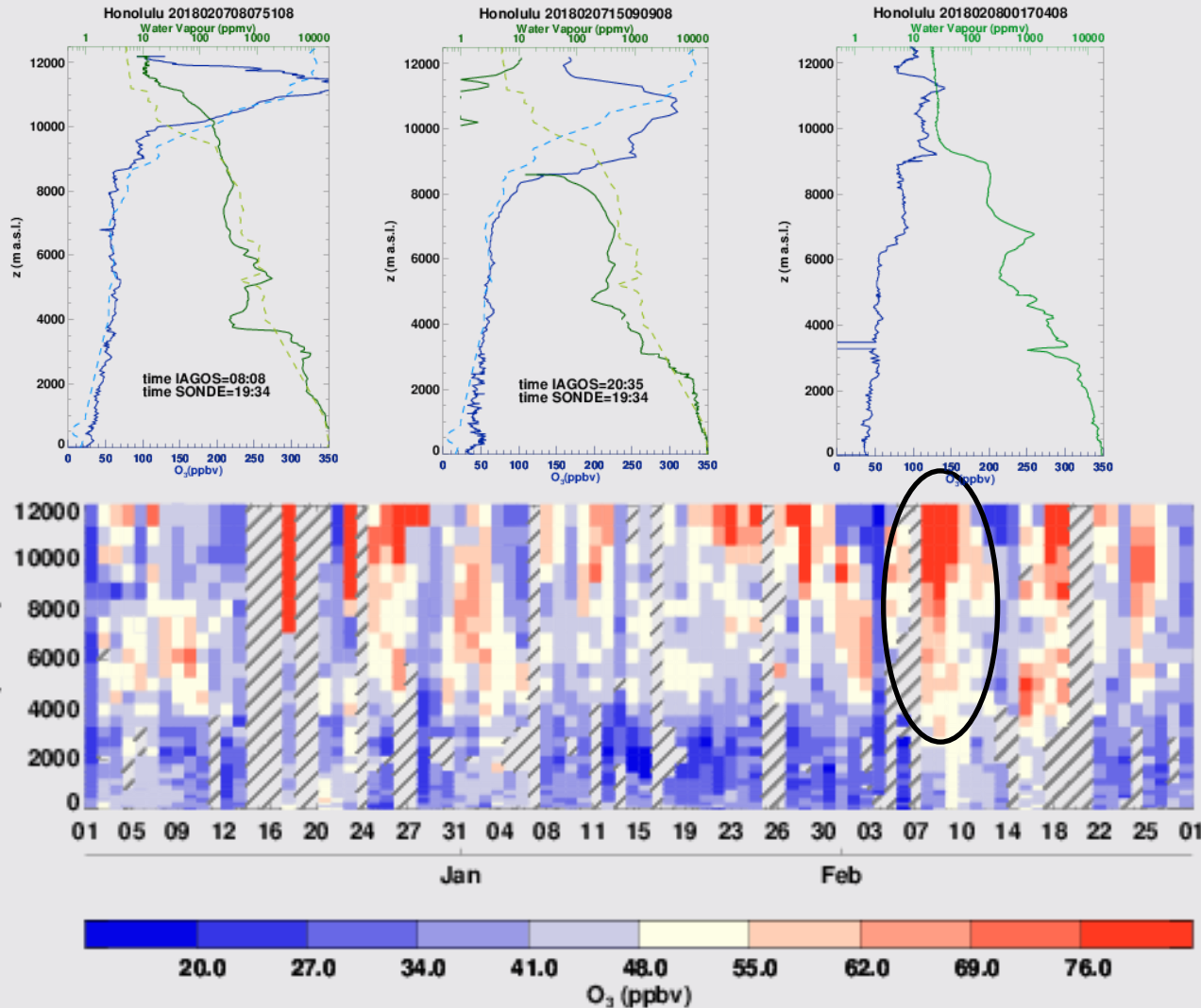
Wind speed

Hawaiian Airlines A330 operational since October 2017



- Daily profiles at Honolulu (21°N)
- New flight tracks over Pacific

Daily Profiles at Honolulu (21°N)



NEWS SPORTS LIFE MONEY TECH TRAVEL OPINION 35° CROSS

Flake news: It's snowing in Hawaii

Doyle Rice, USA TODAY Published 5:12 p.m. ET Feb. 6, 2018 | Updated 11:09 a.m. ET Feb. 7, 2018

Yes, it's snowing in Hawaii.

But don't panic, it's not the end of days. It's only snowing on Hawaii's high mountain volcano summits of Mauna Loa and Mauna Kea on the Big Island.

Both mountains are under a winter storm warning until Wednesday evening.

The National Weather Service said "fog, ice, snow and very strong winds" will hammer the Big Island summits through Wednesday, with up to 14 inches of snow possible.

"Plan on difficult travel conditions," the weather service warned, with "visibility near zero at times."

High temperatures should be in the 30s and low temperatures in the 20s.

