Liquid water paths from C-130 and Ron Brown

Paquita Zuidema  U of Miami
contributions from Maria Cadeddu  Argonne NL; Chris Fairall NOAA; David Leon UWyoming; David Painemal UMiami; Andrew Pazmany Prosensing

Prosensing 183 GHz
GVR

2-channel MWR
(Peter Minnett)  ARM
Radiometrics 183

NOAA
90 GHz
the short story

good final LWP datasets expected from both platforms

Ron Brown “version 1” on EOL archive in 1-2 weeks

C-130 “version 1” in progress
“version 1”:
23-31 GHz channels only

4-6/daily RS92 sondes

physical retrieval ala Zuidema et al. 2005
good MWR/sonde clear-sky brightness temperature comparison

nov 15-16: 20,30 GHz

nov 15-16: 170-175 GHz
clear-sky spectra of 10th and 90th percentile
VOCALS-REx domain soundings
good linearity $T_b$ (170 K) @ pwv < 2 cm

LWP (170 GHz+sonde)

LWP (23,31 GHz+sonde)

Southeast Pacific water vapor path

$N_{2001-2007} = 313$ (268<2cm)
$N_{vocals} = 212$ (187<2cm)
$T_b$ sensitive to LWP, cloud T, WVP, T&rh structure. Use radiosondes, above-cloud C130 legs, cloud boundaries as constraints.
still need to determine error bars - “version 2”

use data to address VOCALS hypotheses - remote sensing retrievals, drizzle as f(LWP,Nd)
2 (or 3) LWP regimes

LWP  Oct 01–05–06–07–08

[ g/m² ]
near-coastal region
perfect for evaluating
standard remote
sensing retrievals
double-peaked LWP diurnal cycle 75W

Diurnal Cycle at 75W, 20S: Nov. 12-15

height (km)

LWP (g m$^{-2}$)

adiabatic stat. ret. (2chan)

satellite microwave
O’Dell et al. 2008
precipitation as $f(LWP, N_d)$

maximum WCR dBZ in vertical column (D. Leon)

Figure 6: Cloud droplet concentrations from the PSCP-100 during RF3.

precipitation threshold
Ron Brown

O’Connor et al technique

\[ drizzle = f(\text{radar dBZ, ceilometer extinction}) \]