

VOCALS REx from the south: Paposo and Paranal

Arica, Nov. 7 2008

Laura Gallardo
Depto. de Geofísica, Universidad de Chile
laura@dgf.uchile.cl

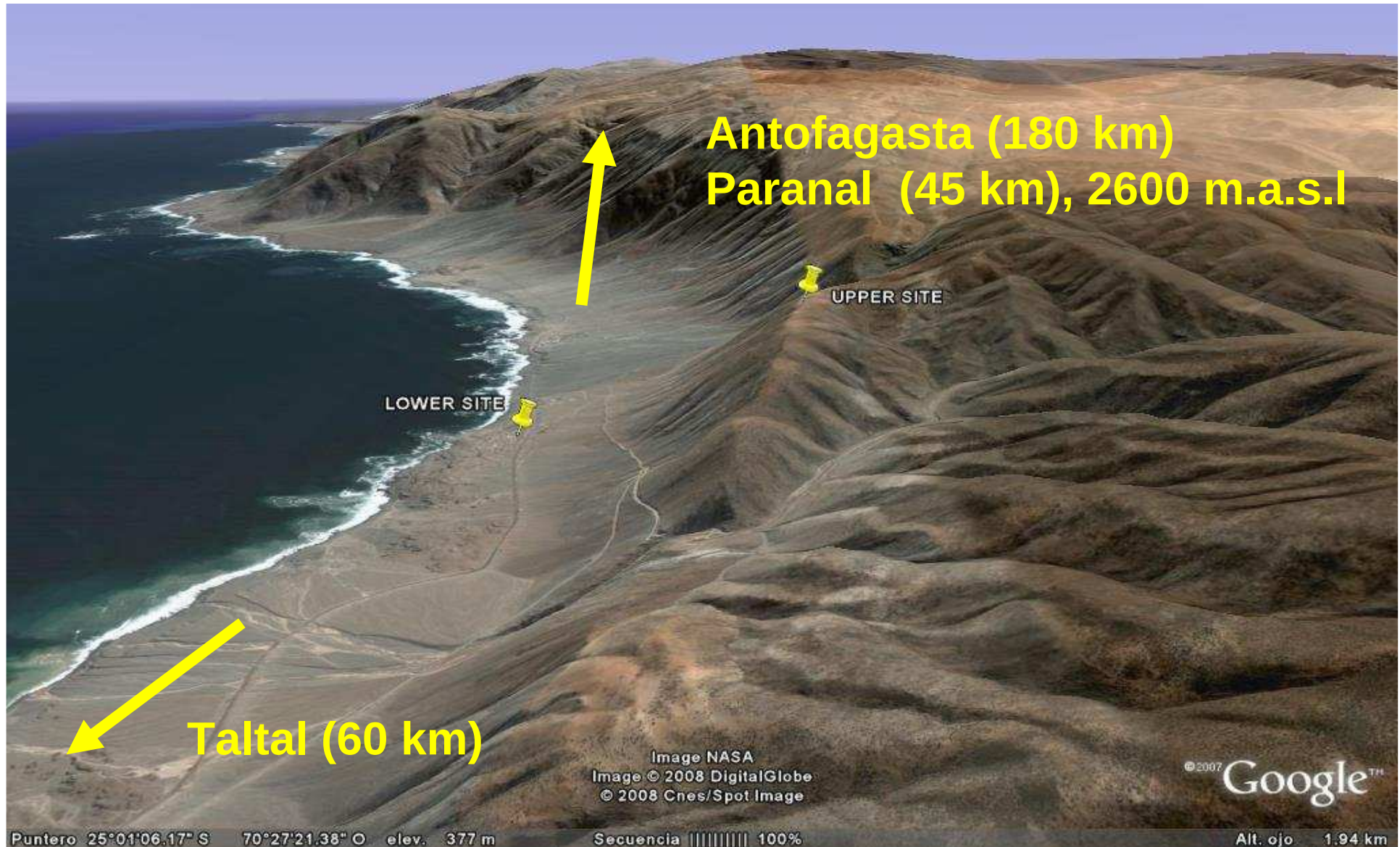
On behalf of the Paposo/Paranal in the field team:

