Long Term Land Data Record from AVHRR/MODIS/VIIRS

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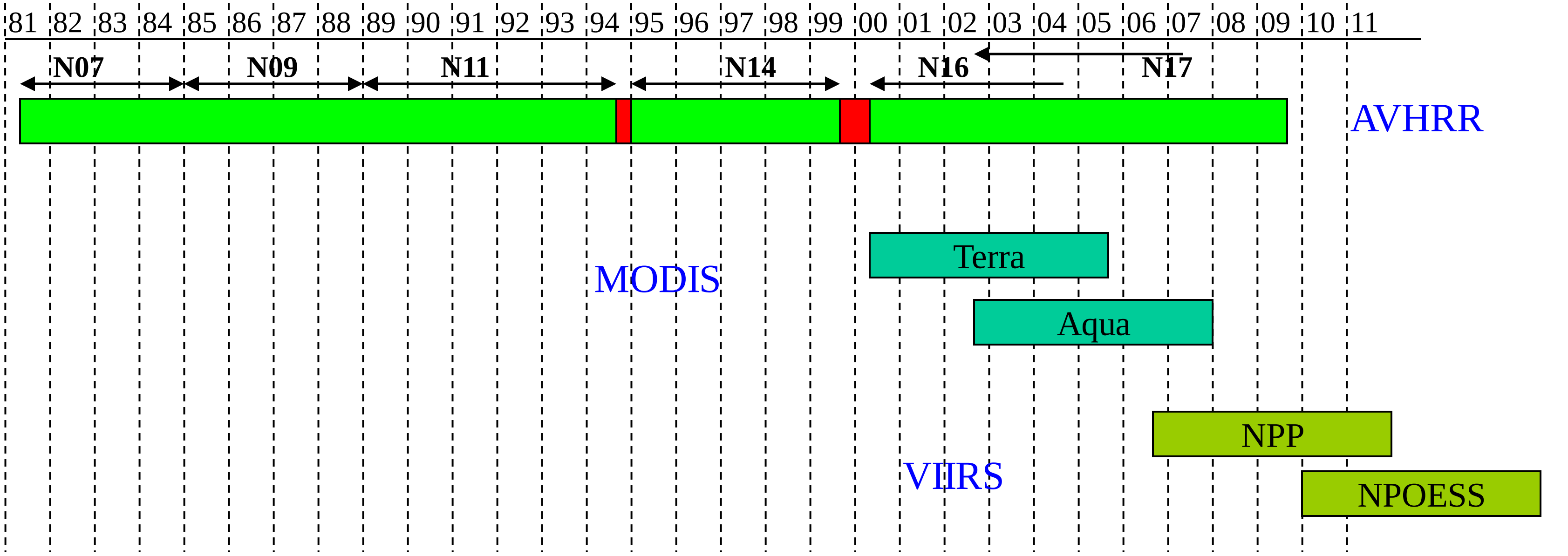
and
NASA/GSFC Code 922

