CRCS Calibration for FY-3A/VIRR &MERSI and other Sensors in Dunhuang , 2008

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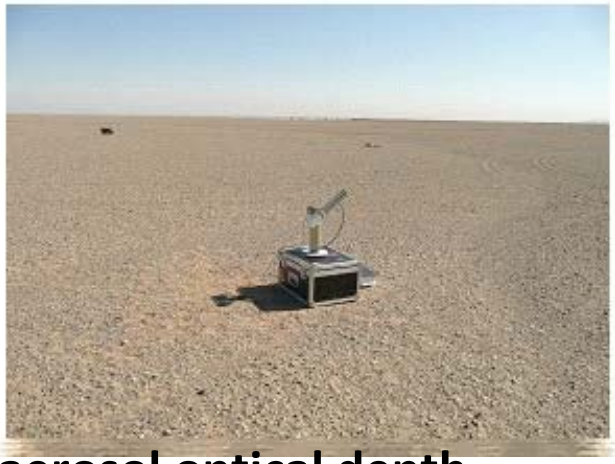
INSTRUMENTS WORKING PHOTO

1 diffuse irradiance

2 ground reflectance

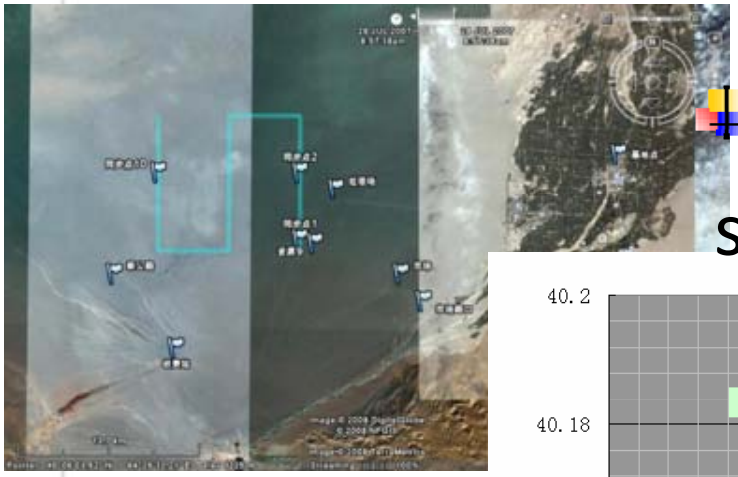