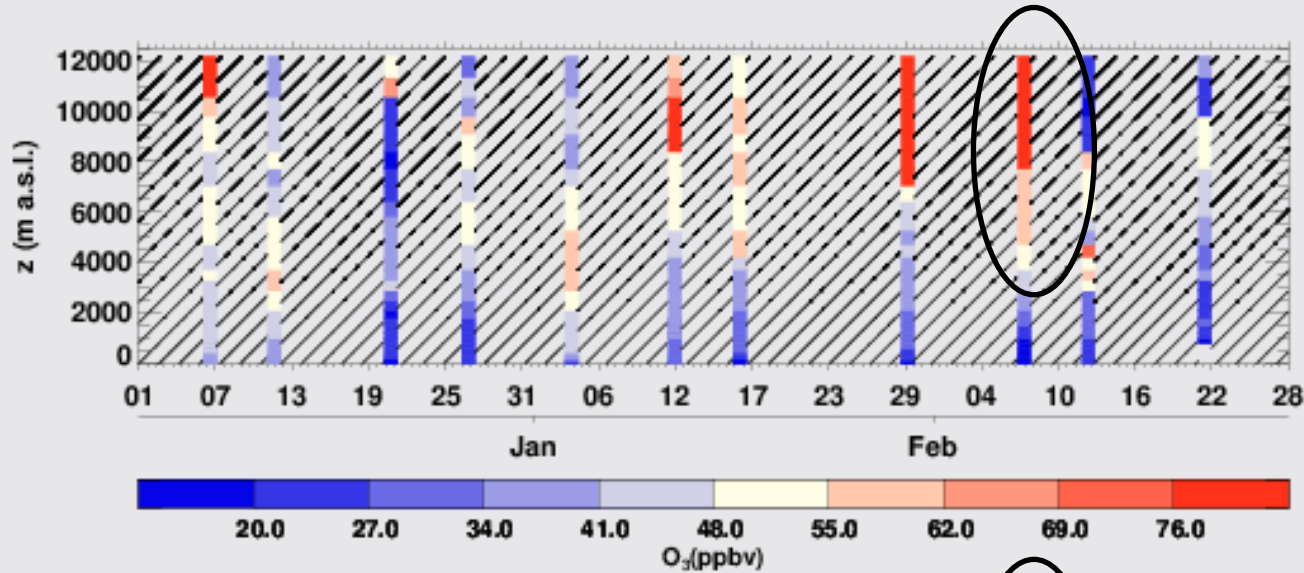
Lower elevations of the Big Island, as well as the rest of the island chain, are under a flash flood watch due to a forecast of pounding rain and thunderstorms.

Though it was snowing at the tops of the Big Island summits, temperatures were mild throughout the rest of Hawaii, with high temperatures forecast in the 70s.