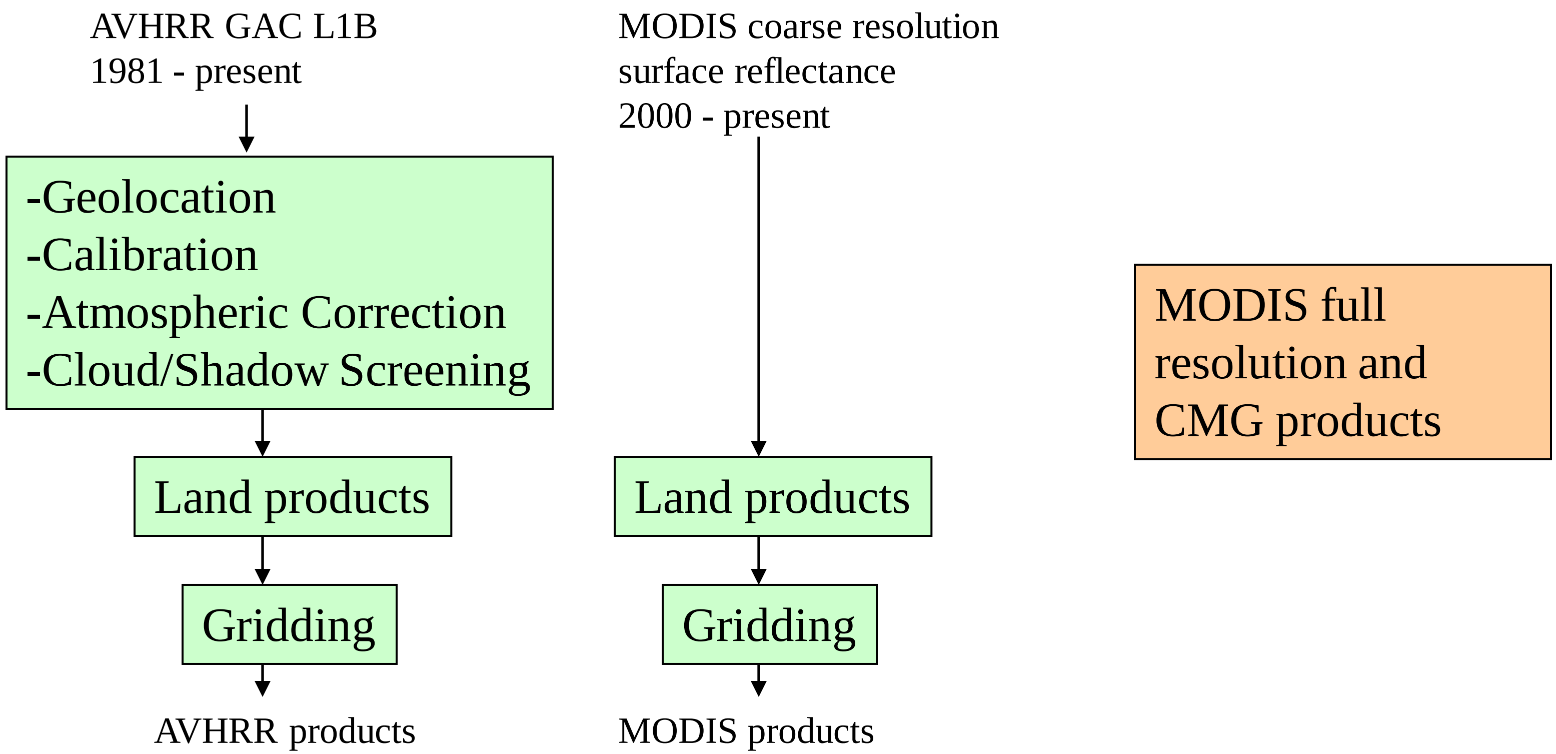
Long Term Land Data Record Project

- Started in December of last year.
- Objective is to develop a coarse spatial resolution data set from AVHRR, MODIS and VIIRS for Land studies.
- Provides the link between AVHRR, MODIS and VIIRS.
- Team members:
  - NASA GSFC: Ed Masuoka, Nazmi Saleous, Jeff Privette, Jim Tucker, Jorge Pinzon.
  - UMD: Eric Vermote, David Roy, Steve Prince.
  - Collaborator: Chris Justice (UMD).

Data Sources



Proposed System



List of potential products:
Surface Reflectance, VI,
Surface Temperature and emissivity,
Snow, LAI/FPAR, BRDF/Albedo,
Aerosols, Burned area

Format:
HDF
Geographic projection 1/20 deg resolution
Daily, multi-day, monthly

AVHRR data set

- AVHRR offers the longest record.
- Lacks onboard calibration.
- Limited set of spectral bands reduces the accuracy of atmospheric parameters retrieval and correction (water vapor and aerosols).
- Broad spectral bands lead to contamination by the atmosphere.
- Orbital drift leads to substantial variation in the solar geometry throughout the mission.

