

## Progress on Ocean BRDF effects

Kenneth Voss (UM)

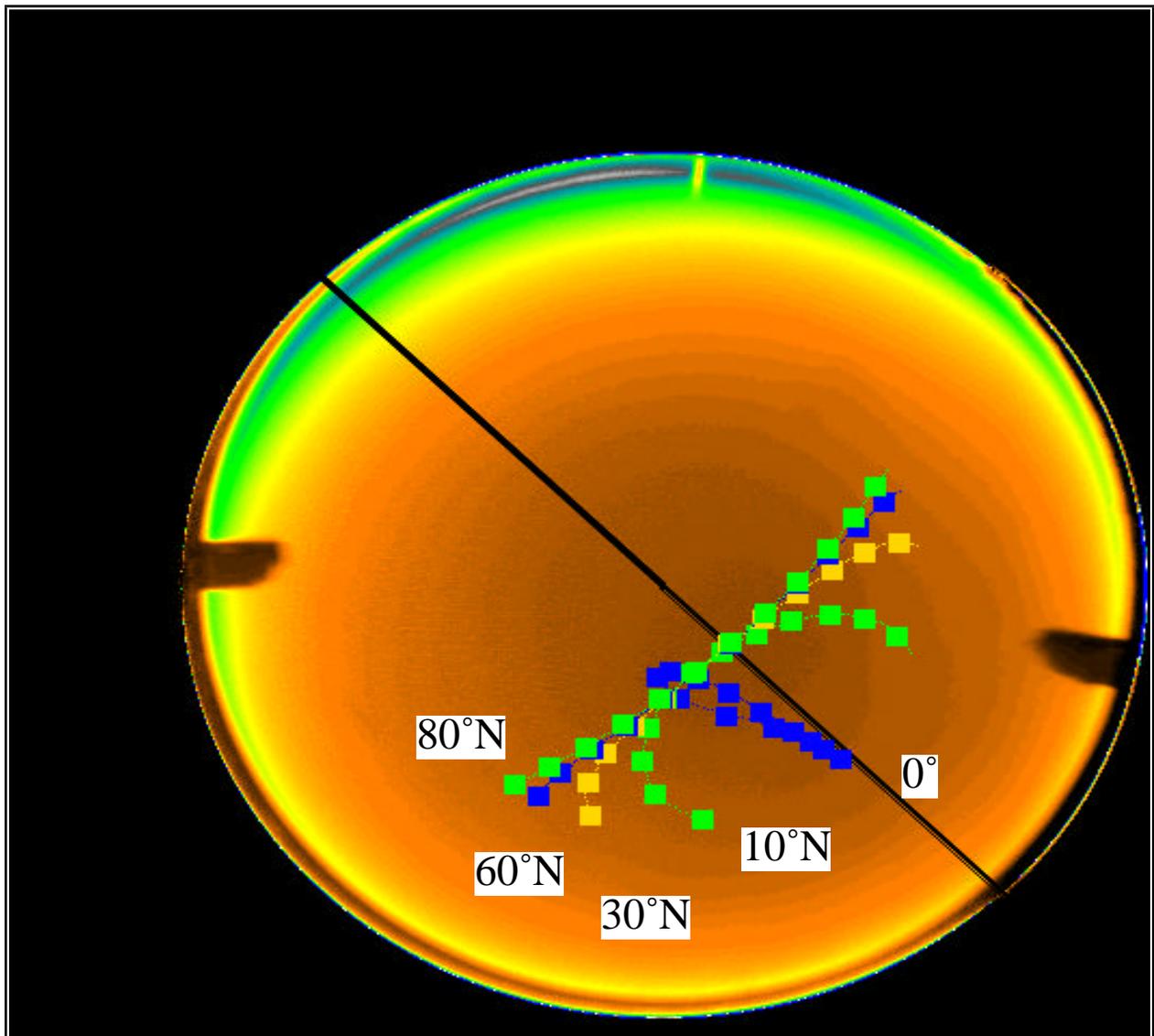
Howard Gordon (UM)

Dennis Clark (NOAA)