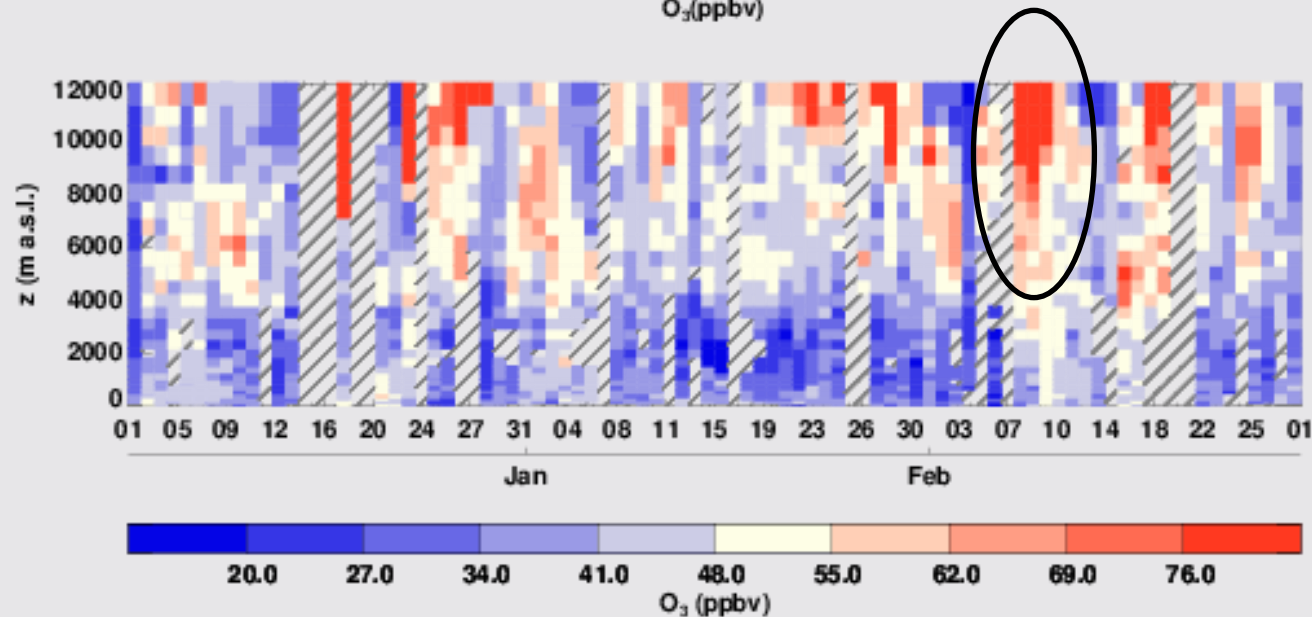
Honolulu

Hilo

IAGOS compared with sondes



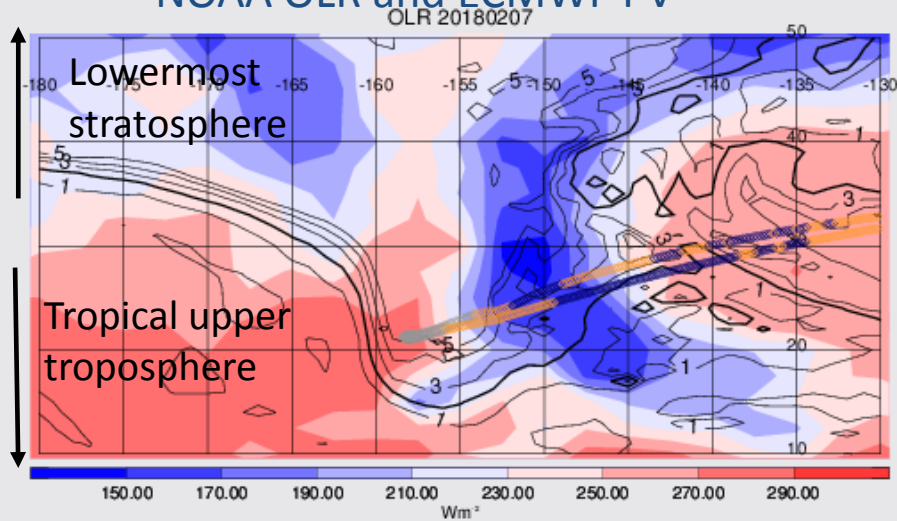
Hilo



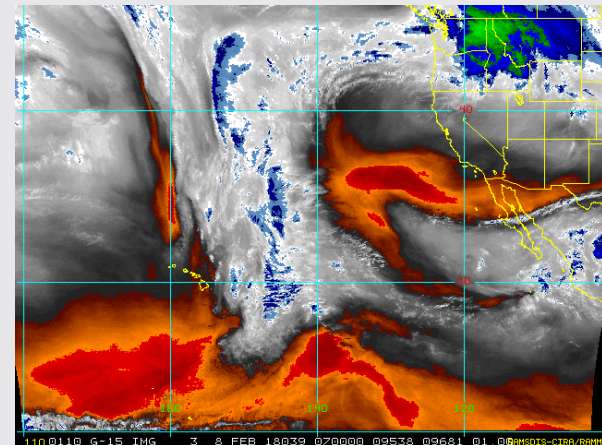
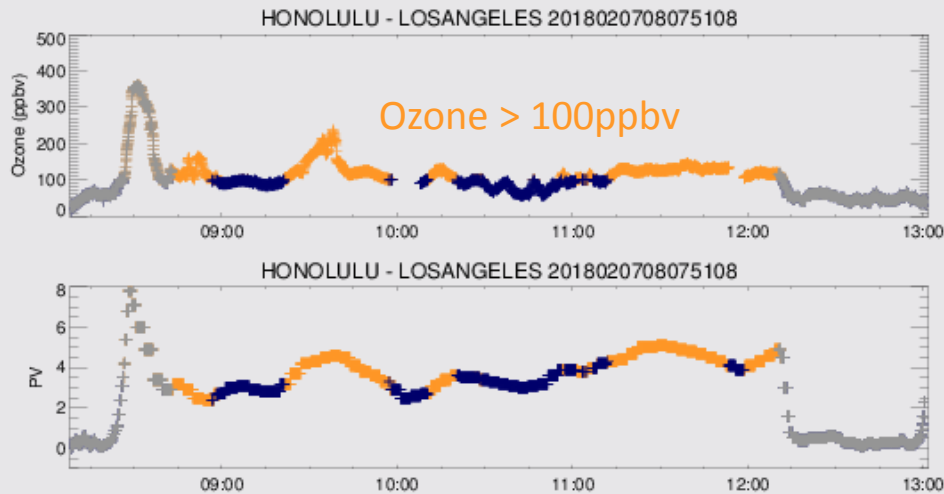
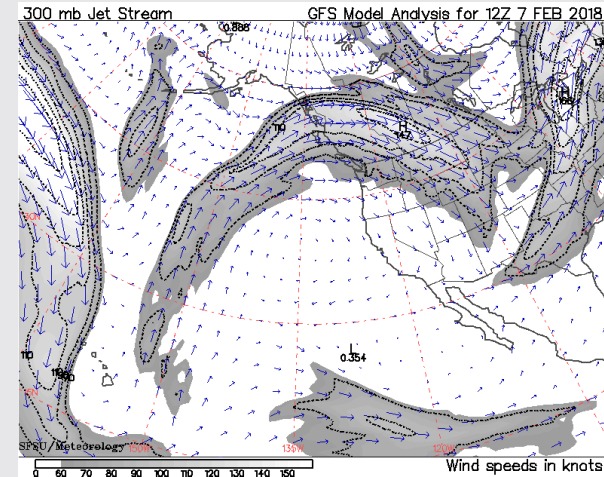
Honolulu