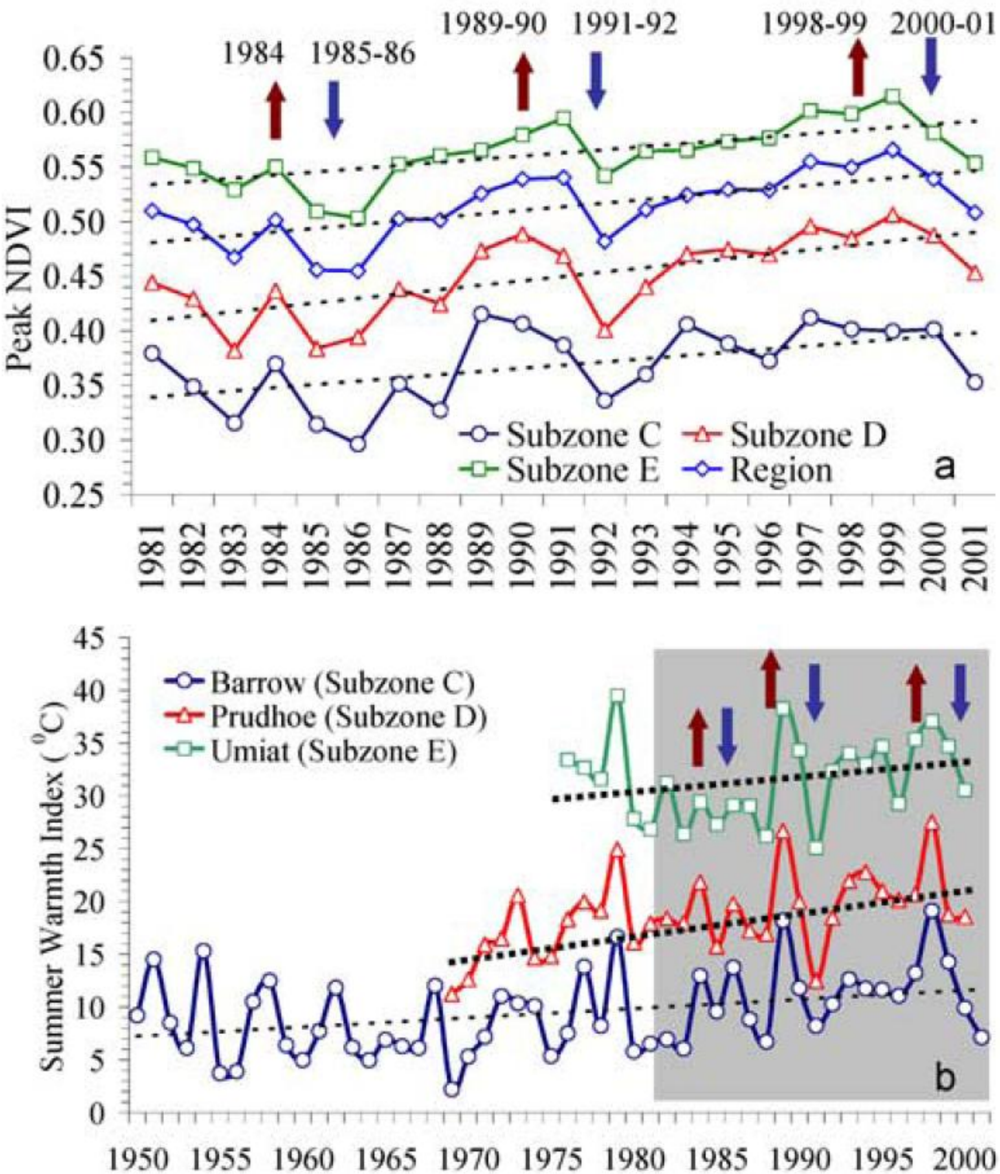
Significant Earth Science findings based on AVHRR

- Major science claims based on data
  - Phenology –lengthening snow-free season in arctic
  - Increased NPP in N America
  - Changing Fire frequencies
  - Land cover changes
- Widely-used information based on data
  - NDVI
  - NPP, agricultural yield
  - Phenology
  - Land cover NPP – carbon sequestration
  - Burned area

Are the AVHRR observations adequate to justify these Earth Science conclusions?

