

Contributions of NATIVE to DISCOVER

Anne Thompson & Douglas Martins
Department of Meteorology
Penn State University
<http://ozone.met.psu.edu>

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GROVE

G

EMSS

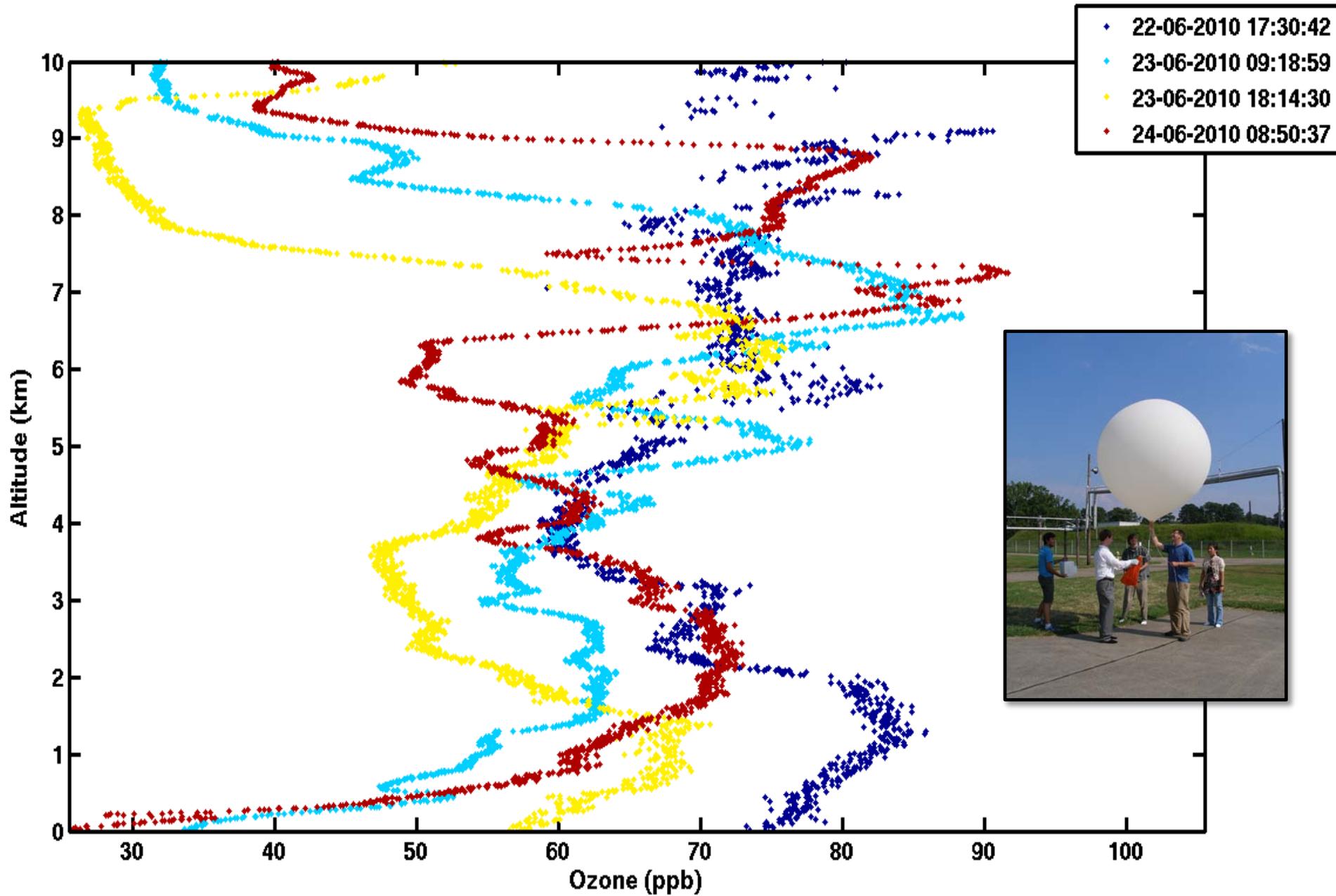
NATIVE Capabilities

Instrument (Mfg.) (Model)	*Detection Limit or range	*Response Time (s)	Uncertainty (at typical ambient concs)	Field Calibration Frequency	Calibration Standard
NO-NO _y (Thermo Scientific) (42 C-Y)	50 ppt	60	3%	daily	gas cylinder (Math-Tri, inc.)
O ₃ (Thermo Scientific) (49C)	1 ppb	20	4%	weekly	UV ozonator
SO ₂ (Thermo Scientific) (43C)	0.2 ppb	80	5%	weekly	gas cylinder (Math-Tri, inc.)
CO (Thermo Scientific) (48C)	40 ppb	60	5%	weekly	gas cylinder (Math-Tri, inc.)
Temperature (R.M. Young) (41382)	-50-50°C	10	0.3°C	per field campaign	water bath
Relative Humidity (R.M. Young) (41382)	0-100%	10	2%	per field campaign	water bubbler
Pressure (R.M. Young) (61202)	500-1100 hPa	10	0.3 hPa	per field campaign	NIST-calibrated barometer
Wind Speed and Direction (R.M. Young) (05103)	1 m/s	1	0.3 m/s; 3 deg	per field campaign	Compass/GPS

* Specifications provided by Thermo Electron Corporation or R.M. Young

Instrument (Mfg.) (Model)	Measured Parameter(s)	Response Time	Spatial Range/Resolution
UV Shadowband Radiometer (YES, Inc.) (UVMFR-7)	diffuse and direct irradiance, total-column ozone	30 s	Total View
J(NO ₂) Filter Radiometer (Metcon) (2-pi-jNO2)	NO ₂ photolysis rate	~1 s	Total View
Pandora (DS-DOAS)	Total column NO ₂	~2 min	Total column
Sun-Tracking Photometer (Cimel) (CE318N-EBS9)	total-column water vapor, ozone, aerosol size distribution and aerosol optical thickness	~30 s	Total column
Ozonesonde/Radiosonde Ground Station (ENSCI/Vaisala)	vertically-resolved ozone mixing ratio, temperature, pressure, and water vapor	<30 s	0-30 km/~10 m