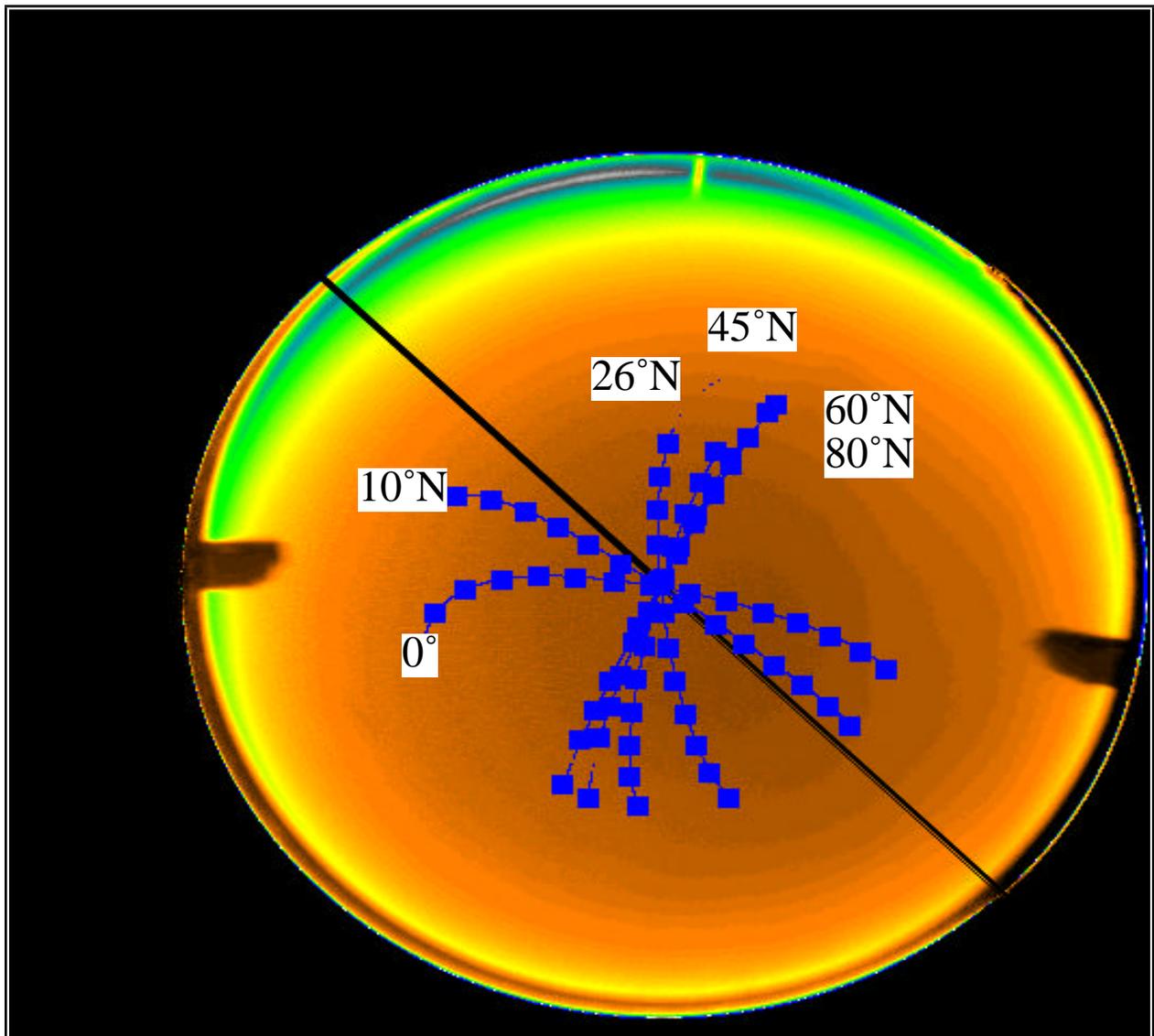
Mike Ondrusek (NOAA)

MODIS Oceans Team meeting 12/17/01

SeaWiFS, Scan line geometry,  
Variation with Latitude, 0° to 80°N



MODIS, Scan line geometry,  
Variation with Latitude, 0° to 80°N



Approach to solving problem:

For general MODIS data we need a model (too many variables: Chl, sun, view, ), as Morel has stated, this will probably end up as an iterative procedure. Need a validated model, which means lots of data collection.

1) Measure with RADS during MOCE cruises.

Good data collected in blue, significant shading at other wavelengths.

Good data set from MOCE5 (Baha) with variable Chl, but relatively constant sun.

2) For MOBY data, use both RADS data, but also WARS which can be mounted on MOBY for short (2-3 day) periods.

- Only one wavelength, but high temporal resolution, not much shadow from instrument. Only 8 bits.
- 3) NuRADS: 6 wavelength filterwheel, significantly smaller than RADS, but with better noise and sensitivity than RADS. First trip last week (MOCE9), no calibration data yet.