- What accuracy and precision in the AVHRR data is assumed by users when reporting "significance" of results?
- Any independent verification?

1. What are the data implications of the science conclusions?

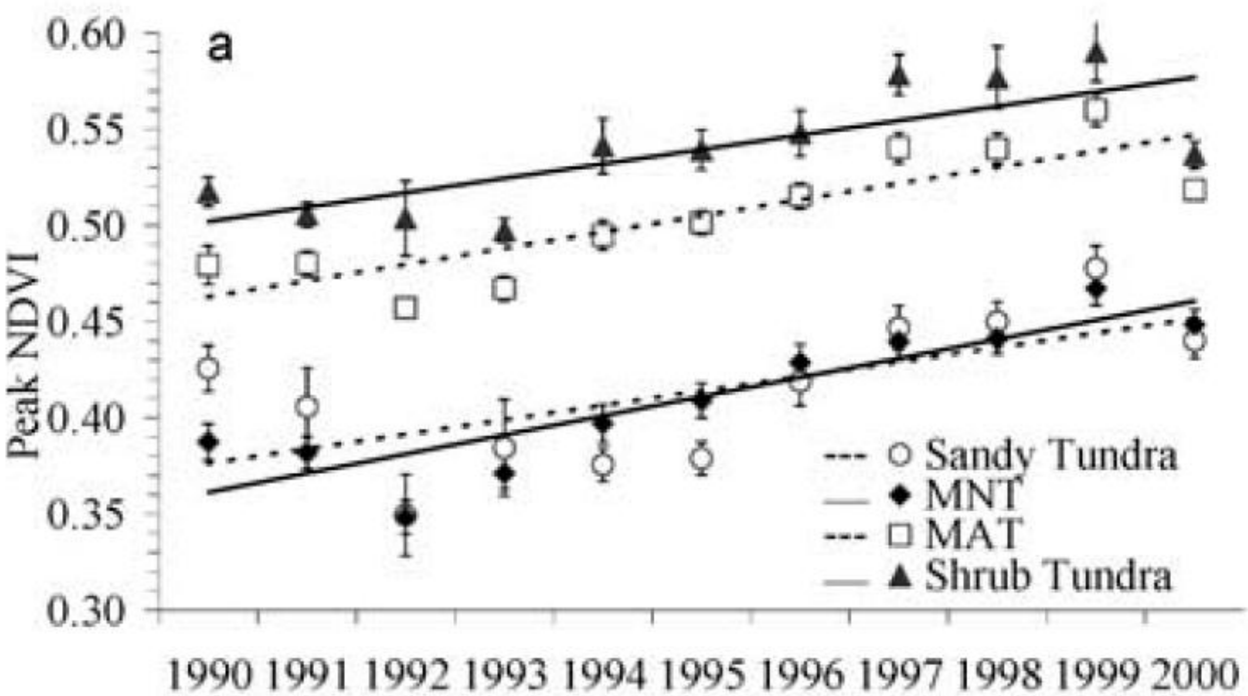


Time series of peak NDVI derived from 8-km resolution AVHRR data from 1981 to 2001 (a) and SWI over the past 22–50 years (b) among bioclimate subzones. Dashed lines are linear regressions. The shaded area highlights the period of SWI covered by NDVI data

Significant ΔNDVI over 21 years =0.056 0.0032 to 0.082 0.028

From: Jia, G.J., Epstein, H.E. and Walker, D.A., 2003. Greening of arctic Alaska, 1981–2001. GEOPHYSICAL RESEARCH LETTERS, VOL. 30, NO. 20, 2067, doi:10.1029/2003GL018268.

1. What are the data implications of the science conclusions?



Significant ΔNDVI =0.061/11yrs

Time series of peak NDVI based on 1-km resolution AVHRR data among tundra vegetation types. Error bars represent plus/minus standard error.

From: Jia, G.J., Epstein, H.E. and Walker, D.A., 2003. Greening of arctic Alaska, 1981–2001. GEOPHYSICAL RESEARCH LETTERS, VOL. 30, NO. 20, 2067, doi:10.1029/2003GL018268.