3 diffuse irradiance

4 BRDF

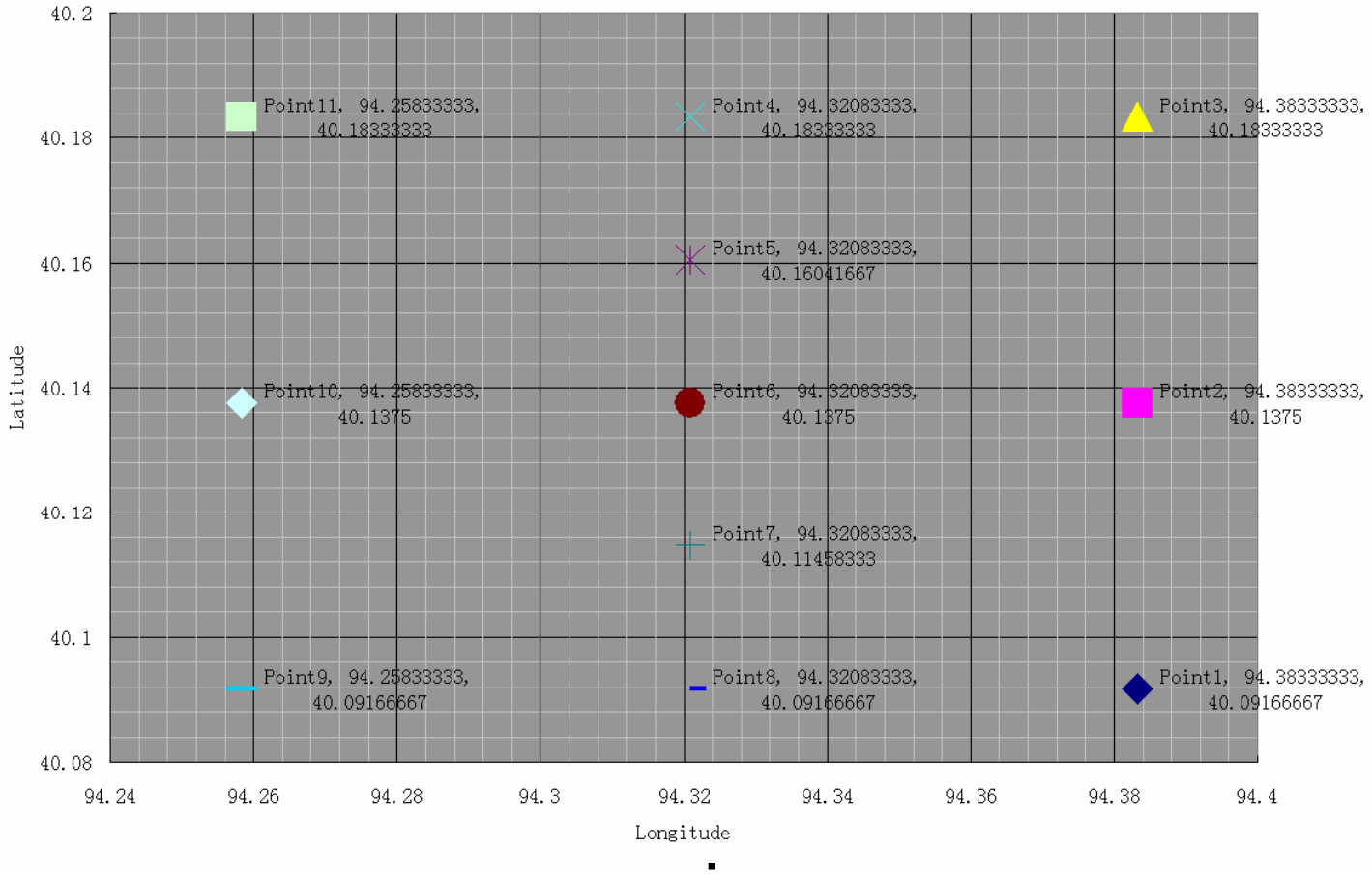


5 aerosol optical depth

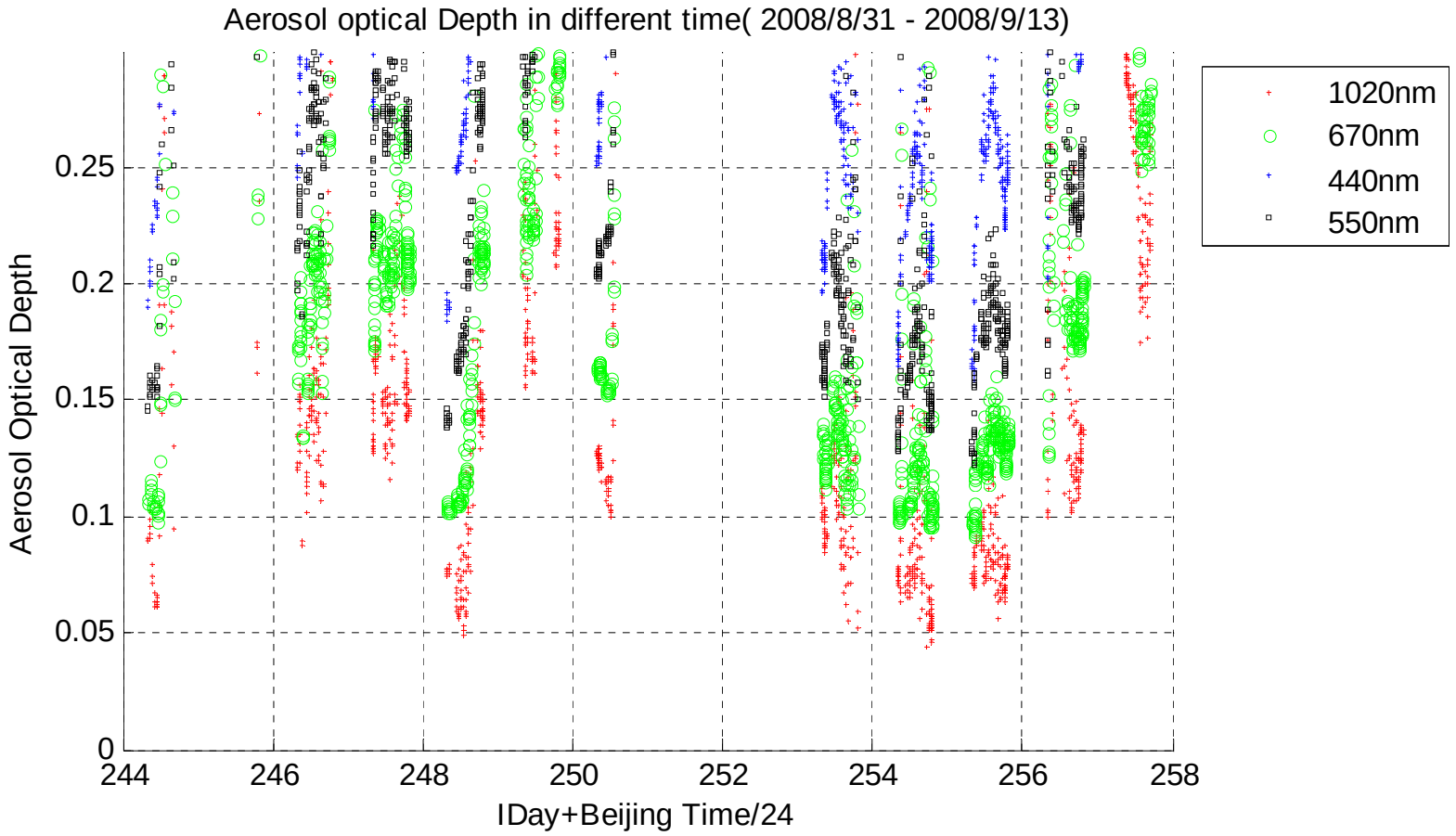
POSITION OF SYNCHRONIZATION POINT



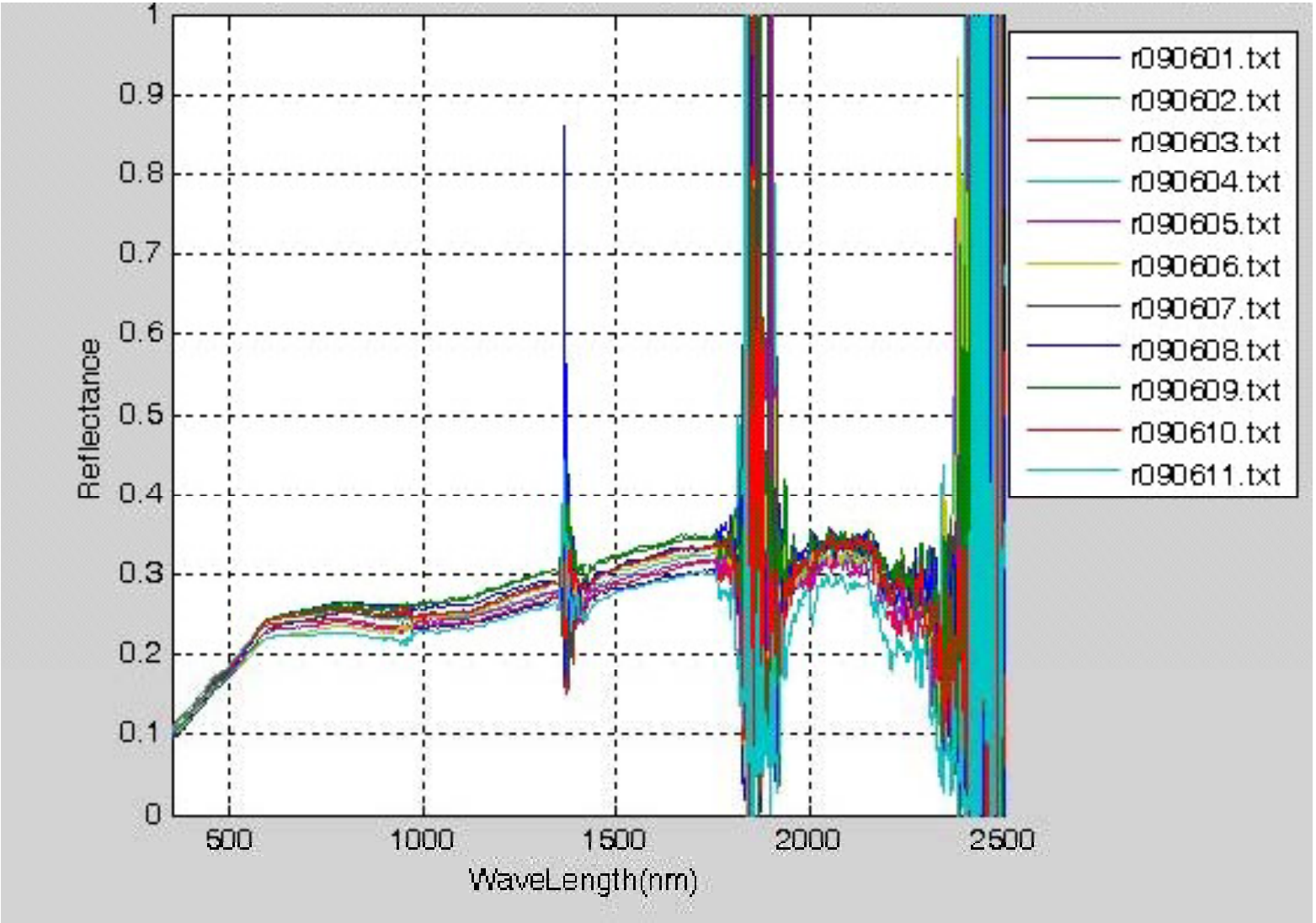
- 11 points were selected as the synchronization point in Dunhuang.