Duli Chand, U. Washington
Ana María Córdova, U. Valparaíso
Javier Fochesatto, U. Alaska
Catherine Cahill, U. Alaska
Glenn Shaw, U. Alaska
Radovan Krejci, Stockholm University
Ricardo Muñoz, Universidad de Chile
José Rutllant, Universidad de Chile
Alvaro Amigo, Universidad de Chile
Andrés Pavez, Universidad de Chile
Chilean Weather Office
Plus hard-working students



PAPOSO

25 S, 70.3 W; 25 (lower) and 690 (upper) m.a.s.l.



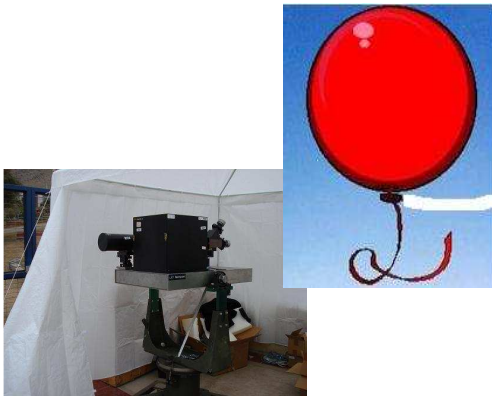
Paposo (Oct 15-Nov 15)

OPC, PSAP, SMPS, CVI, Aethalo-,
drum-sampler, Nephelo, Sunphoto-
meter

What are these clouds made of? Where do the
CCN/aerosols come from? Sc and MBL dynamics?



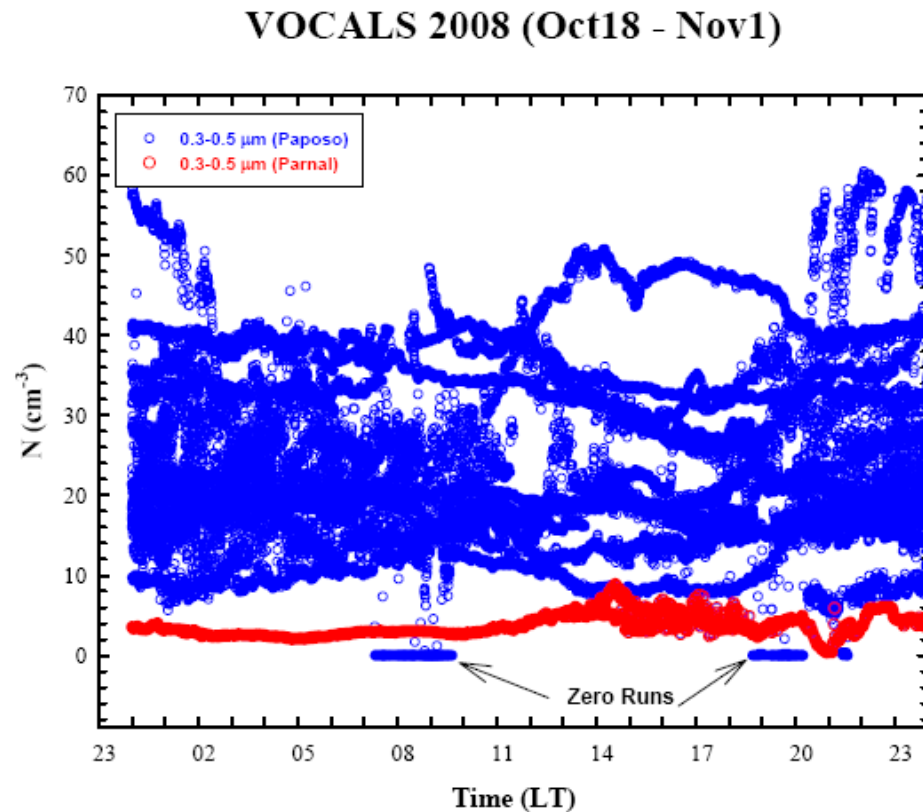
Vertical structure, optical depth, droplet prop.