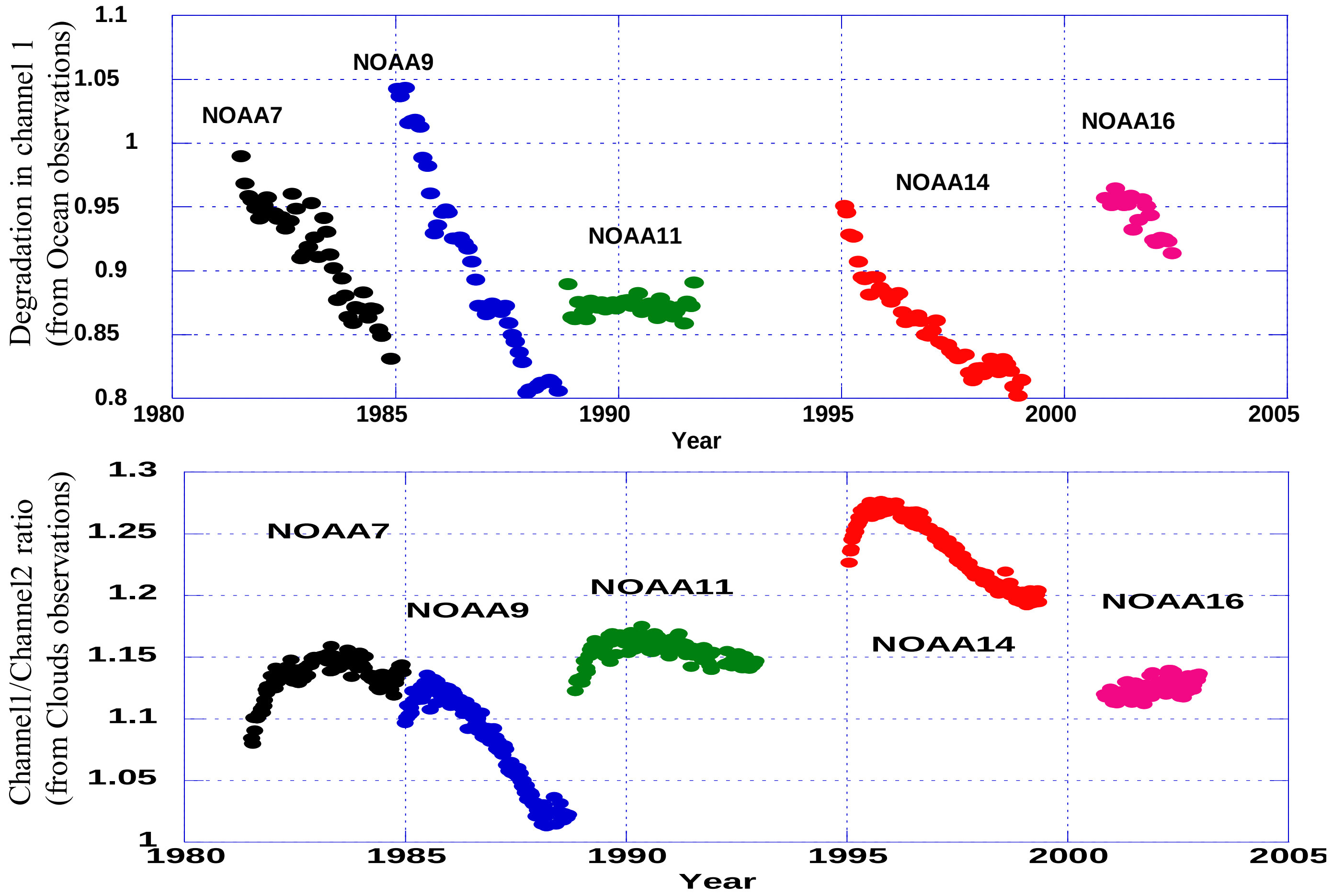
Generating Improved AVHRR products

Goal to make the AVHRR data set temporally consistent and consistent with MODIS by using:

- Reliable and consistent calibration across the different NOAA platforms.
- Apply MODIS algorithms to AVHRR where possible, e.g.: the MODIS aerosol retrieval and atmospheric correction approach.
- BRDF correction to address differences in the solar and viewing geometry.
- Coincident AVHRR/MODIS to evaluate and improve AVHRR products and quantify accuracy.