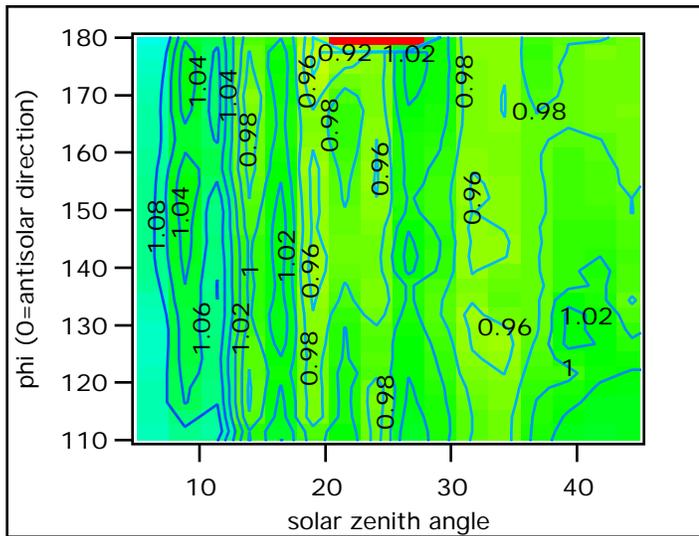
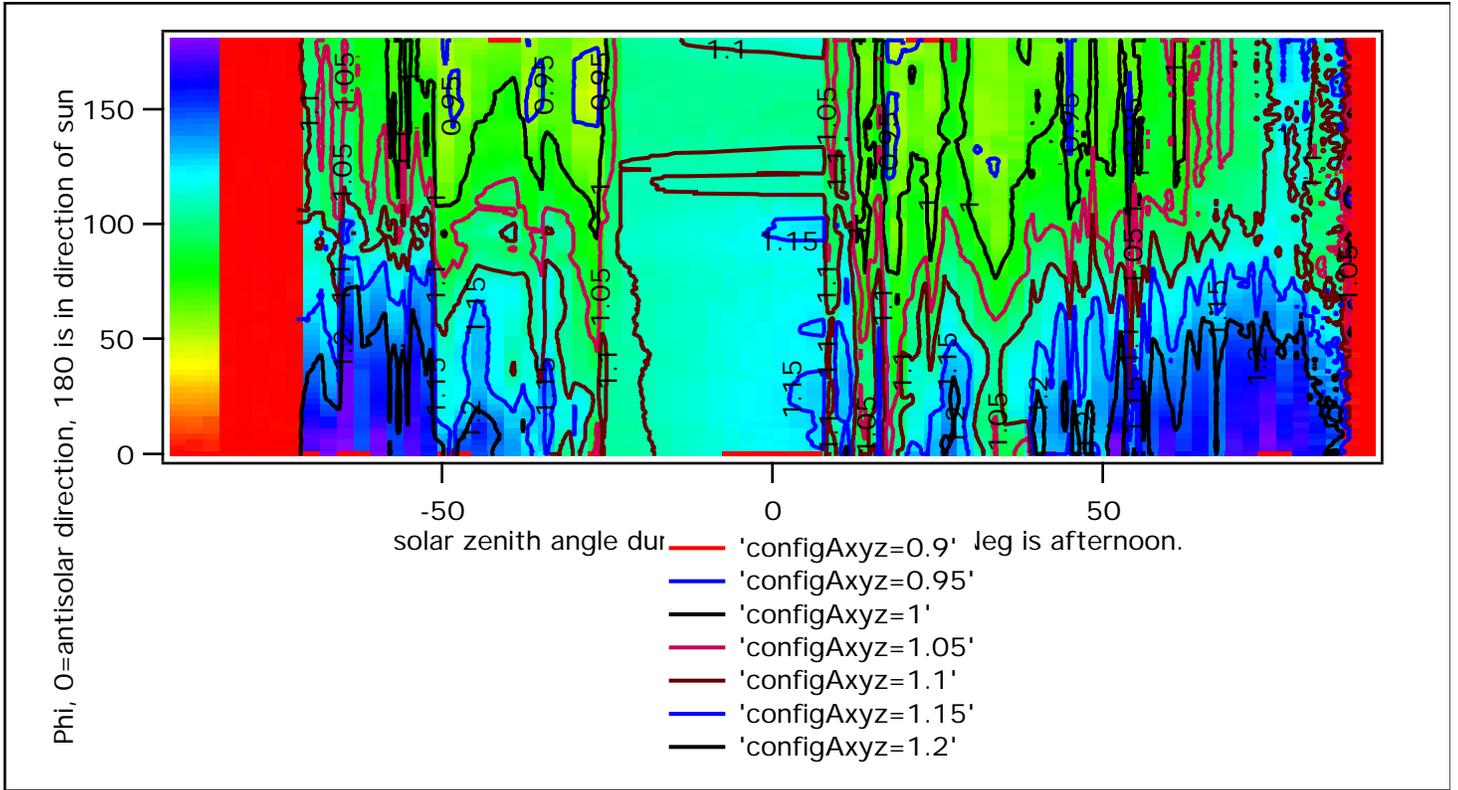
Initial idea of an empirical approach for MOBY data:

Takes advantage of:

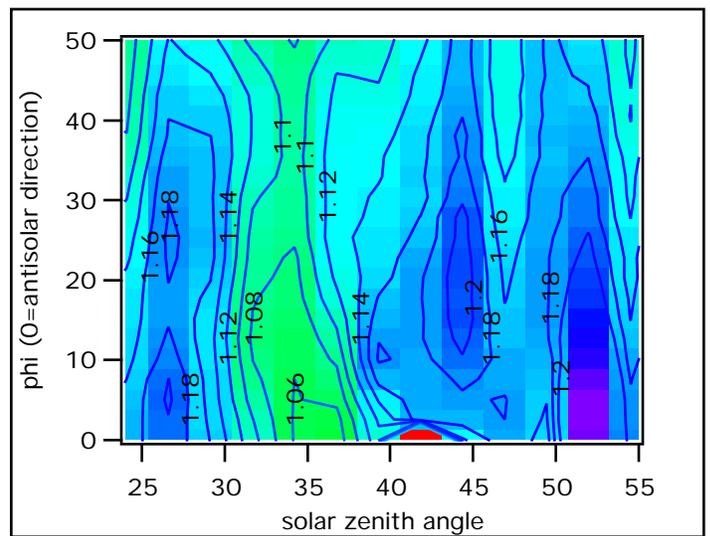
- 1) MODIS has repeated orbit geometries
- 2) Water properties around MOBY are stable (generally clear).
- 3) View zenith angle for MODIS to MOBY can be defined in 14 configurations.

Config#	Time	view	sun		final
1	2121	3	15-47	0-59	none
2	2204	53	5-45	180-109	A
3	2109	27	17-48	0-45	B
4	2151	44	8-45	180-113	C
5	2056	42	21-50	0-53	C
6	2139	30	11-46	180-117	B
7	2044	52	24-52	0-50	A
8	2127	8	13-47	180-120	none
9	2116	16	16-48	0-58	D
10	2157	49	6-45	180-112	A
11	2102	36	19-49	0-56	E
12	2145	38	9-45	180-114	E
13	2050	48	22-50	0-51	A
14	2133	20	12-46	180-119	D

Configuration A, view angle approximately 50 degrees, Color bar on left ranges from 0.8 to 1.3, where this is ratio of view radiance/nadir radiance.