Jet Stream Signature at Honolulu 7/8 February 2018

NOAA OLR and ECMWF PV

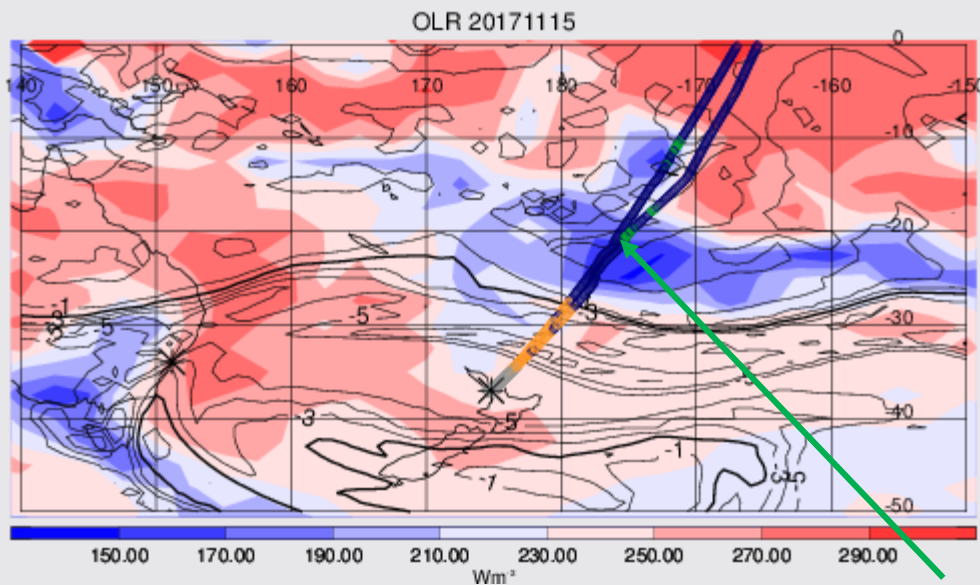


300hPa Jet Stream

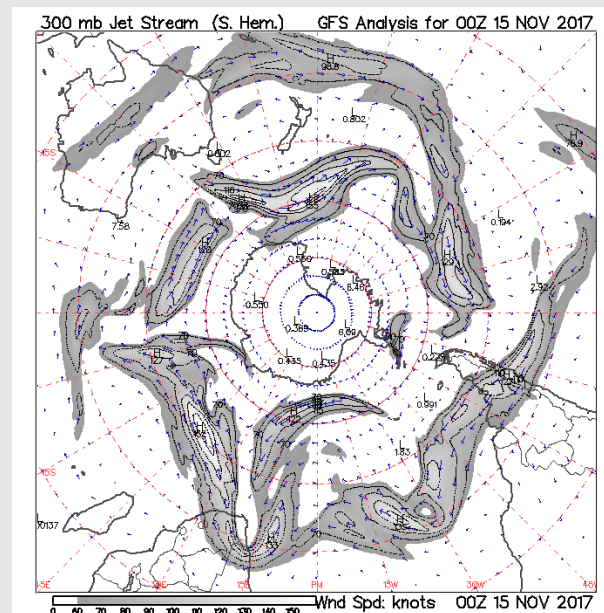
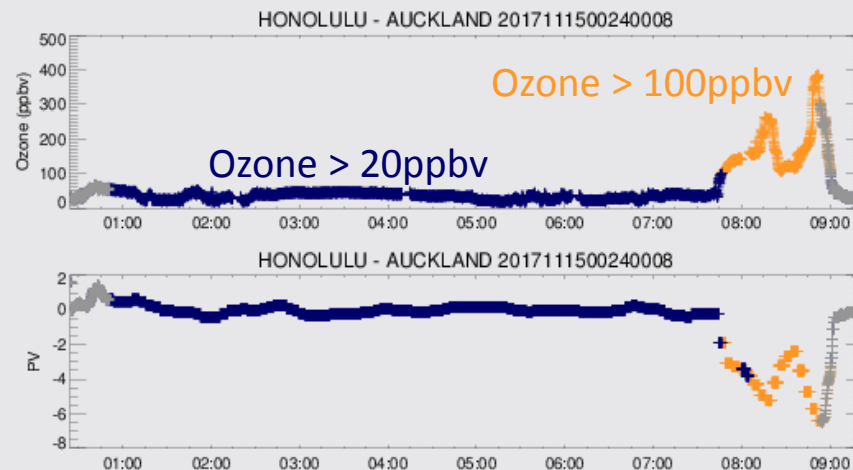
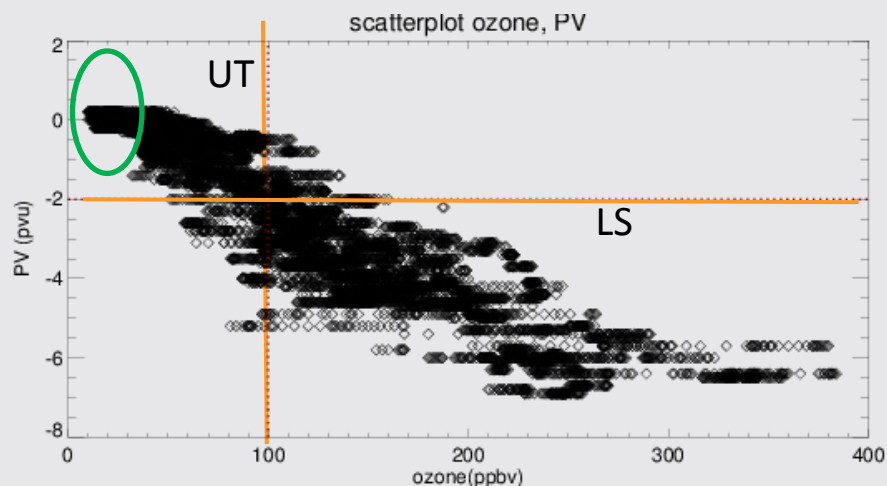