Consistent AVHRR calibration across platforms

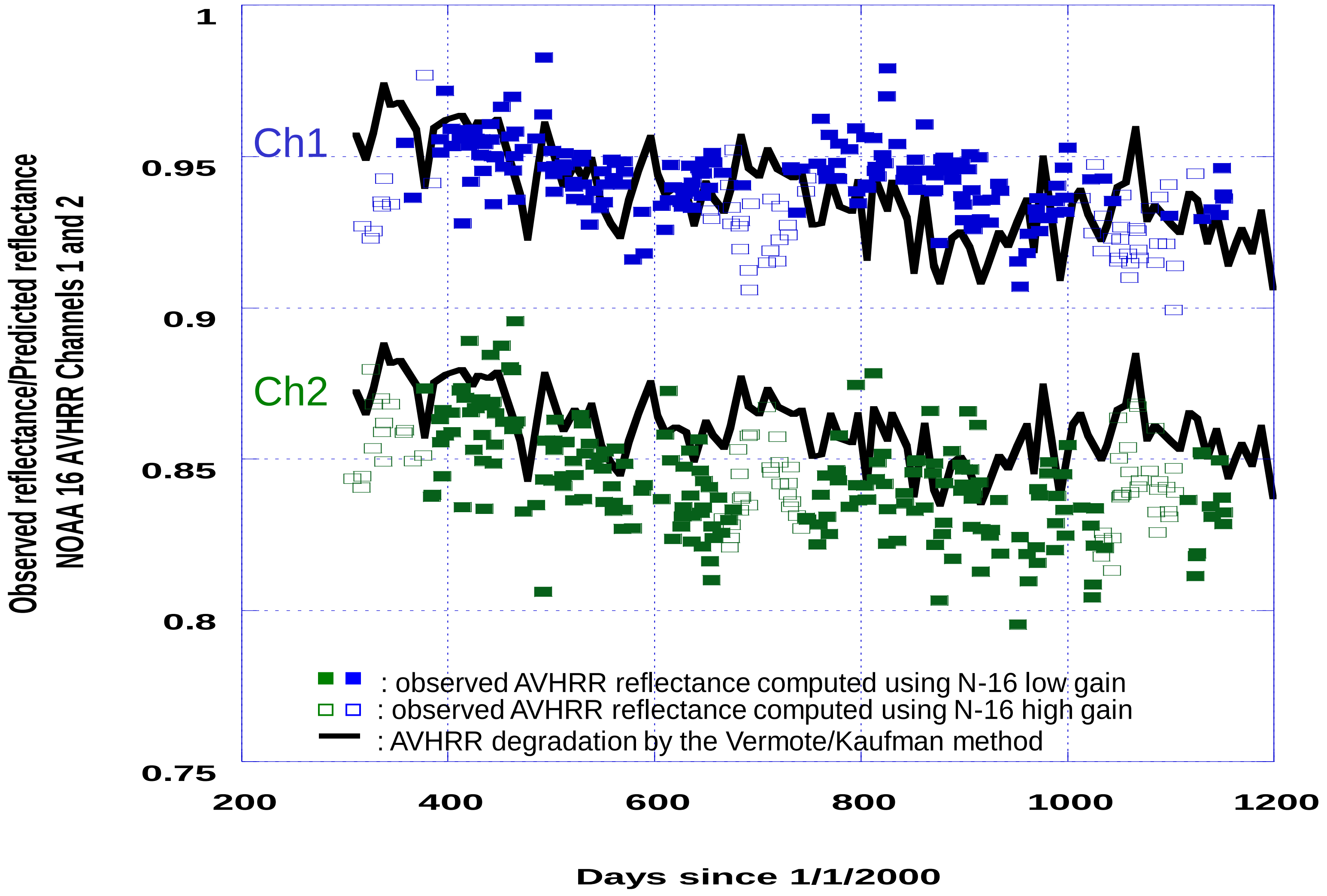
- Use the Vermote/Kaufman calibration approach (1995)