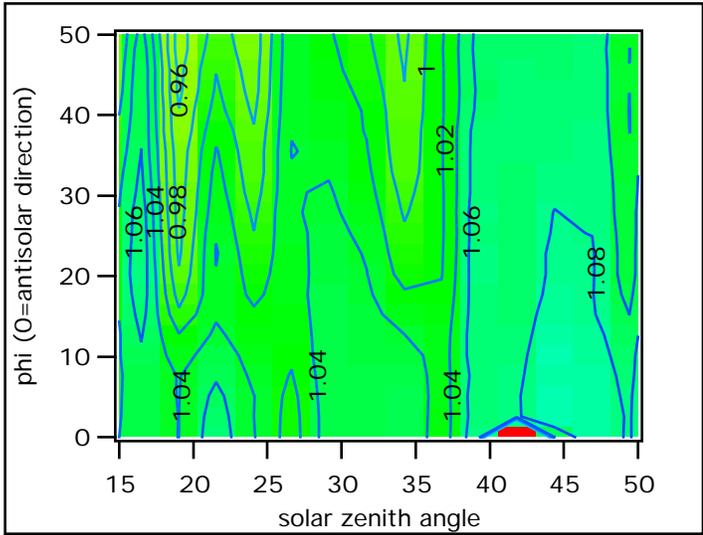
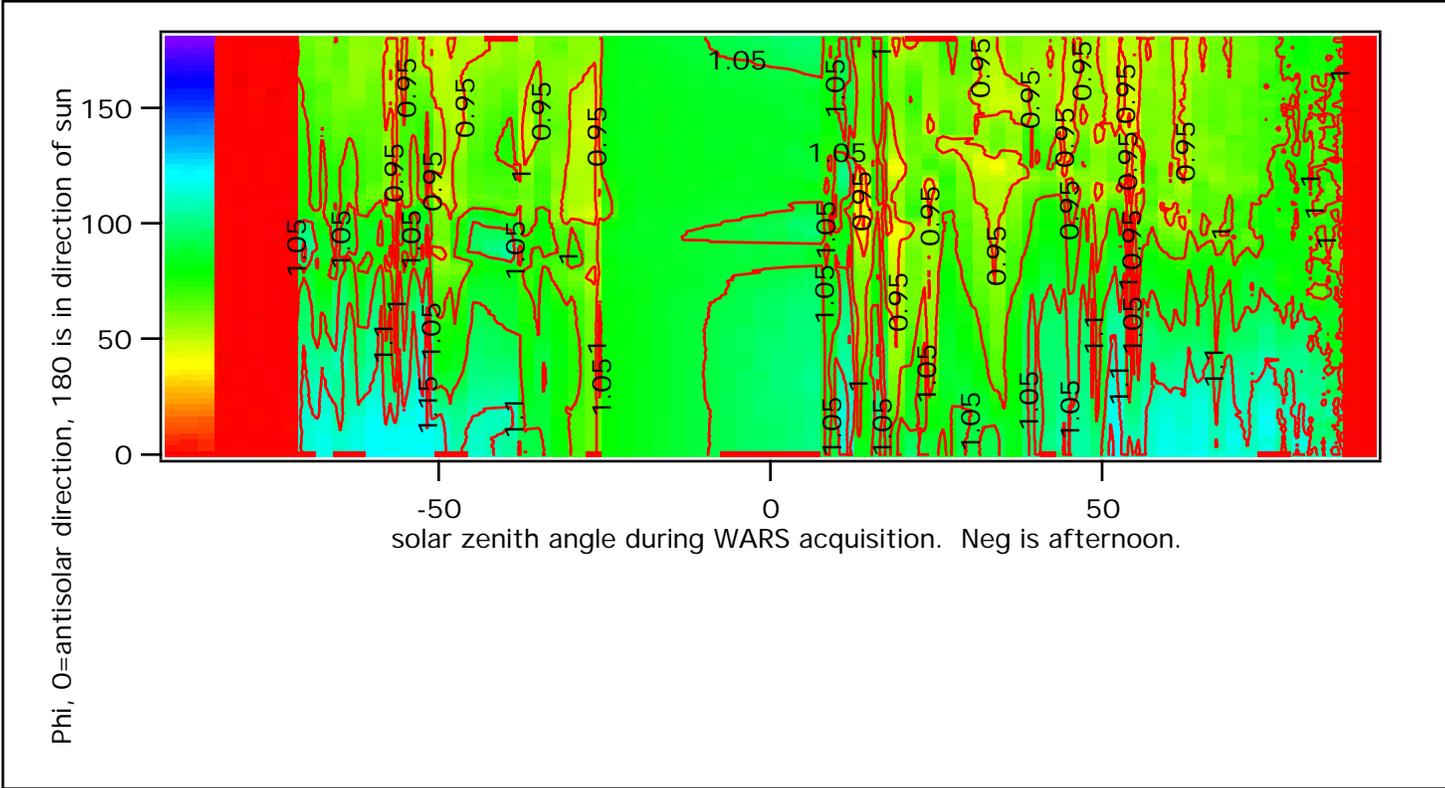


Range of solar zenith angles and azimuth angles for 2204 and 2157 measurement.