Crossing the jet: Southern Hemisphere

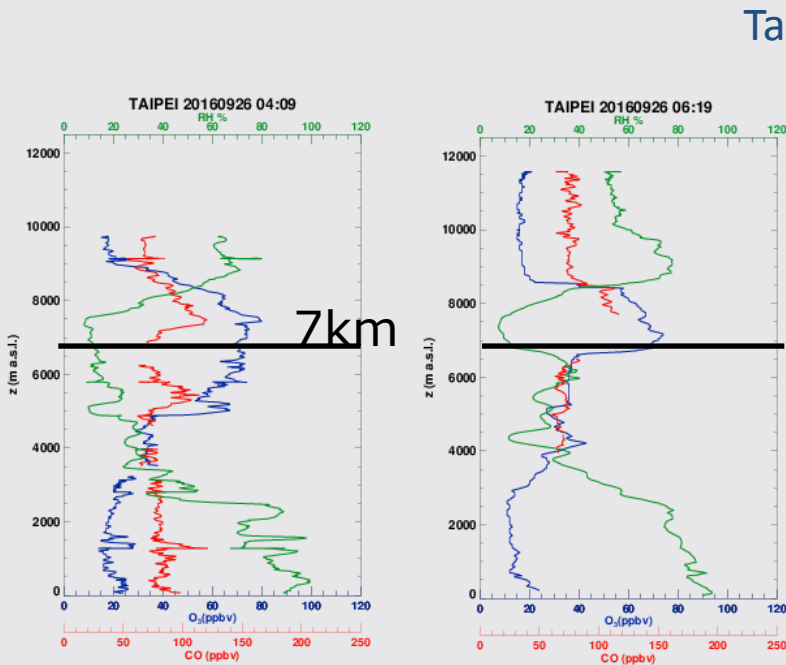
20 flights from Honolulu to Sydney and Auckland



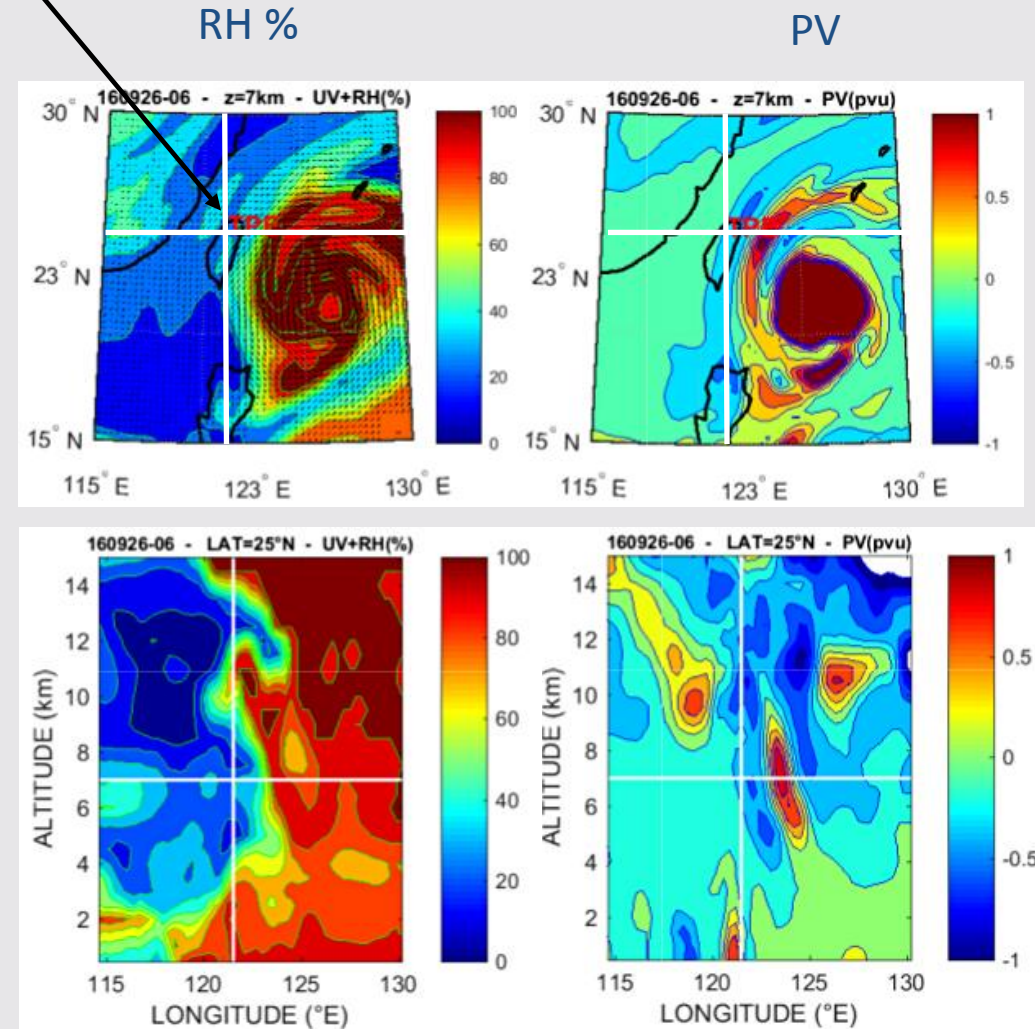
Ozone < 20ppbv in convective region

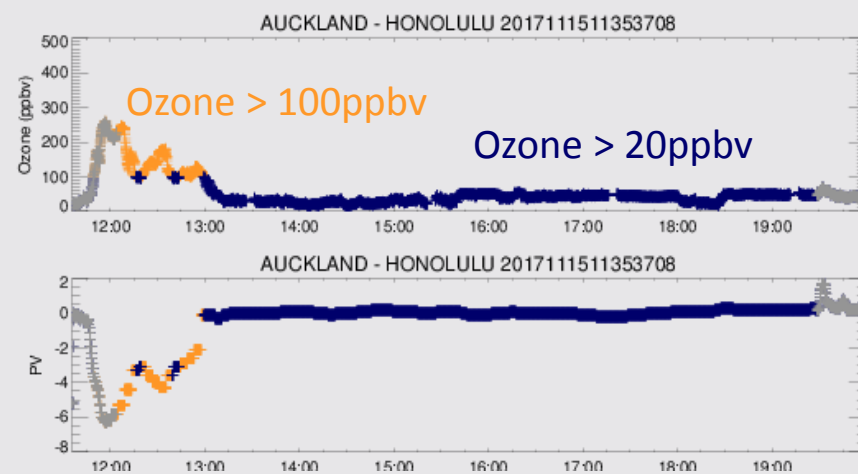


Ahead of Typhoon Megi 26th September 2016.