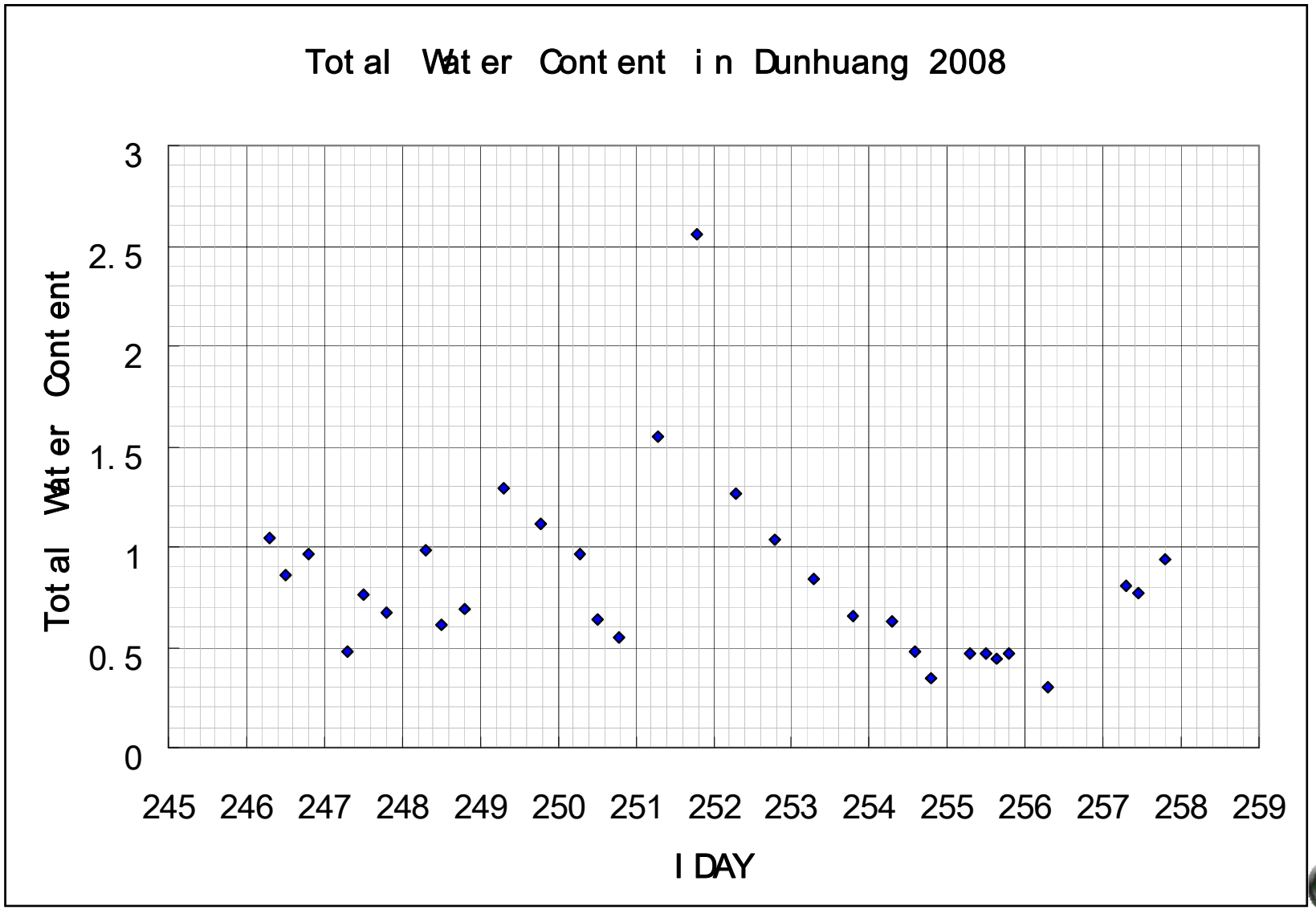
AOD MEASURED DURING EXPERIMENT



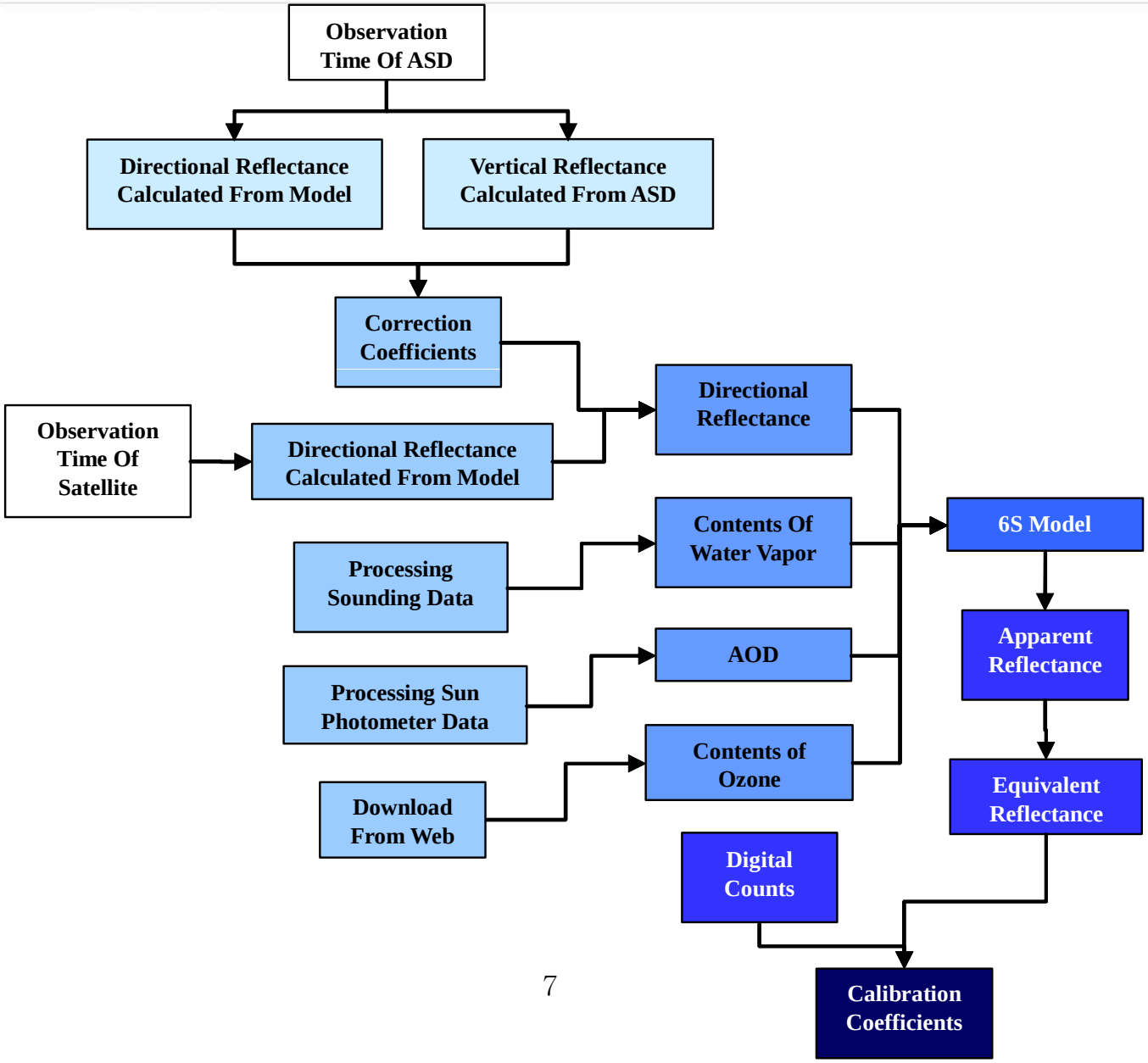
REFLECTANCE MEASURED IN ONE CIRCLE



TWC MEASURED DURING EXPERIMENT



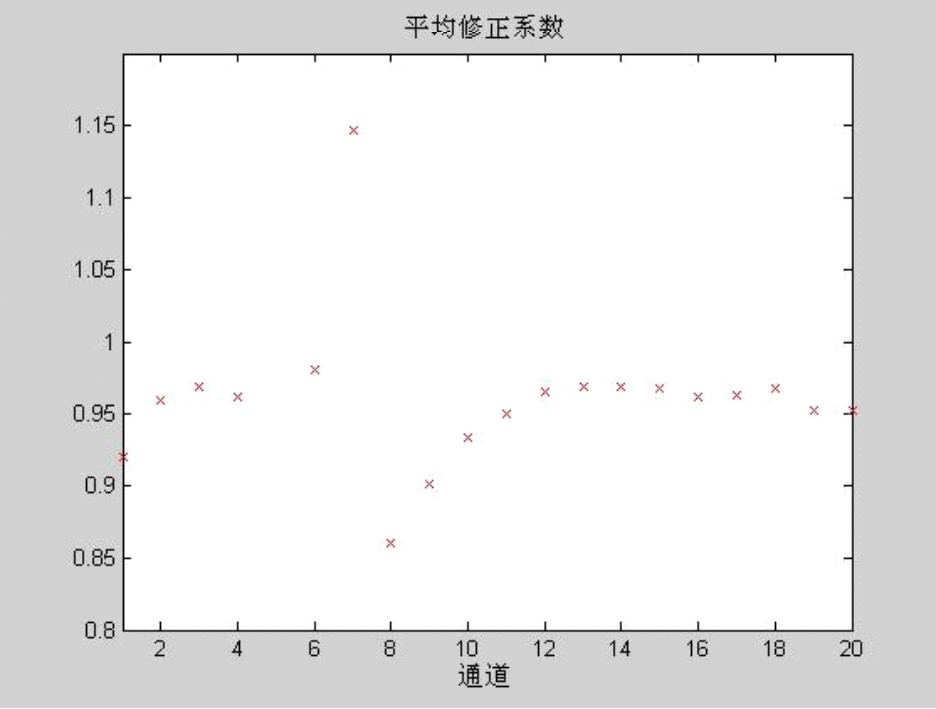
CALIBRATION FLOW



CALCULATING THE CORRECTION COEFFICIENTS