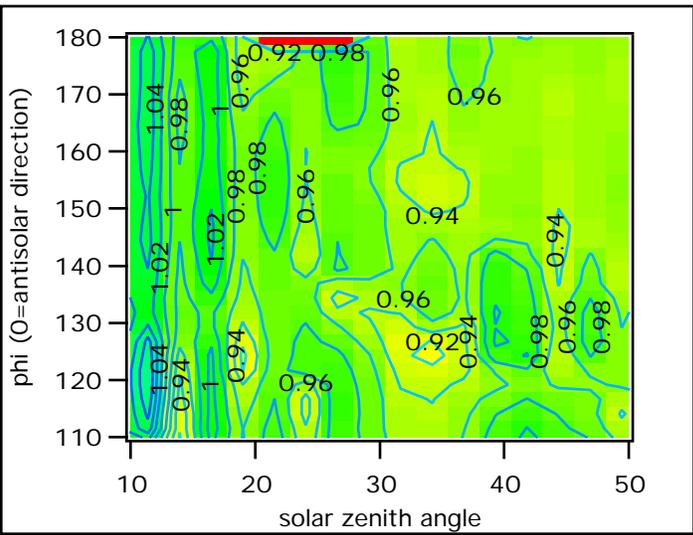


Range of solar zenith angles and azimuth angles for 2044 and 2050 measurement

Configuration B, view angle approximately 30 degrees, Color bar on left ranges from 0.8 to 1.3, where this is ratio of view radiance/nadir radiance.

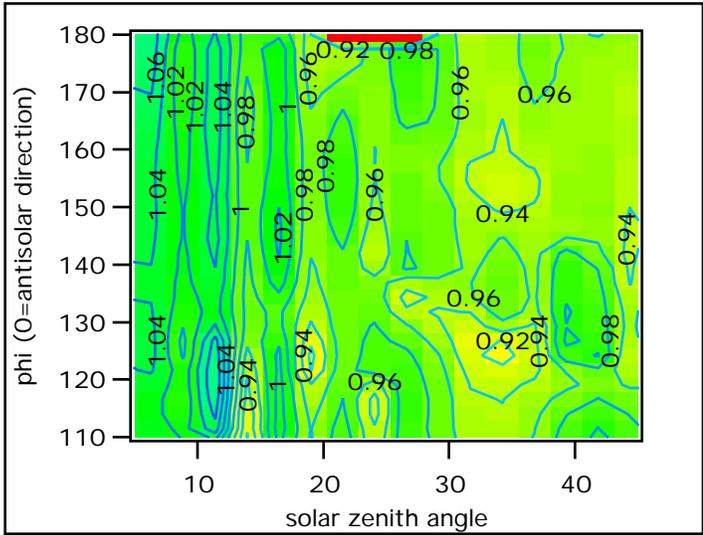
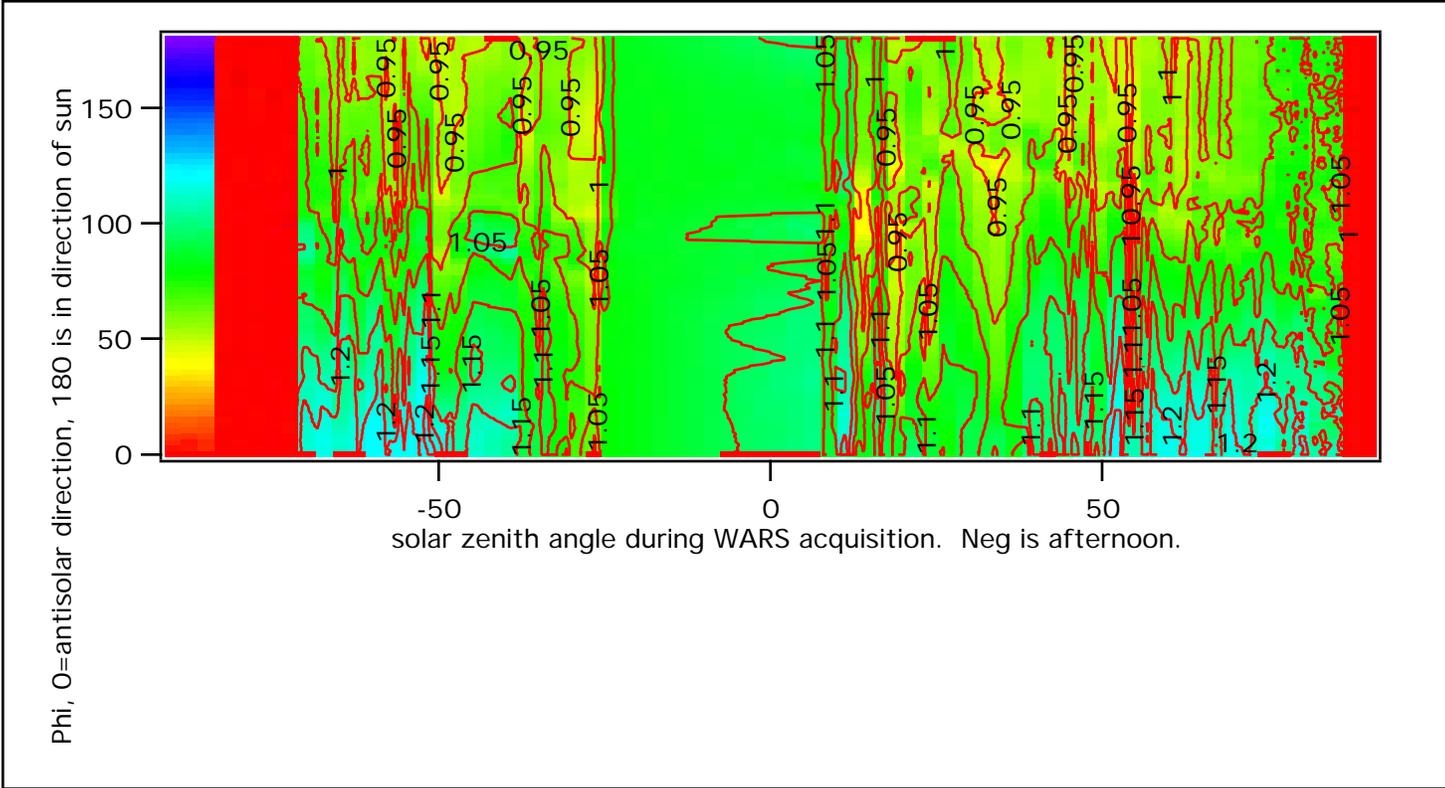