- Aerosol number, size distribution, composition, mixing state
- CCN number, size distribution, composition, morphology
- Soot
- Ozone
- Winds, RH, T, Rad.. etc



Aerosol Modes (Duli Chand) @ Alto Paposo OPC, 0.3-5 microns



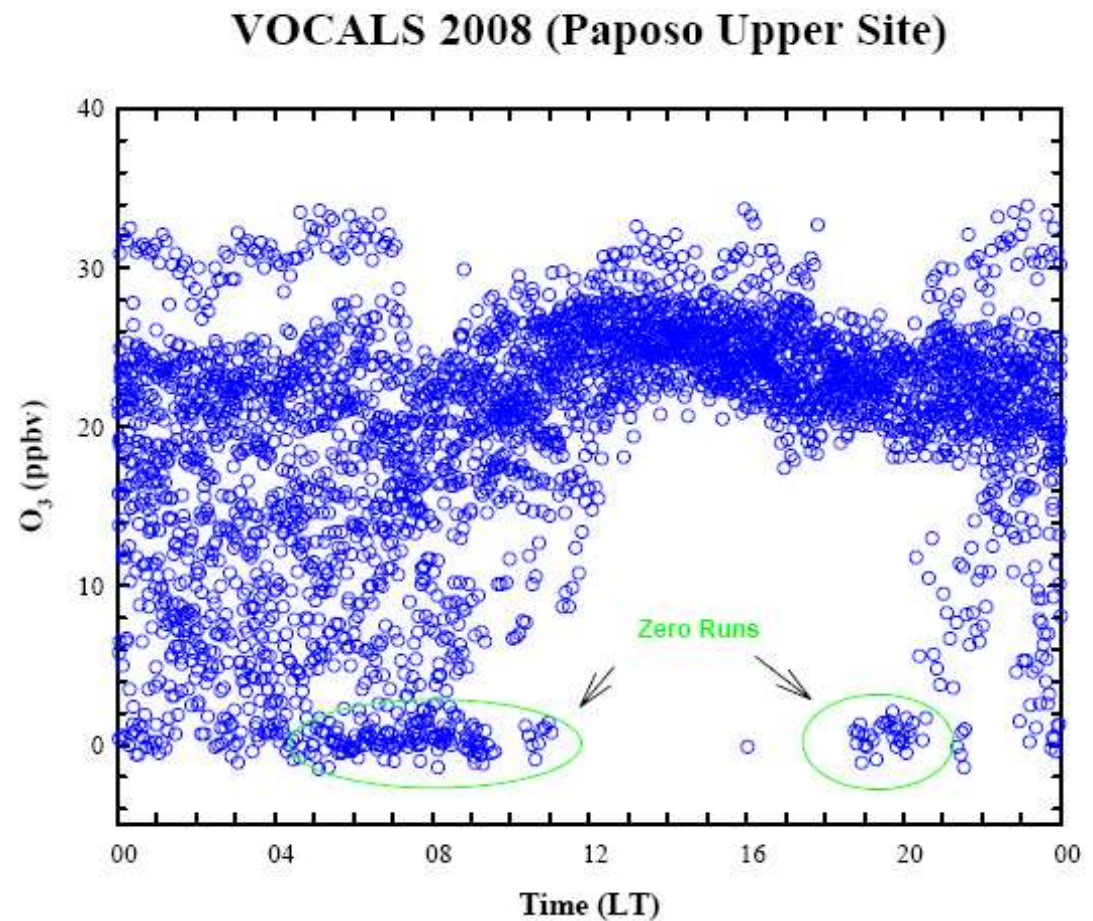
- Rel. Small diurnal variation compared to day-to-day variations (larger particles)
- At Paranal, 4-5 times lower values, no significant diurnal variation
- Events of higher particle number concentration