$$A_i(\theta_s) = \frac{\rho_{MEASURE}(\theta_s,0,0)}{\rho_{AMBRALS}(\theta_s,0,0)} \quad i = 1,2\Lambda\ 11$$

$$\rho_{DIRECTIONAL}(\theta_s,\theta_v,\phi_s-\phi_v) = \frac{1}{n}\sum_{i=1}^{n} A_i(\theta_s)\rho_{AMBRALS}(\theta_s,\theta_v,\phi_s-\phi_v) \quad n=11$$

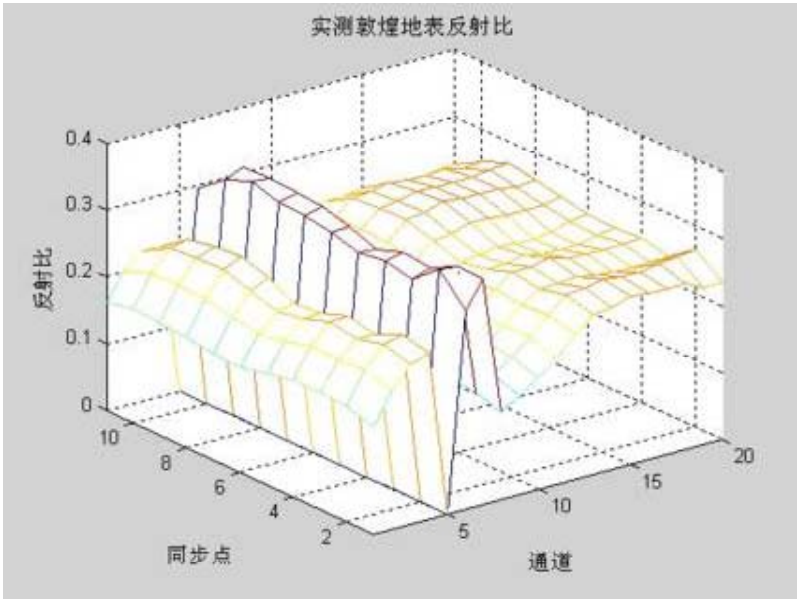


- The correction coefficients of MERSI in 20080906 changing rang reached ±15%.