Ozonesonde profiles at NASA LaRC Summer 2010



Additional NATIVE Capabilities

MOPS - Measurement of Ozone
Production Sensor *(courtesy B. Brune)*

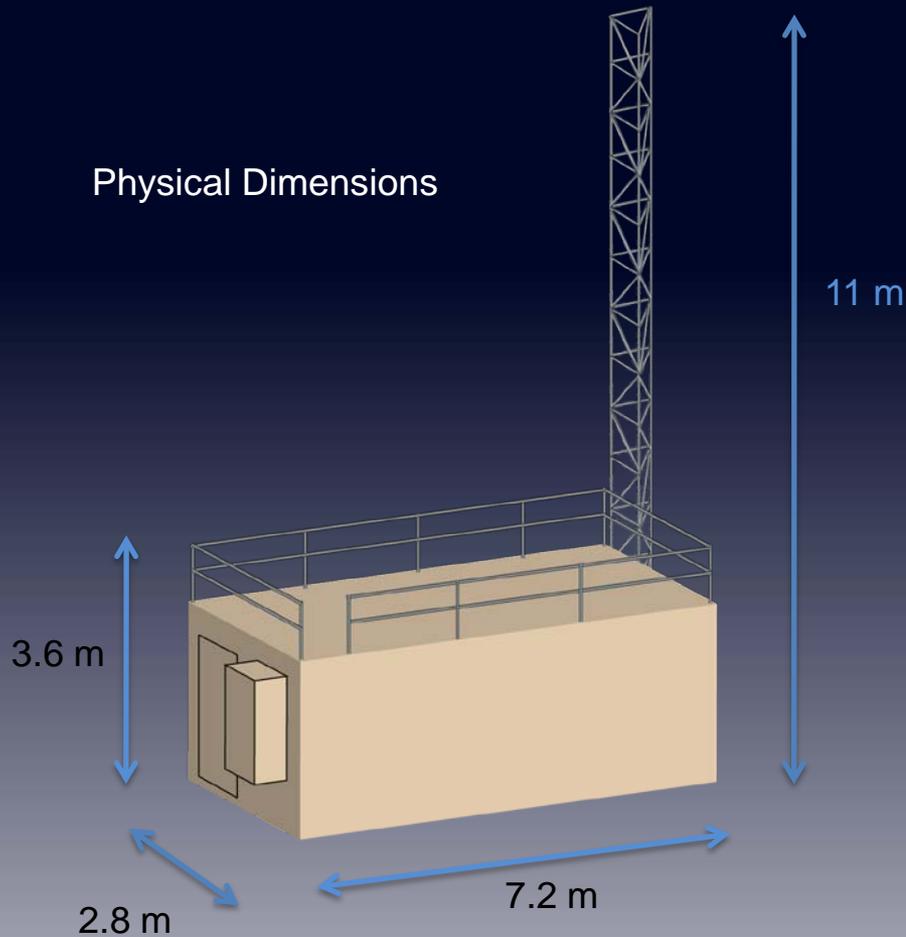


Pandora – Column NO₂



Turbulence and ozone
flux measurements
(courtesy J. Fuentes)

NATIVE Requirements



Power Requirements:

Connection: Female, 200A, 240/120V, 60Hz

Maximum start up: 80 Amps

Normal operation: ~35 Amps

Standard Gases:

Nitric oxide (~5 ppm in nitrogen)

Nitric oxide (2% in nitrogen – for O₃ flux)

Sulfur dioxide (~5 ppm in nitrogen)

Carbon monoxide (~5 ppm in nitrogen)

Helium (1 per 2 ozonesonde launches)

Clearance from FAA to launch ozonesondes!!