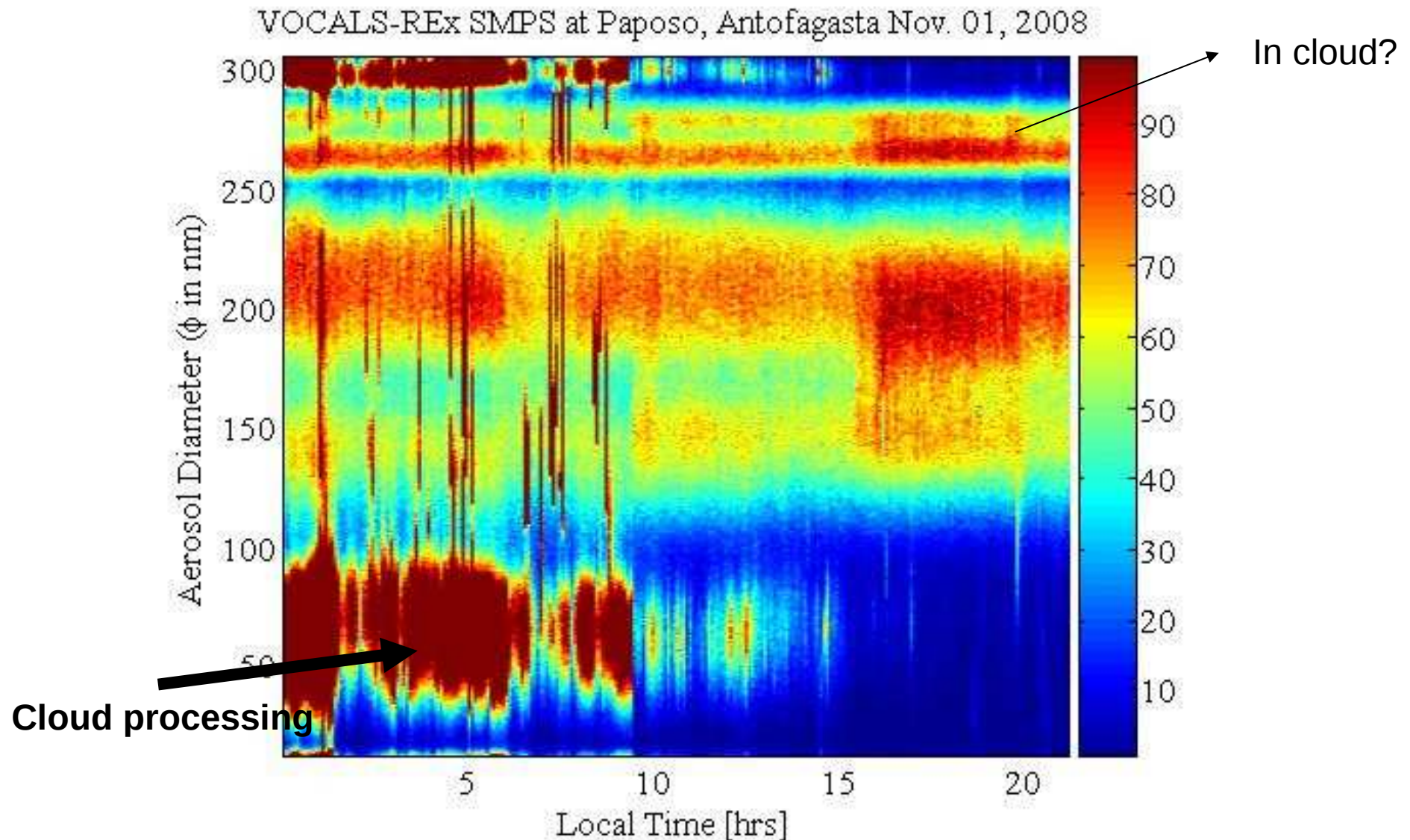
NB. Scattering coefficient: 20-30 /m

Ozone @ Alto Paposo (Duli Chand)