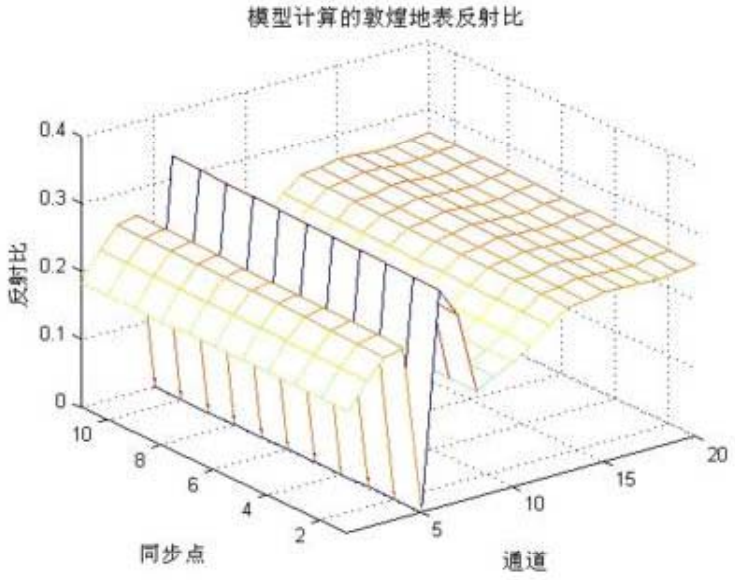
ABOUT THE AMBRALS BRDF MODEL

- Directional reflectance could be gotten from AMBRALS BRDF model of Dunhuang calculated by Liu Jingjing .

$$\rho_{AMBRALS}(\theta_s, \theta_o, \varphi_s - \varphi_v) = f_{iso} + f_{vol} RossThick + f_{geo} LiSparse$$