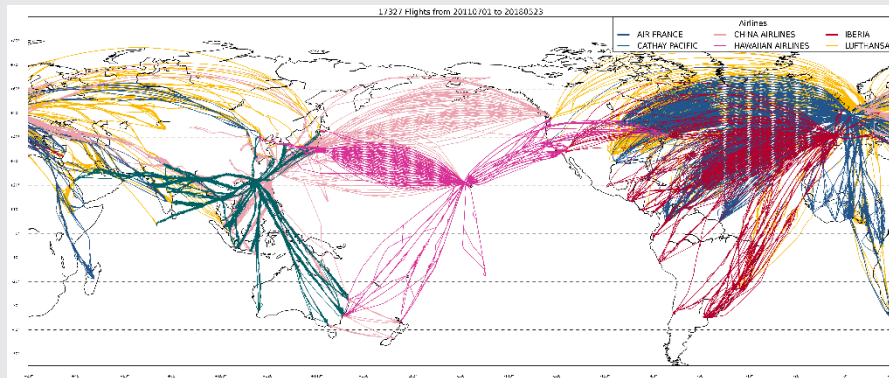
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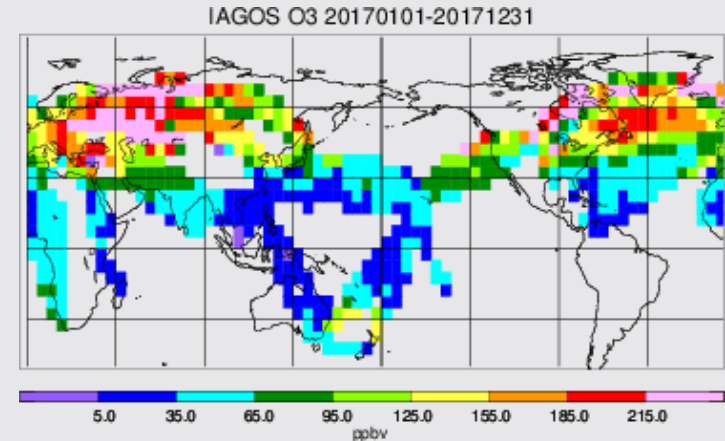