Potential Summer 2011 Sites

Aldino



Edgewood



Essex

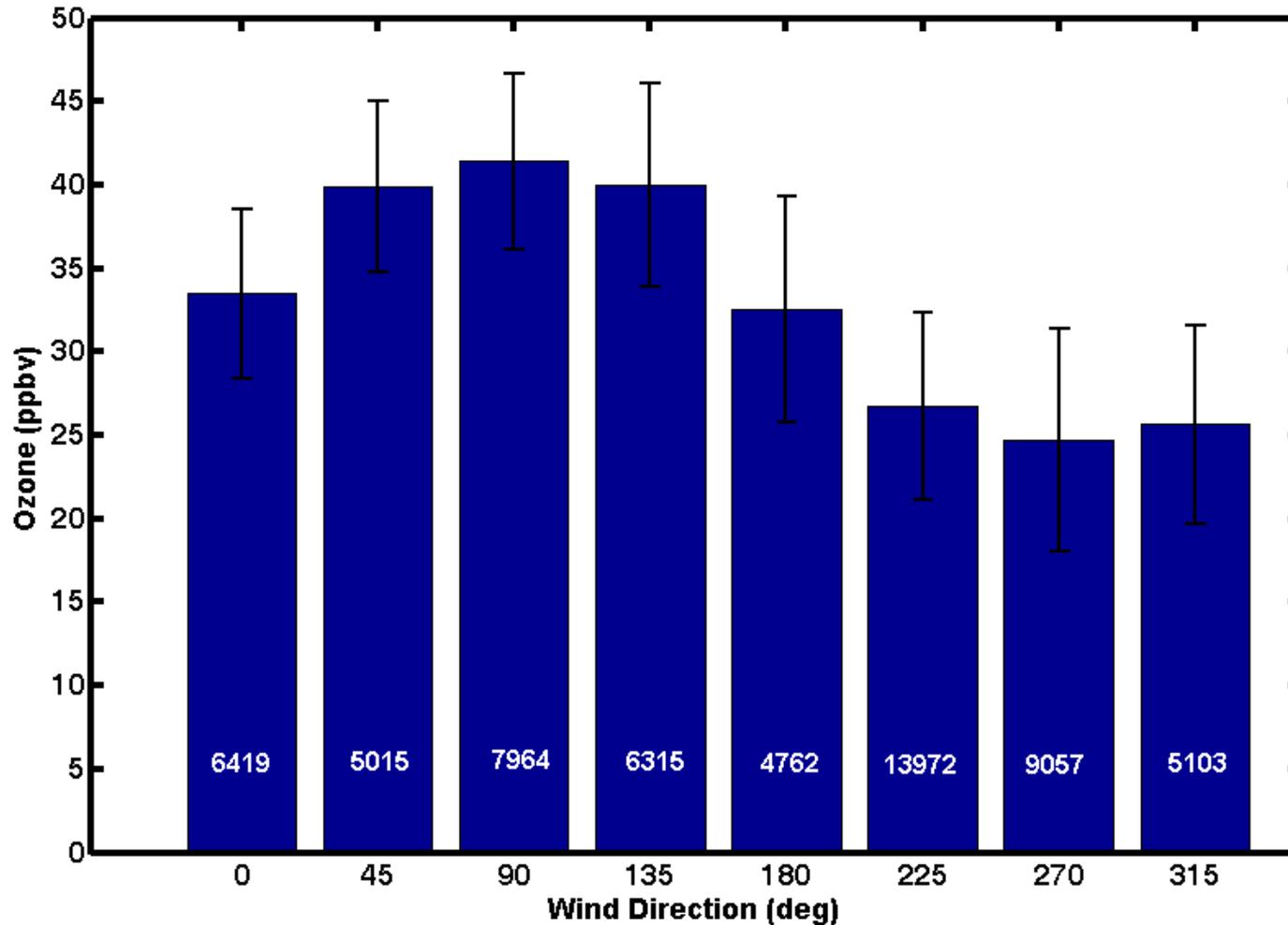


MDE Monitoring Stations - 2009



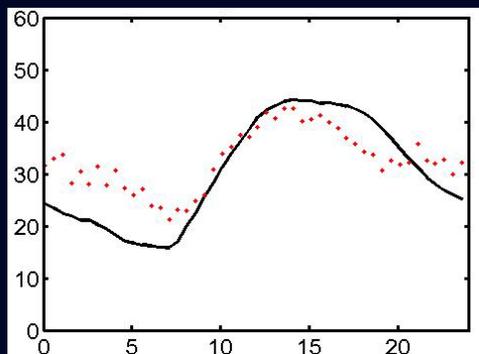
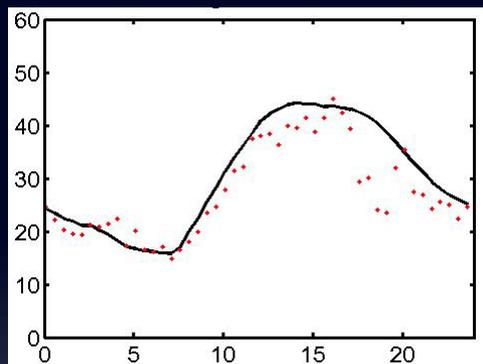
Results from CAPABLE – Summers 2009 and 2010

Highest concentrations of ozone observed during easterly (from the ocean) flow



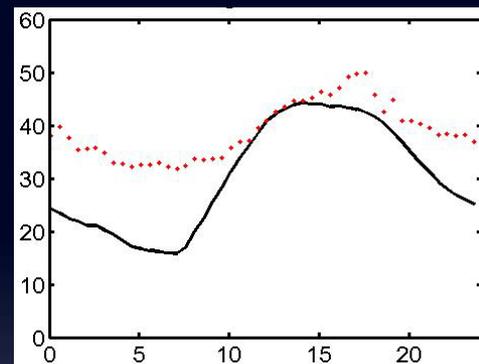
* Numbers within bars indicate sample sizes