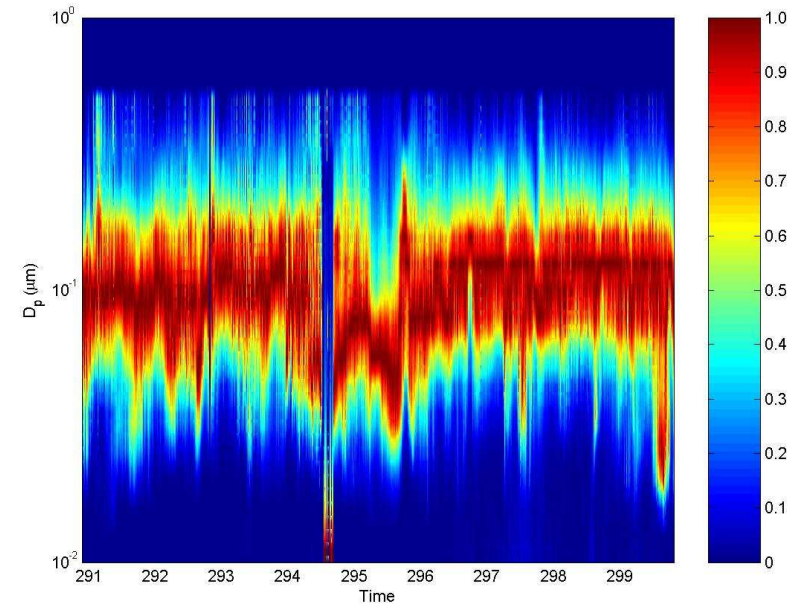
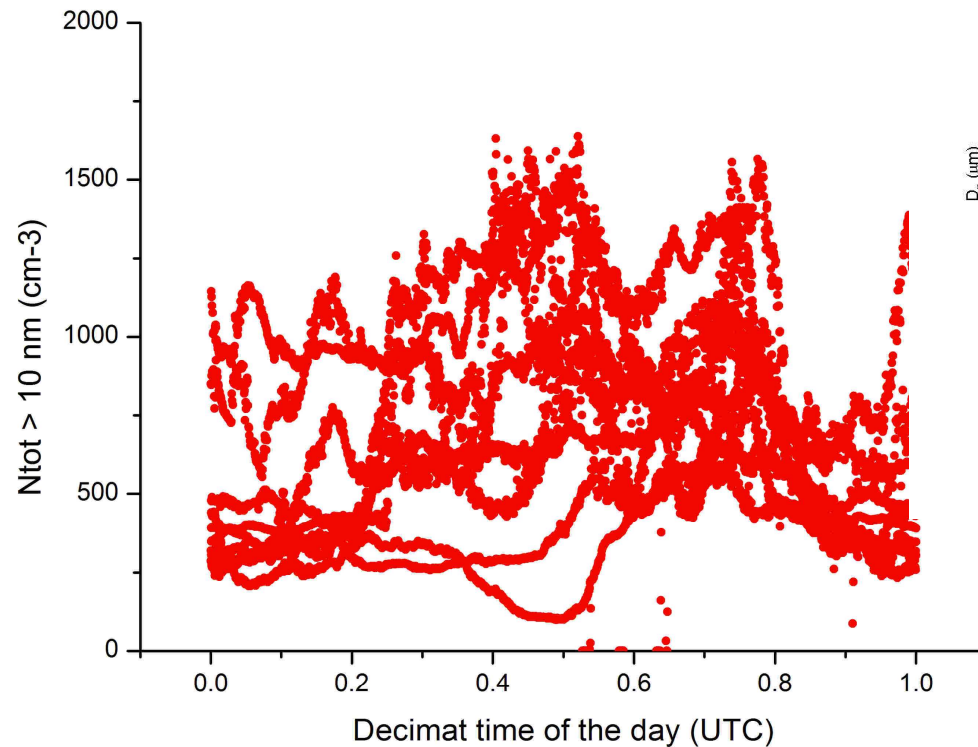
- Large nocturnal variability (Deposition processes? Nighttime chemistry? Local mixing?)
- Stable background diurnal values (similar to Paranal)
- No apparent in situ photochemistry