Daily Monitoring of Global Atmospheric Composition

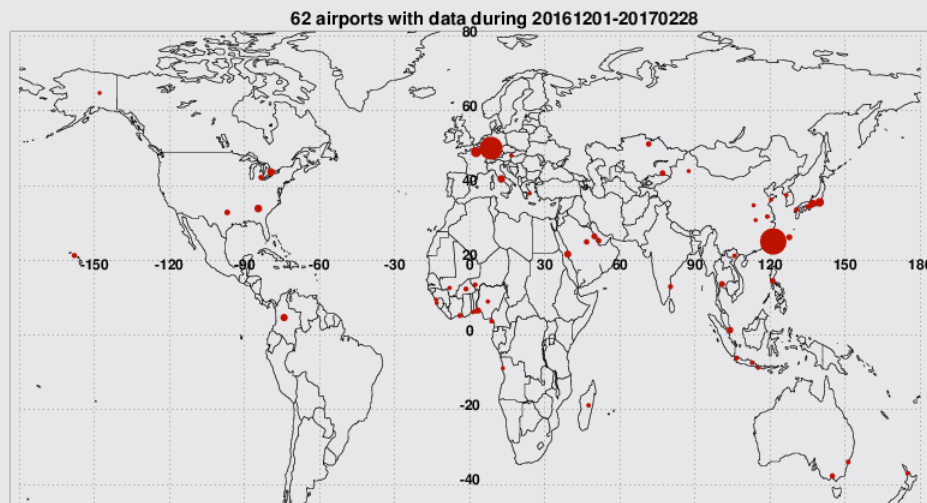
UTLS Flight tracks since 1994



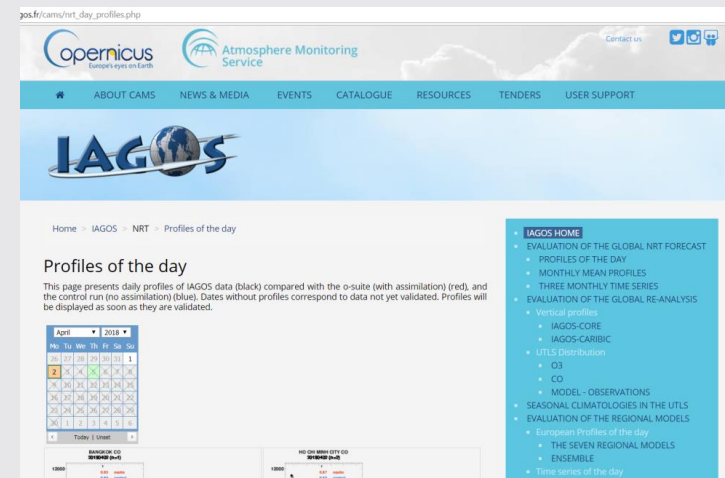
Seasonal Climatology DJF 2017/2018

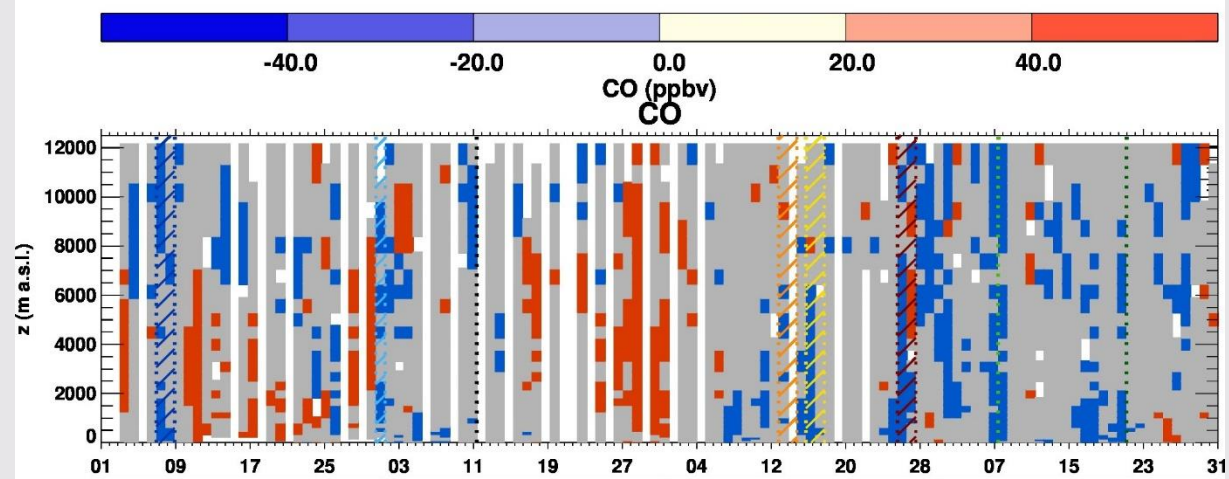
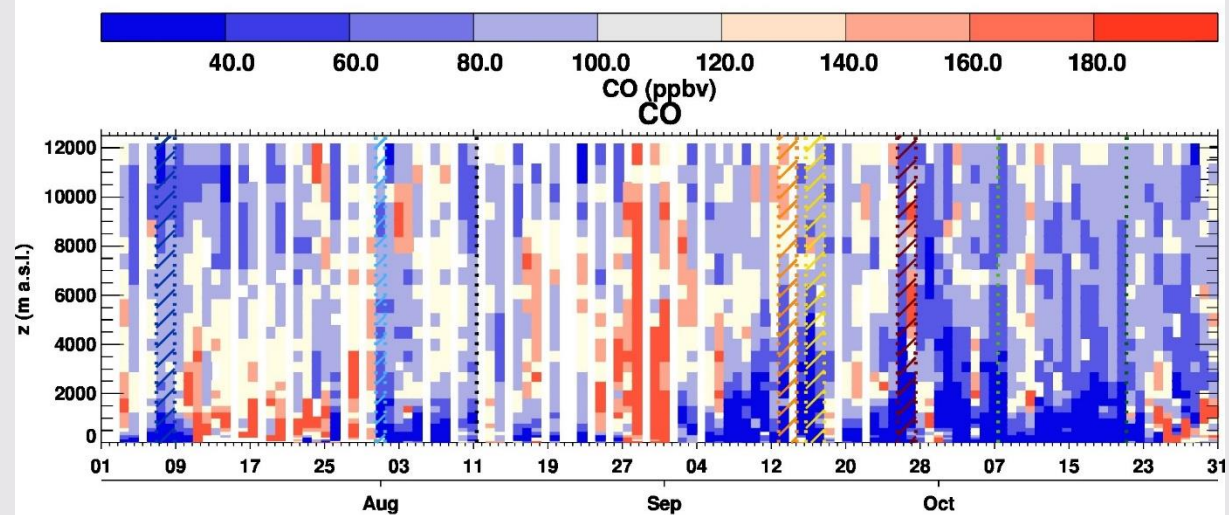
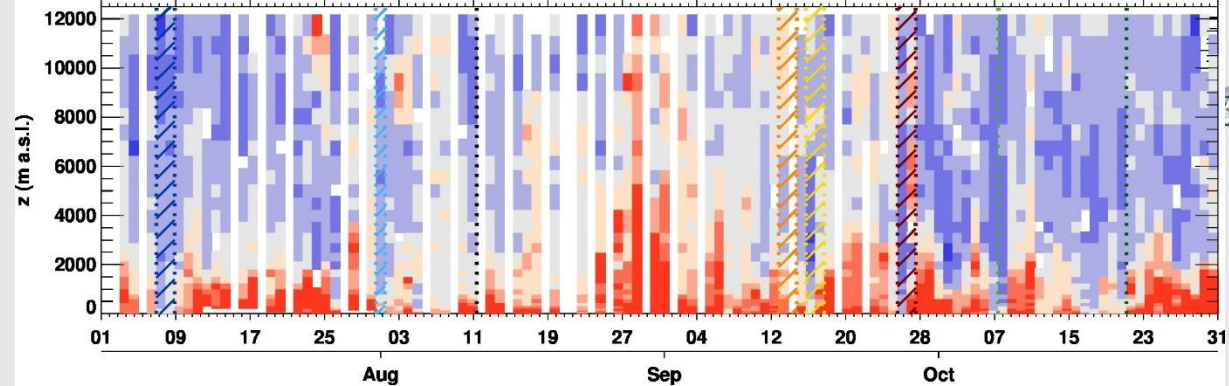