Northwest

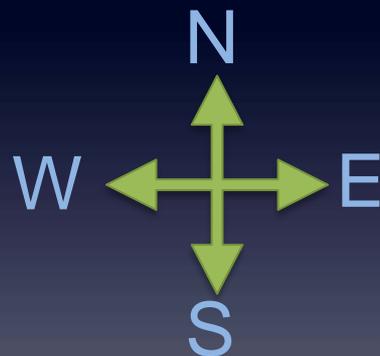
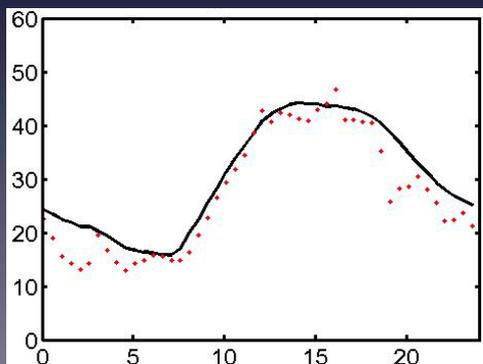


North

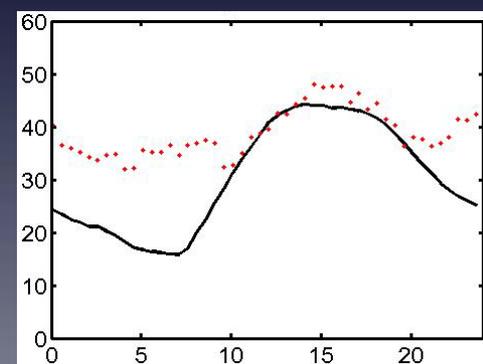
Northeast



West



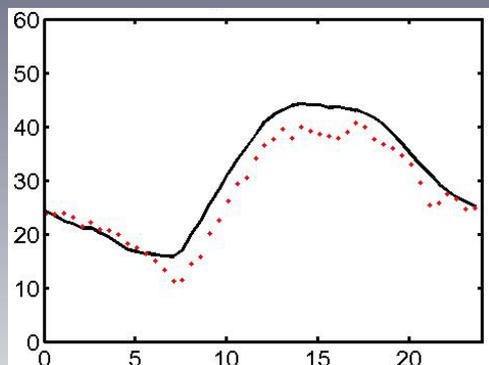
East



O₃ [ppbv]

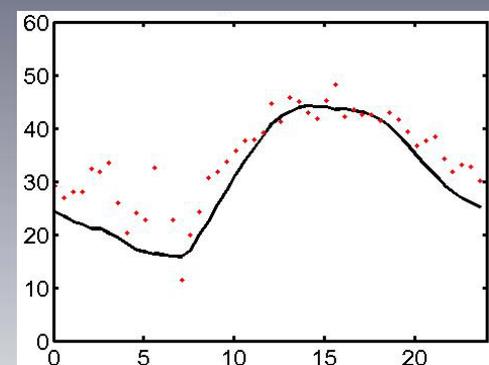
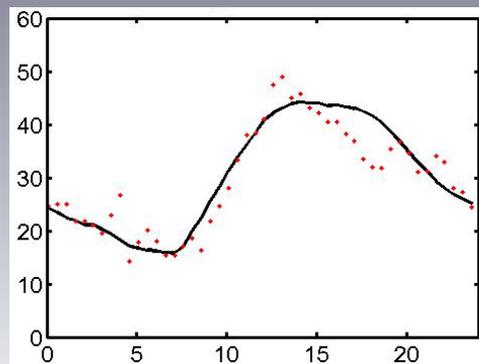
— Mean diurnal profile (entire campaign)
 ··· Mean diurnal profile (wind direction specific)

Hour (local)



Southwest

South



Southeast

Much Thanks to Past and Present Supporters:

NASA's Aura Validation Program (M.J. Kurylo, K.W. Jucks)

GEO-Cape (B. Doddridge, M. Pippin, J. Fishman, D. Neil, J. Murray)

DISCOVER Partners

Anne Thompson – amt16@psu.edu

Douglas Martins – dmartins@psu.edu

<http://ozone.met.psu.edu>