Scanning mobility particle spectrometer (SMPS), Glenn Shaw/JF, Alto Paposo



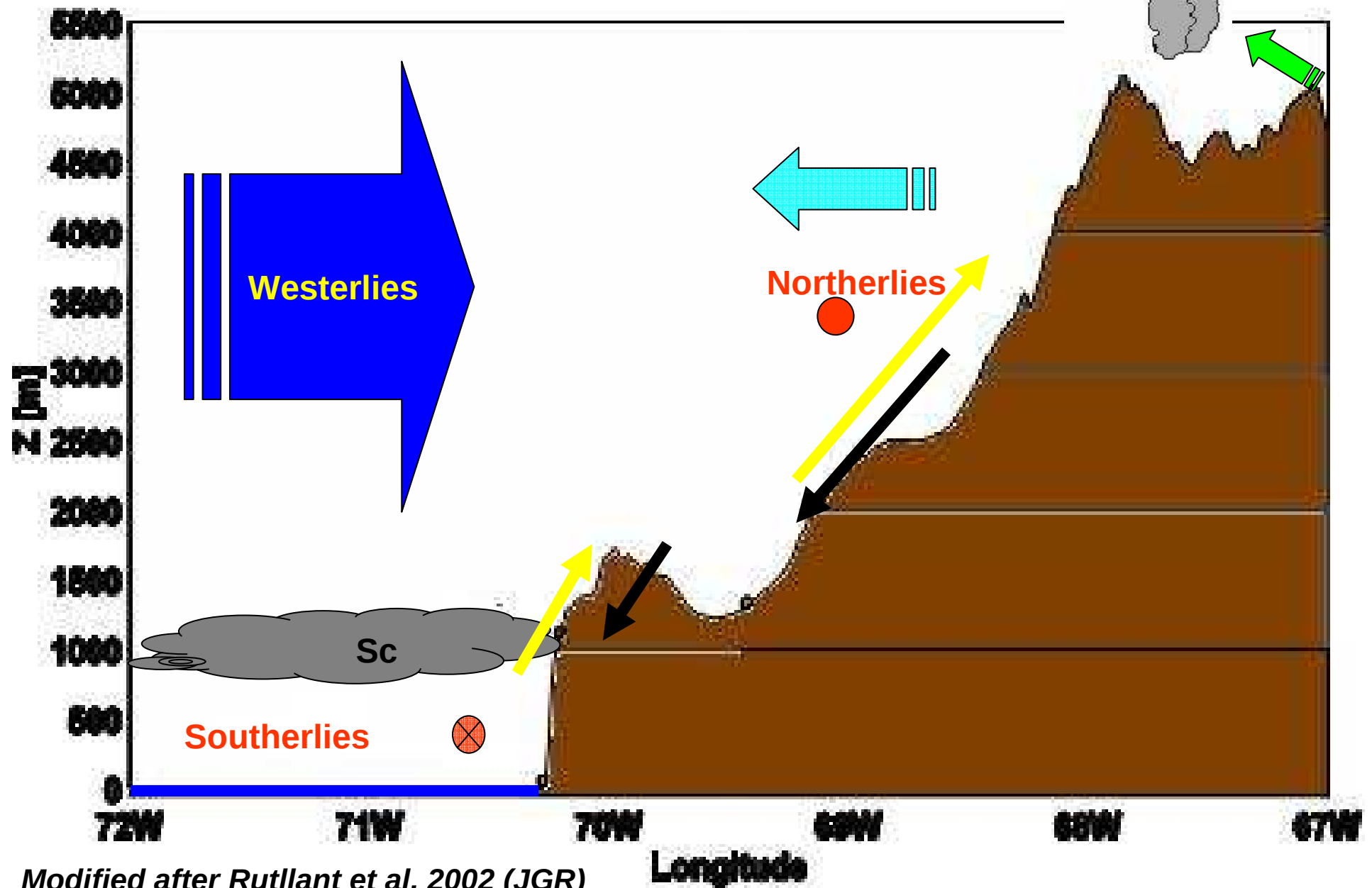
Aerosol Number and size distribution @ Paranal 24.6S, 70.4 W, 2600 m.a.s.l, Radovan Krejci