Range of solar zenith angles and azimuth angles for 2109 measurement.

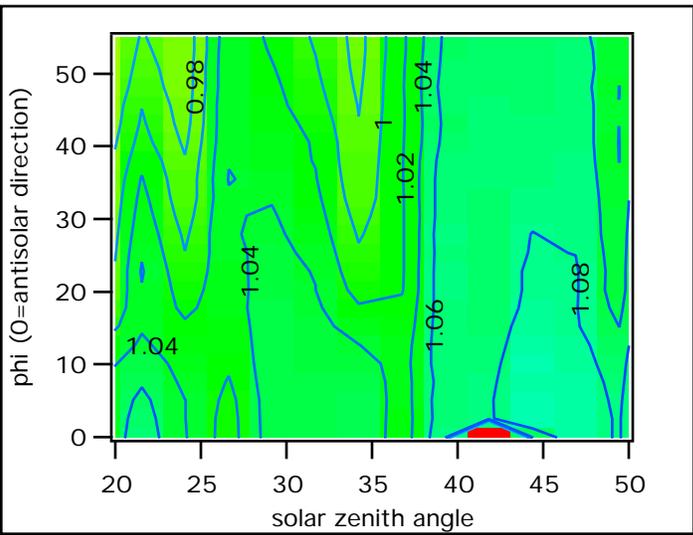


Range of solar zenith angles and azimuth angles for 2139 measurement

Configuration C, view angle approximately 42 degrees, Color bar on left ranges from 0.8 to 1.3, where this is ratio of view radiance/nadir radiance.

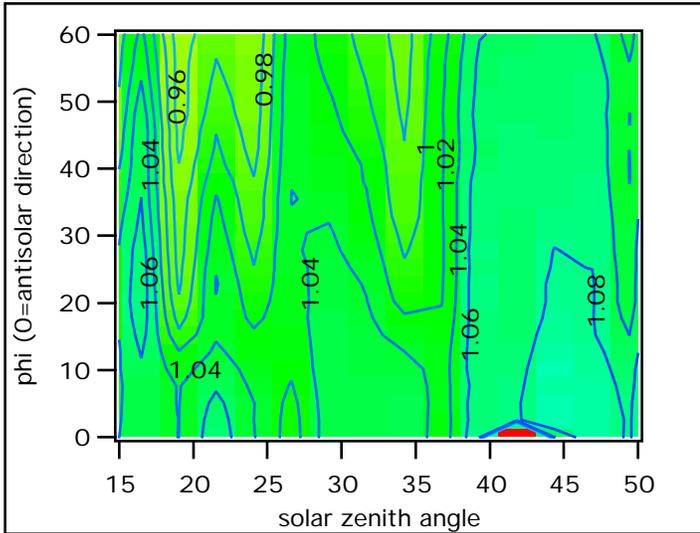
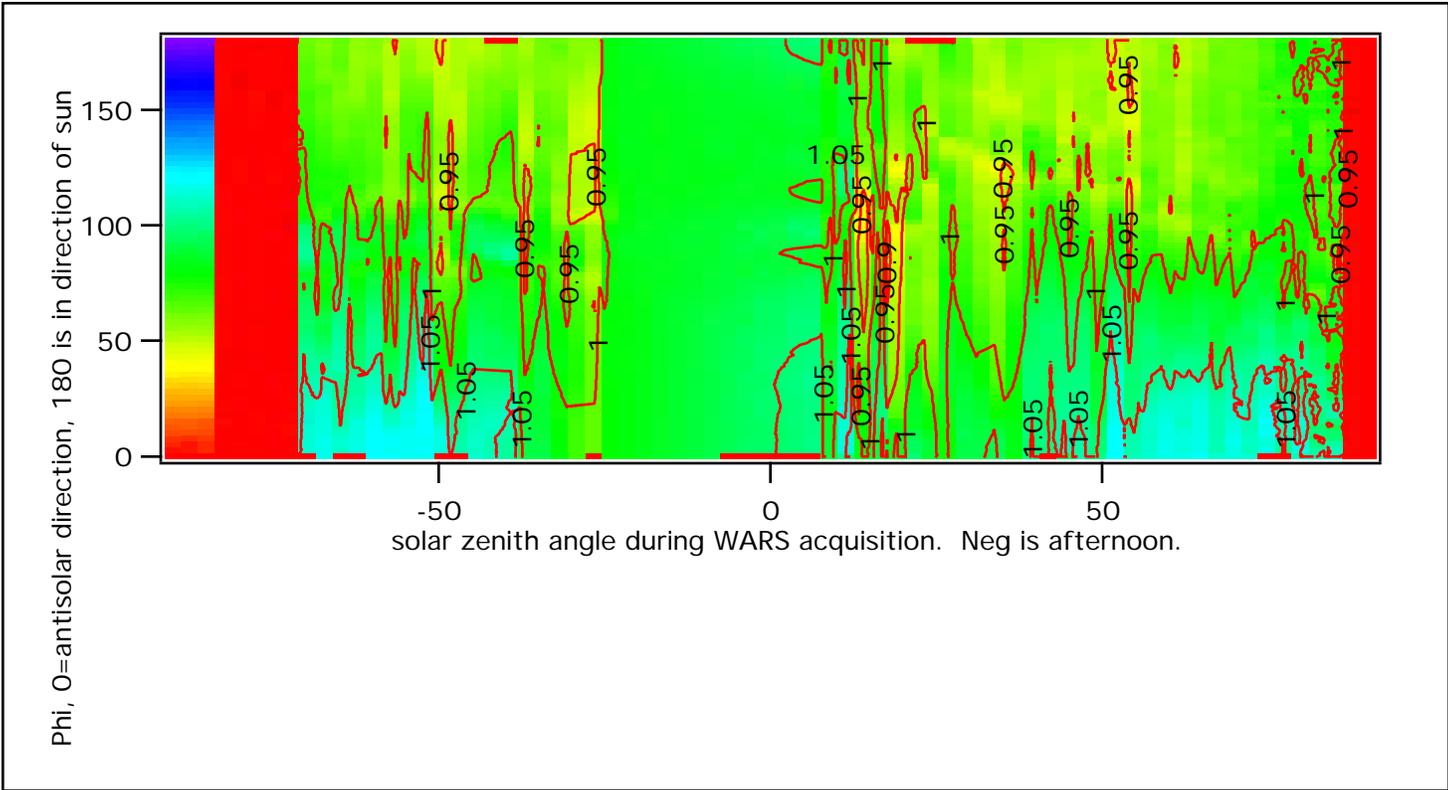