Vertical reflectance measured by ASD radiance meter

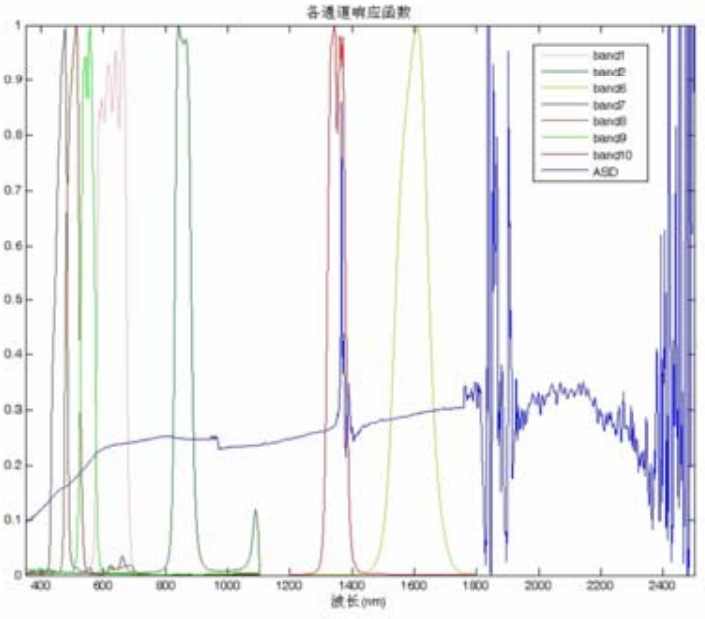


Vertical reflectance calculated by AMBRALS BRDF model

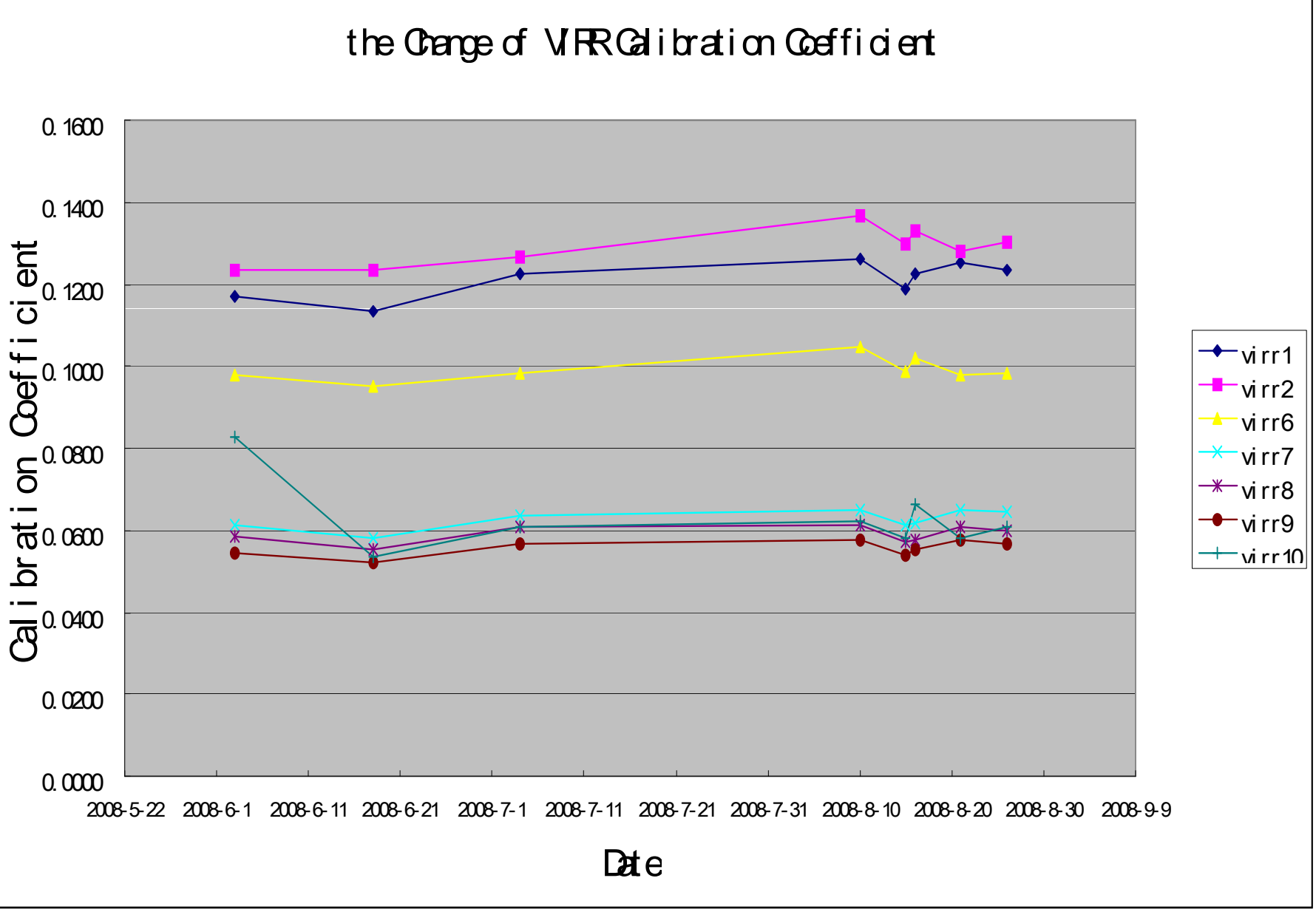
FY3A/VIRR CRCS Cal

	virr1	virr2	virr6	virr7	virr8	virr9	virr10
20080906	0.1238	0.1279	0.0966	0.0615	0.0583	0.0560	0.0635
20080910	0.1224	0.1266	0.0984	0.0621	0.0577	0.0554	0.0632
20080911	0.1257	0.1323	0.1033	0.0620	0.0584	0.0567	0.0701
ave.	0.1239	0.1289	0.0995	0.0619	0.0581	0.0560	0.0656
std.	1.36%	2.31%	3.50%	0.47%	0.70%	1.09%	5.92%

- Band10 error is bigger because it is affected by Water vapor absorption



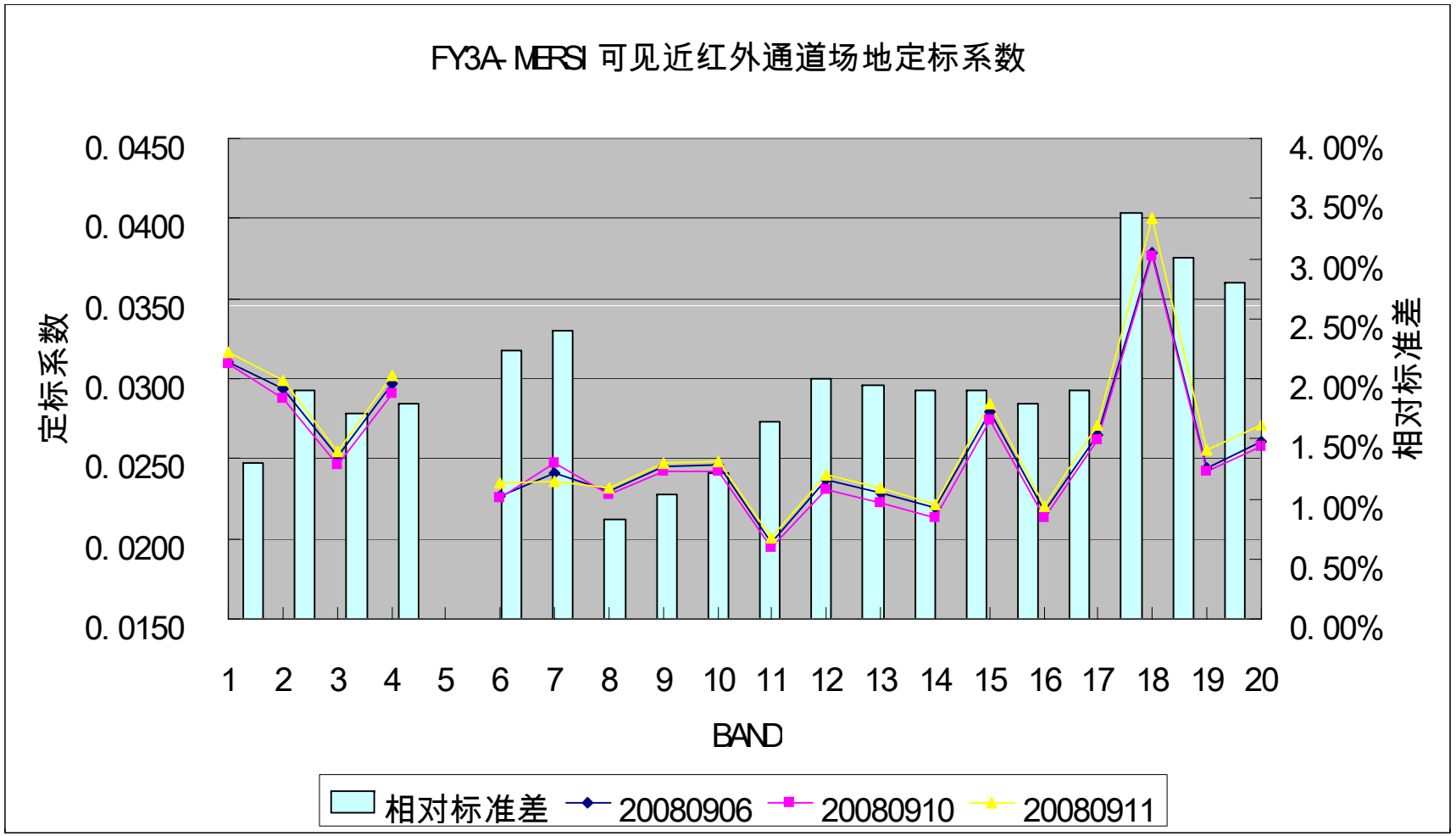
VIRR calibration trend us Dunhuang



FY3A/MERSI CRCS Cal

Cal Slope	20080906	20080910	20080911	Mean	Std error
MERSI1	0.0310	0.0309	0.0317	0.0312	1.29%
MERSI2	0.0294	0.0288	0.0299	0.0294	1.90%
MERSI3	0.0252	0.0246	0.0254	0.0251	1.71%
MERSI4	0.0297	0.0291	0.0302	0.0296	1.79%
MERSI6	0.0226	0.0225	0.0234	0.0229	2.24%
MERSI7	0.0242	0.0248	0.0236	0.0242	2.40%
MERSI8	0.0229	0.0228	0.0231	0.0230	0.83%
MERSI9	0.0245	0.0242	0.0247	0.0245	1.04%
MERSI10	0.0246	0.0243	0.0248	0.0246	1.22%
MERSI11	0.0197	0.0195	0.0201	0.0198	1.64%
MERSI12	0.0237	0.0231	0.0240	0.0236	2.00%
MERSI13	0.0229	0.0223	0.0231	0.0228	1.95%
MERSI14	0.0219	0.0214	0.0222	0.0218	1.91%
MERSI15	0.0280	0.0274	0.0284	0.0279	1.90%
MERSI16	0.0218	0.0213	0.0220	0.0217	1.79%
MERSI17	0.0264	0.0261	0.0271	0.0266	1.90%
MERSI18	0.0378	0.0376	0.0400	0.0385	3.38%
MERSI19	0.0244	0.0242	0.0256	0.0247	3.01%
MERSI20	0.0260	0.0257	0.0271	0.0263	2.80%