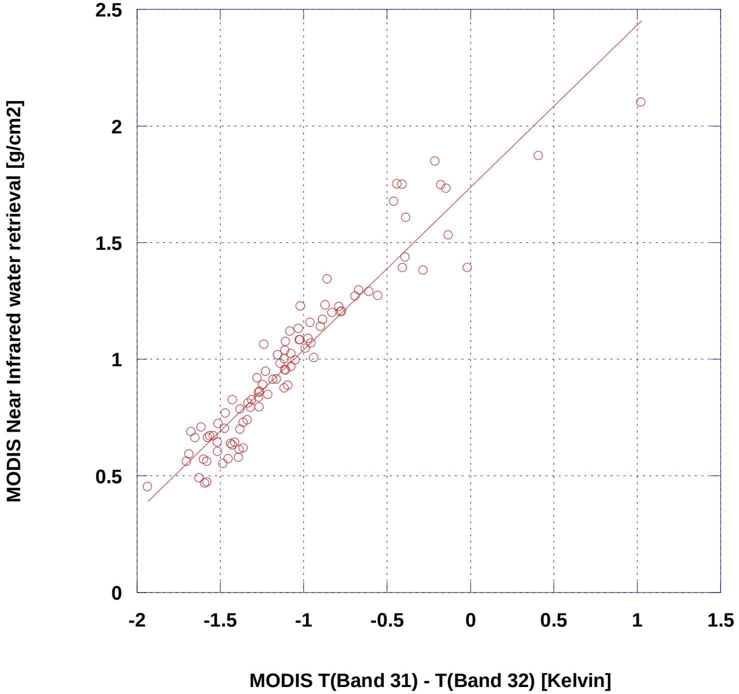
Use MODIS to validate N16 calibration / Approach

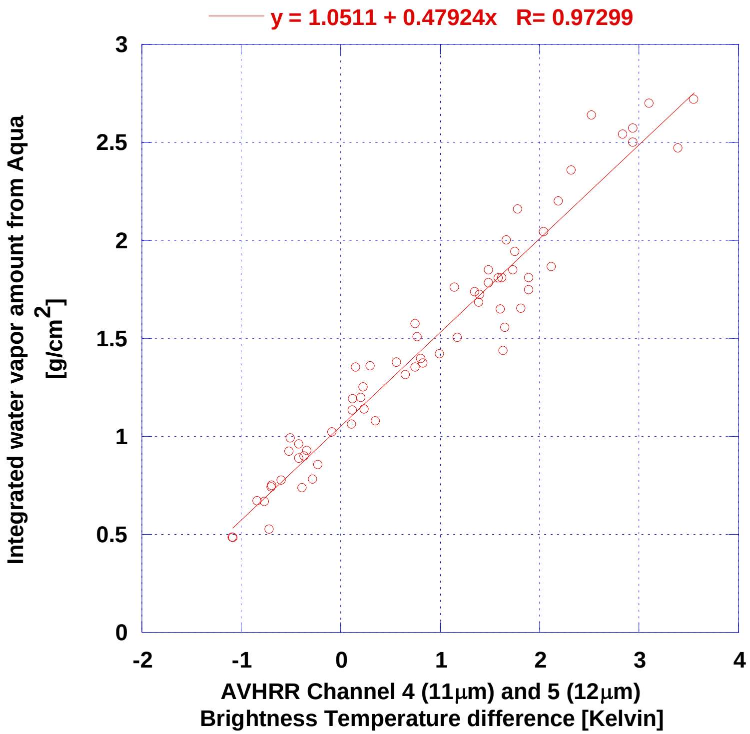
- Select a stable calibration site.
- Characterize the reflectance spectral variation using MODIS narrow bands.
- Use 2 years of data to characterize the site BRDF using the simple linear kernel model used in the MODIS BRDF product.
  - Rigorous cloud screening is applied to the data.
  - Exclude observations within 15deg of backscattering conditions to avoid the hot spot.
  - Exclude off-nadir observations (viewing zenith angle > 50 deg) where the pixel size variation makes it difficult to select coincident observations.