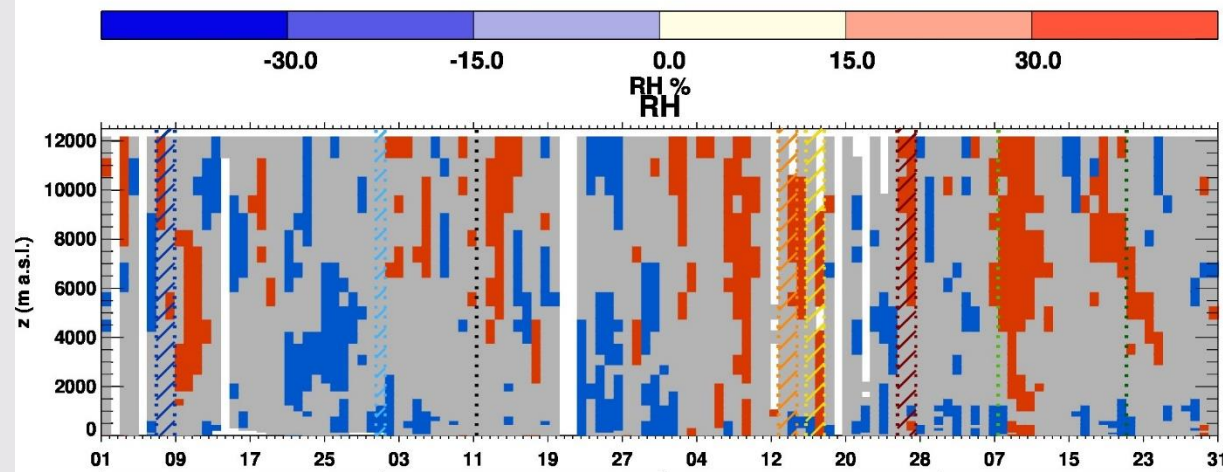
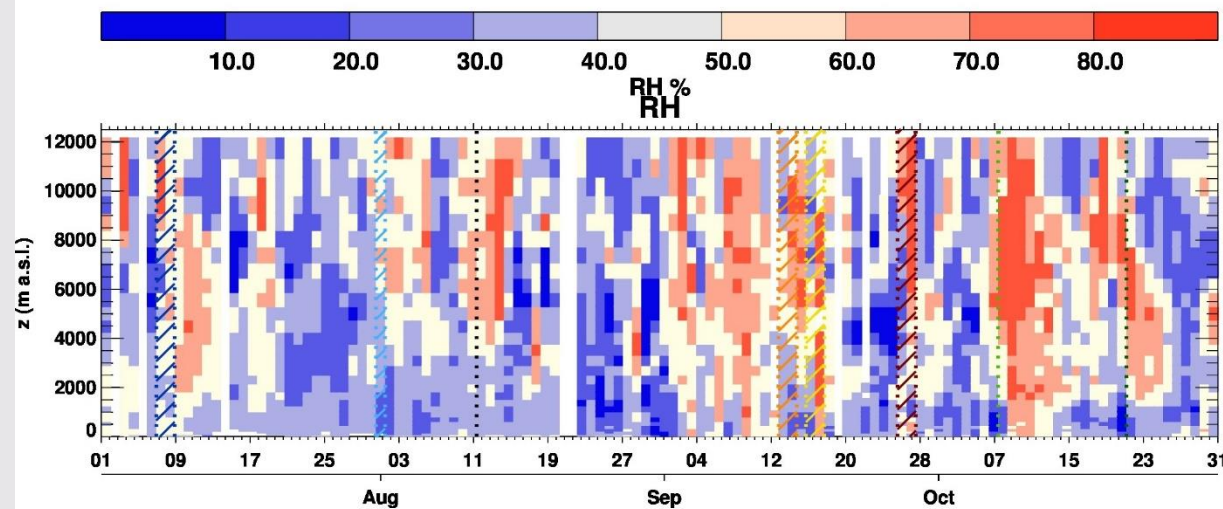
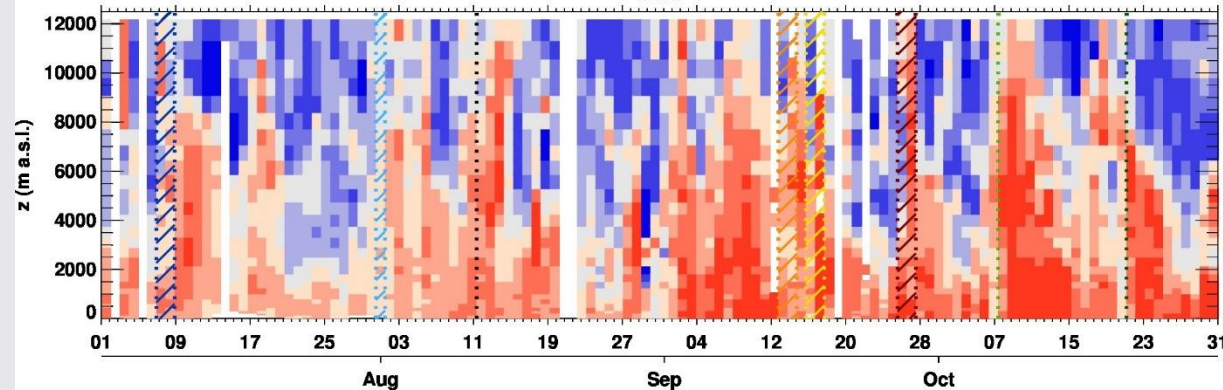
Landing-take off profiles at worldwide airports



Latest profiles shown at www.iagos.fr/cams







Typhoon Megi

200hPa divergence and 850hpa winds 20160926