FY3A-MERSI场地定标



PARTIALNESS RESULTS: MODIS-TERRA

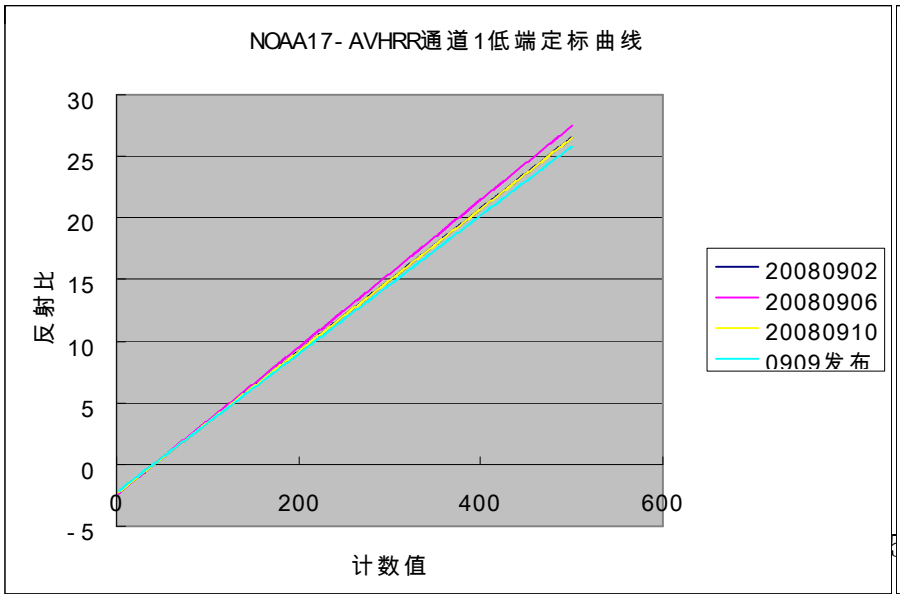
MODIS	SLOPE			RELATIVE ERROR WITH THE NOAA1B		
	904	906	911	904	906	911
BAND1	5.2170E-05	5.2494E-05	5.2687E-05	-0.06%	0.65%	1.28%
BAND2	3.1332E-05	3.1493E-05	3.1622E-05	-1.84%	-1.23%	-0.55%
BAND3	4.1784E-05	4.1991E-05	4.1453E-05	0.81%	1.36%	0.21%
BAND4	3.5386E-05	3.5557E-05	3.5542E-05	-1.10%	-0.53%	-0.36%
BAND5	3.5058E-05	3.4982E-05	3.8998E-05	-8.07%	-8.18%	2.94%
BAND6	3.3719E-05	3.3375E-05	3.4671E-05	-2.29%	-3.21%	0.85%
BAND7	2.9053E-05	2.8603E-05	2.8015E-05	3.59%	2.13%	0.30%

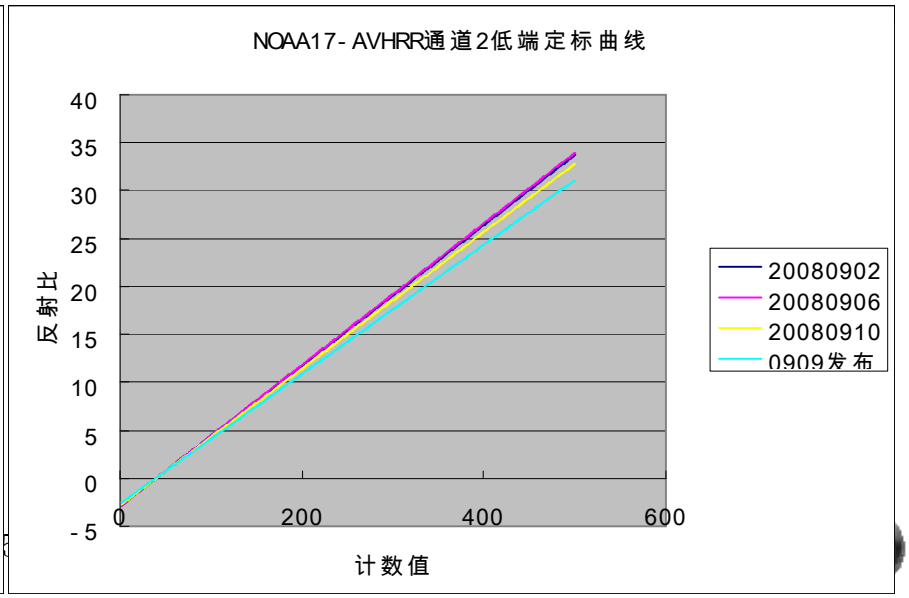
- Notice： there are bad pixel in band 5 of Terra/MODIS, DNs varied by 18%， as the result that the calibration precision was affected.

PARTIALNESS RESULTS: NOAA17-AVHRR

SLOPE	20080902	20080906	20080910	mean	std	0909 RELEASE	RELATIVE ERROR
band1	0.0578	0.0598	0.0577	0.0584	2.0125%	0.0561	4.0183%
band2	0.0733	0.0738	0.0713	0.0728	1.8450%	0.0675	7.5627%

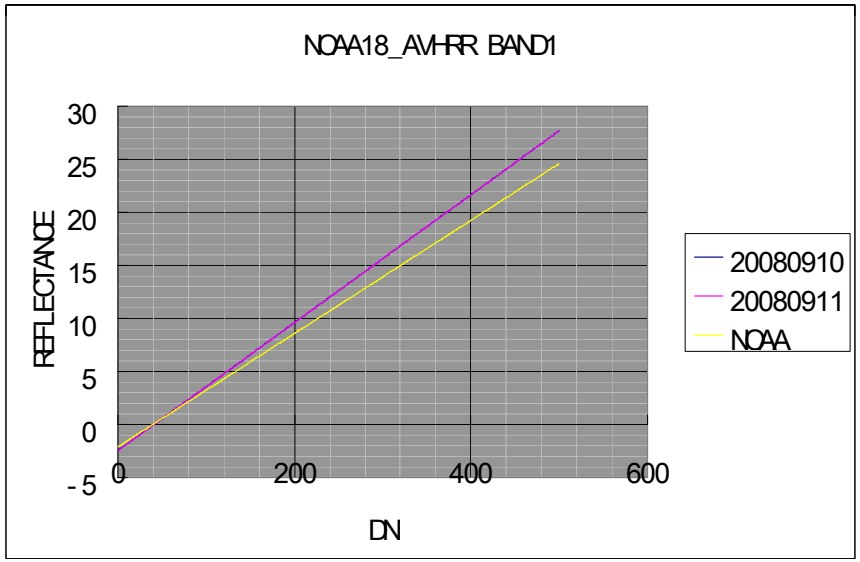
INTERCEPT	20080902	20080906	20080910	mean	std	0909 RELEASE	RELATIVE ERROR
band1	-2.3712	-2.4512	-2.3647	-2.4080	2.5418%	-2.2460	6.9603%
band2	-2.9316	-2.9520	-2.8505	-2.9012	2.4742%	-2.6490	9.0882%