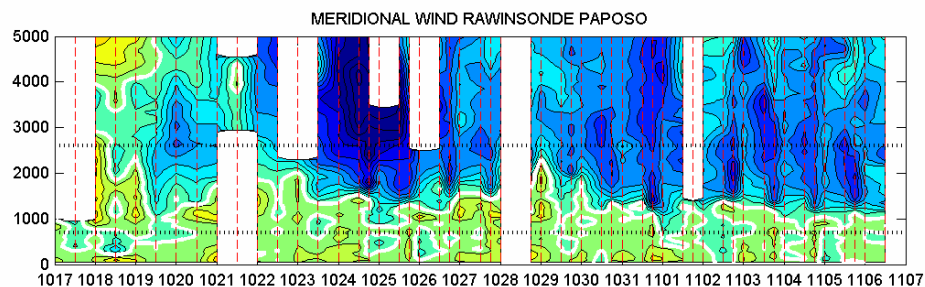
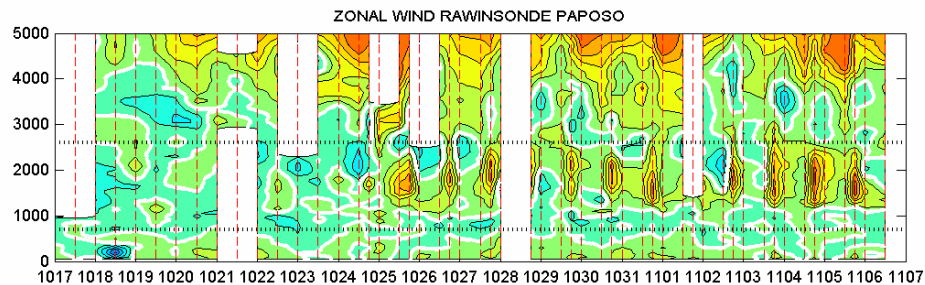
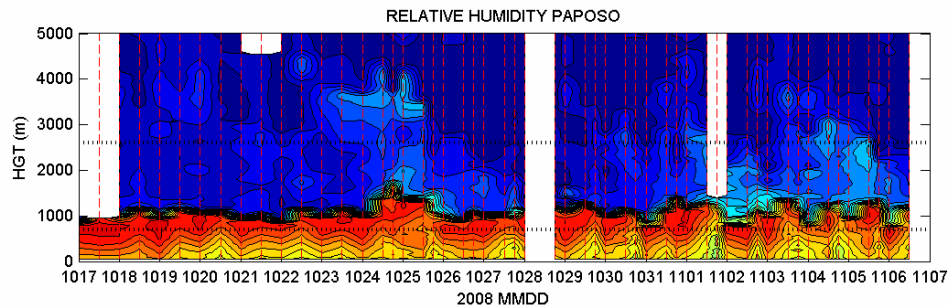
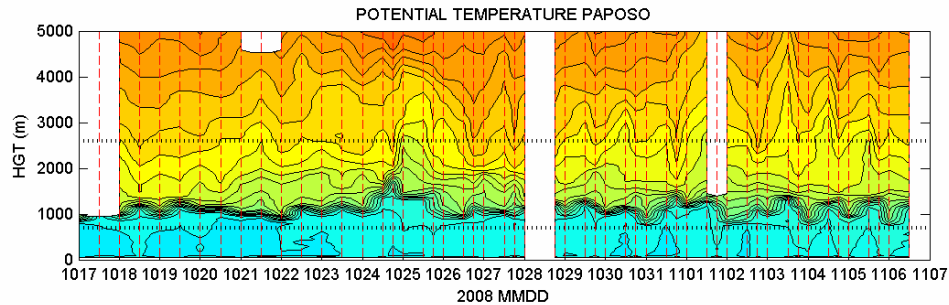