Range of solar zenith angles and azimuth angles for 2151 measurement.

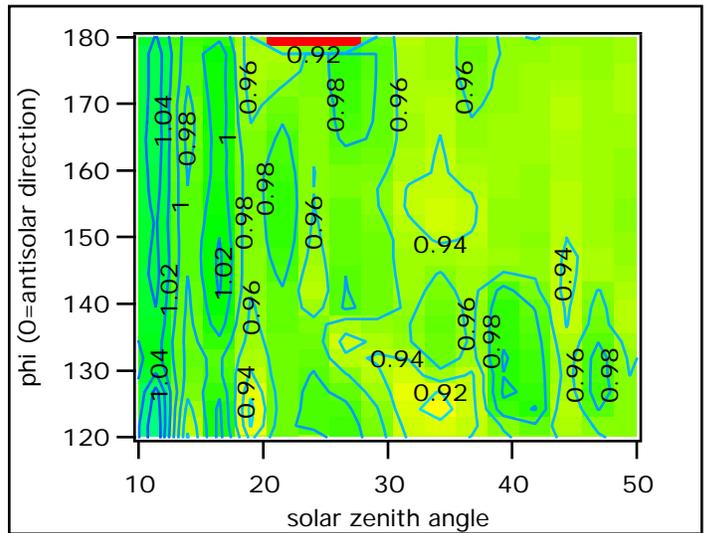


Range of solar zenith angles and azimuth angles for 2056 measurement

Configuration D, view angle approximately 20 degrees, Color bar on left ranges from 0.8 to 1.3, where this is ratio of view radiance/nadir radiance.