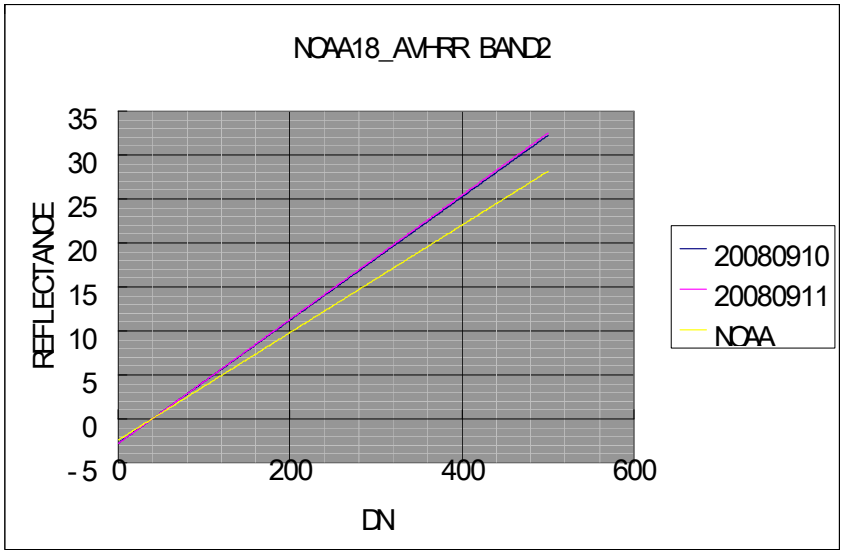




PARTIALNESS RESULTS: NOAA18-AVHRR

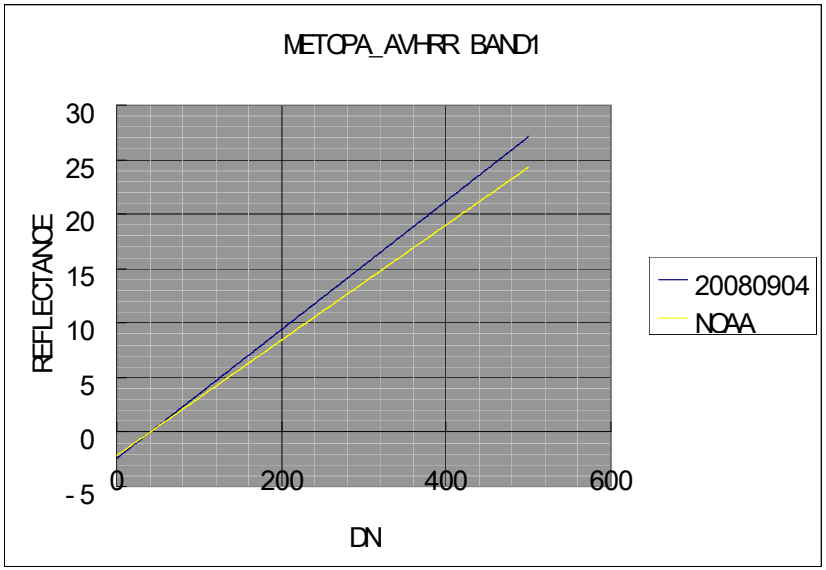
SLOPE				*INTERCEPT*			
date	2008-9-10	2008-9-11	NOAA	date	2008-9-10	2008-9-11	NOAA
band01	0.0603	0.0603	0.0534	band01	-2.4567	-2.4618	-2.105
band02	0.07	0.0706	0.0611	band02	-2.772	-2.8047	-2.407

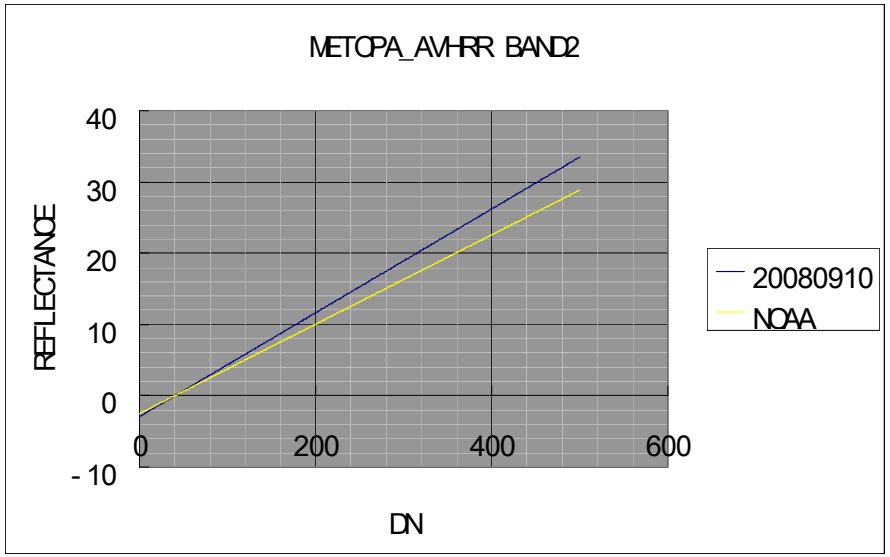




PARTIALNESS RESULTS: METOPA_AVHRR

SLOPE			*INTERCEPT*		
date	2008-9-4	NOAA	date	2008-9-4	NOAA
band01	0.059	0.0529	band01	-2.3926	-2.141
band02	0.0728	0.0627	band02	-2.91	-2.492





Summary

- CRCS Cal results are validated by SNO and Sites cross calibration. They are also validated using MODIS apparent reflectance.
- CRCS cal results are used to update the cal Coefficient of FY-3A/ VIRR and MERSI in DPPS.
- CRCS Cals for MODIS and AVHRR are also nice and validate L1B results of them.

The End

Thanks !