**Largely, aged air
masses...accumulation mode
..plenty of aerosols**



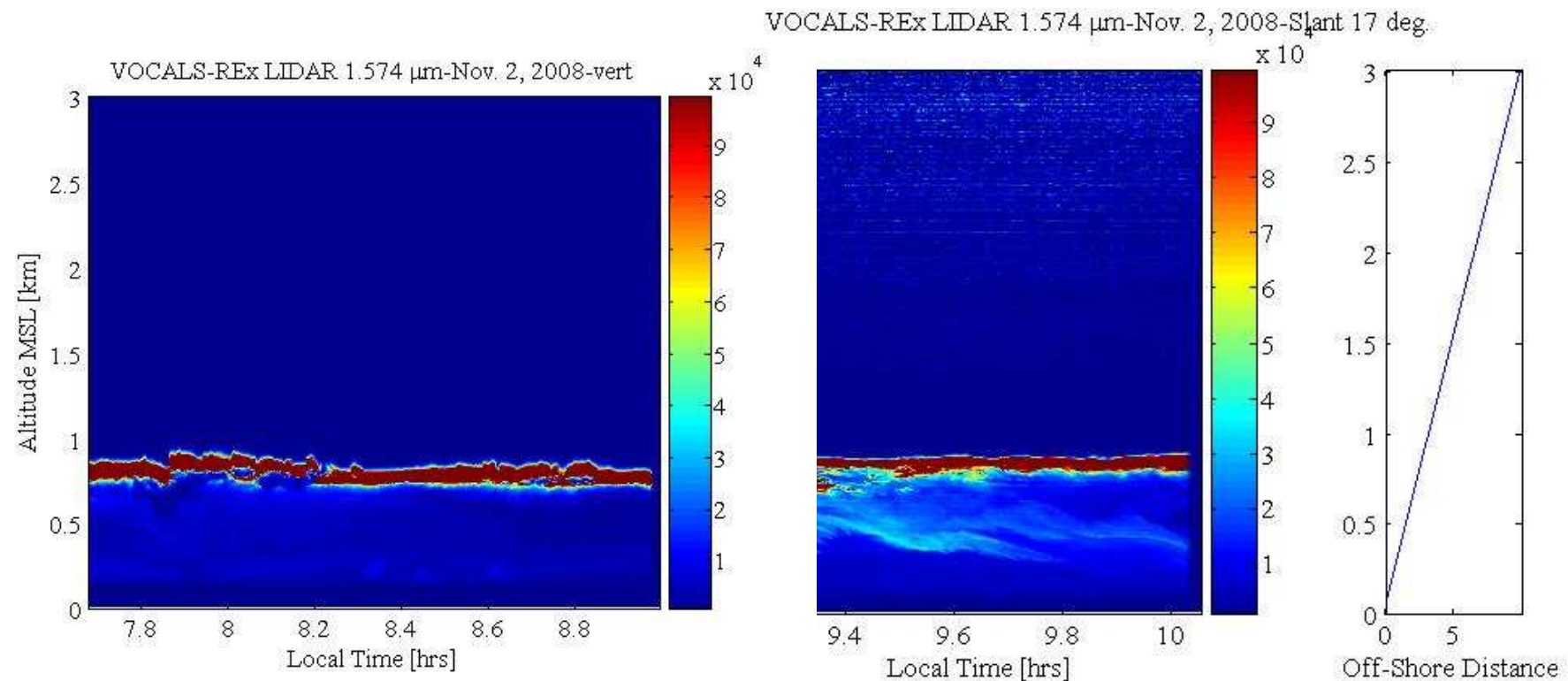
Circulation Patterns





- Paposo upper site is generally in the MBL (In cloud)
- Northerly winds prevail above the MBL
- Conditions have shown no large variability
- Deep trough around Oct 25...breaking in subsidence inversion
- Noticeable diurnal up and down slope winds

Backscatter at 1.574 mm (LIDAR), Javier Fochesatto



- Sc morphology and dynamics of cloudiness (coastal/marine; nighttime/daytime)
- IOP to record the development of cloudiness and to investigate nighttime transport and mixing in the BL

Using miniDOAS, SO₂-S emissions (kgS/s) Oct 28-29-30 (A. Amigo, A. Pavez, AM Córdova)



In sum....so far

- So far so good:
 - Paposo site is fully operational
 - Largely we are seeing regional conditions (...)
 - **Next IOP: joint measurements Paposo sites/C-130 (BAe-146?) to determine Marine/Coastal-Sc and transported aerosol properties differences**
- Soon enough:
 - CVI+: CCN number, size distribution, morphology and composition
 - Aethalometer: soot and local pollution
 - Submicron aerosols
 - Trajectory analyses
 - Dispersion simulations