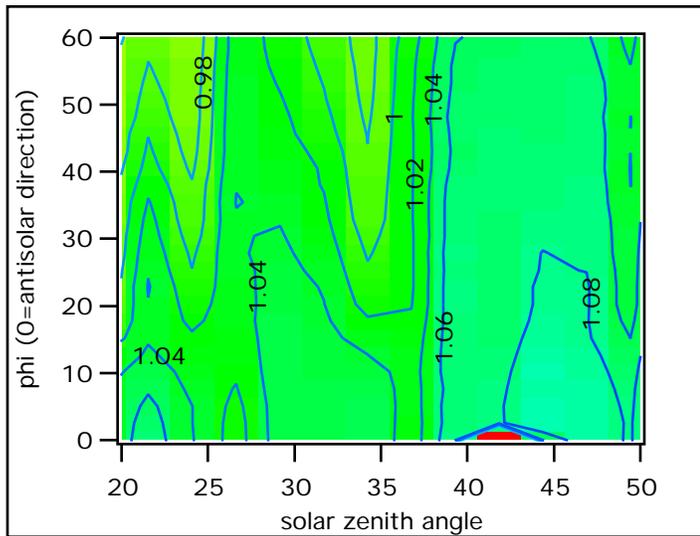
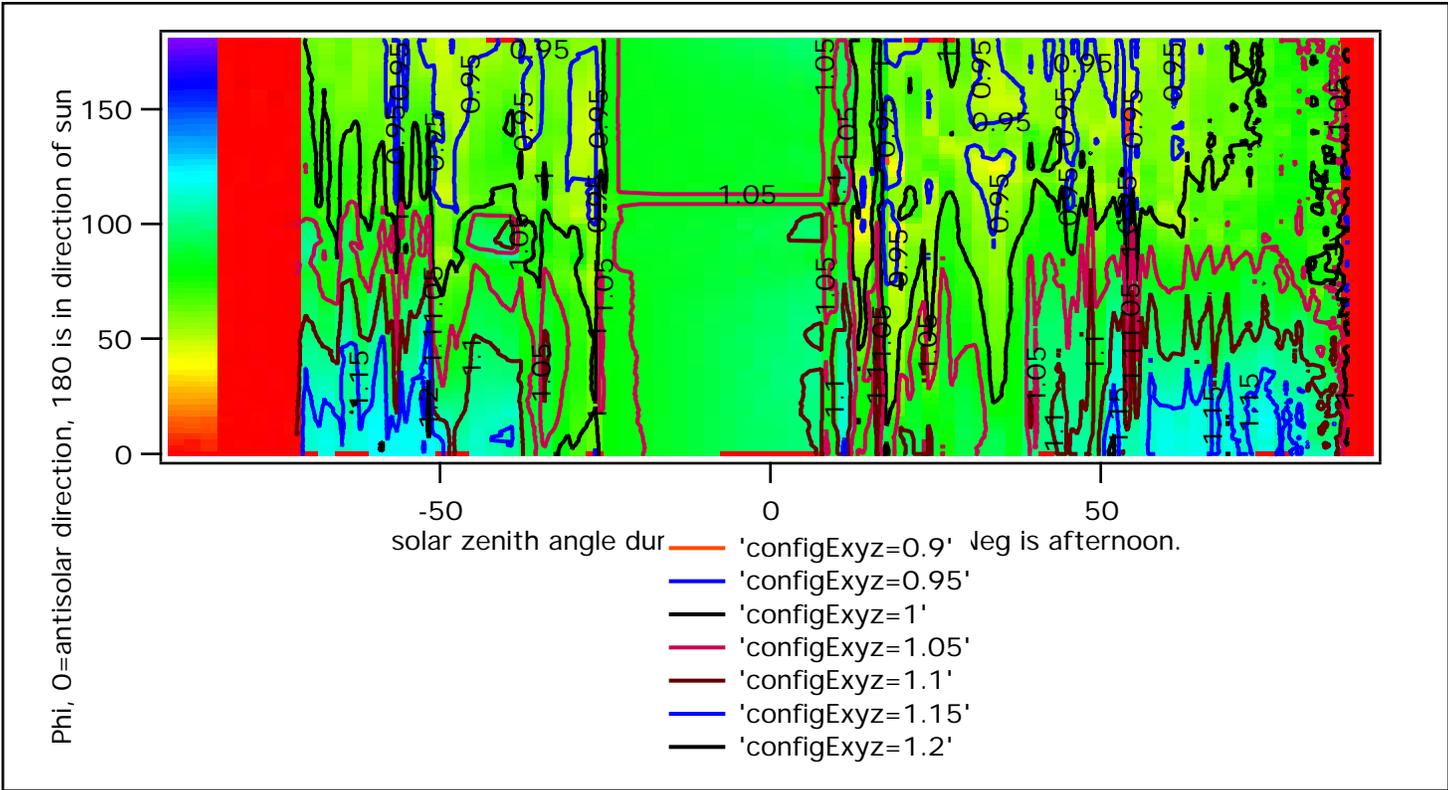


Range of solar zenith angles and azimuth angles for 2116 measurement.

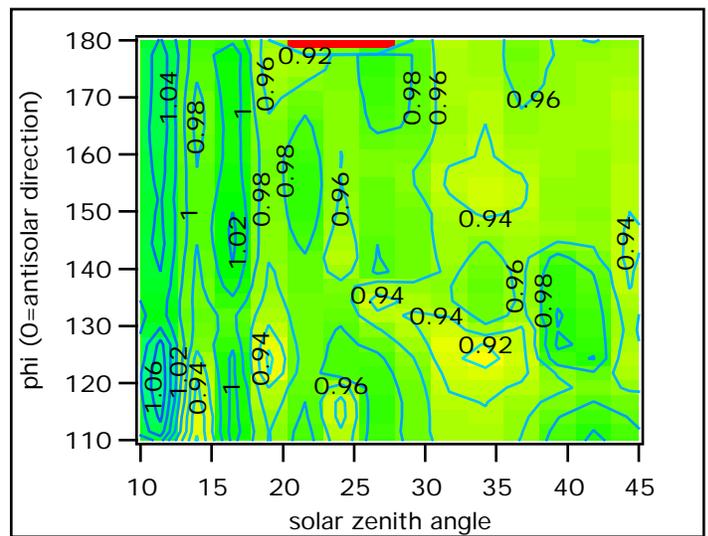


Range of solar zenith angles and azimuth angles for 2133 measurement

Configuration E, view angle approximately 36 degrees, Color bar on left ranges from 0.8 to 1.3, where this is ratio of view radiance/nadir radiance.



Range of solar zenith angles and azimuth angles for 2102 measurement.



Range of solar zenith angles and azimuth angles for 2145 measurement