Evaluating AVHRR calibration using MODIS



Use of MODIS to improve AVHRR atmospheric corrections





Use coincident MODIS/AVHRR data to develop an approach for water vapor retrieval from AVHRR.

MODIS atmospheric correction, theoretical uncertainties estimates

- Calibration: 2% absolute, 1% band to band
- Pressure: +/- 10mb
- Water vapor 0.2g/cm^2 (Differential absorption technique)
- Ozone 20 Dobsons (EP-TOMS)
- SWIR/ VIS relationship: +/- 0.005 reflectance unit
- Aerosol type: Smoke low/high absorption, Urban polluted

Top of the atmosphere simulations

<table>
<tr><th>Parameter</th><th>Values</th></tr>
<tr><td>Geometrical conditions</td><td>
<table>
<tr><th>Solar Zenith</th><th>View Zenith</th><th>Relative Azimuth</th><th>Case Name</th></tr>
<tr><td>30</td><td>0</td><td>0</td><td>A</td></tr>
<tr><td>30</td><td>30</td><td>0</td><td>B</td></tr>
<tr><td>30</td><td>30</td><td>180</td><td>C</td></tr>
<tr><td>30</td><td>60</td><td>0</td><td>D</td></tr>
<tr><td>30</td><td>60</td><td>180</td><td>E</td></tr>
<tr><td>60</td><td>0</td><td>0</td><td>F</td></tr>
<tr><td>60</td><td>30</td><td>0</td><td>G</td></tr>
<tr><td>60</td><td>30</td><td>180</td><td>H</td></tr>
<tr><td>60</td><td>60</td><td>0</td><td>I</td></tr>
<tr><td>60</td><td>60</td><td>180</td><td>J</td></tr>
</table>
</td></tr>
<tr><td>Aerosol optical depth</td><td>0.05 (clear) 0.30 (average) 0.50 (high)</td></tr>
<tr><td>Aerosol model</td><td>urban clean,urban polluted, smoke low absorption
smoke high absorption</td></tr>
<tr><td>Water vapor content [g/cm2]</td><td>1.0, 3.0 and 5.0 uncertainties +/-0.2</td></tr>
<tr><td>Ozone content [cm.atm]</td><td>0.25 , 0.3, 0.35 uncertainties +/- 0.02</td></tr>
<tr><td>Pressure [mb]</td><td>1013mb, 930mb, 845mb uncertainties +/-10mb</td></tr>
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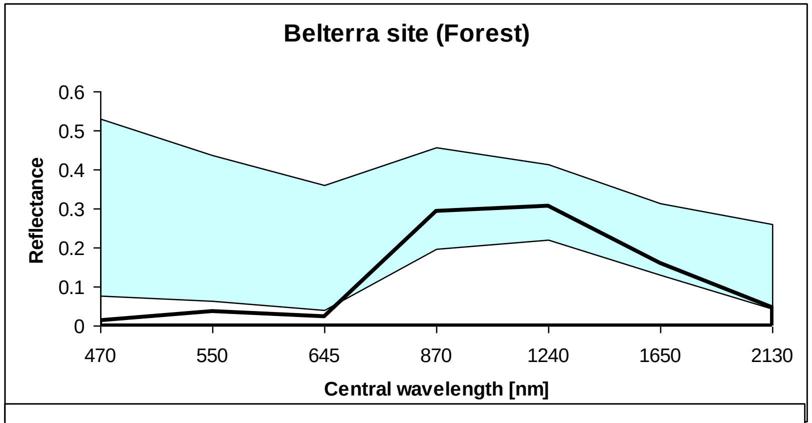
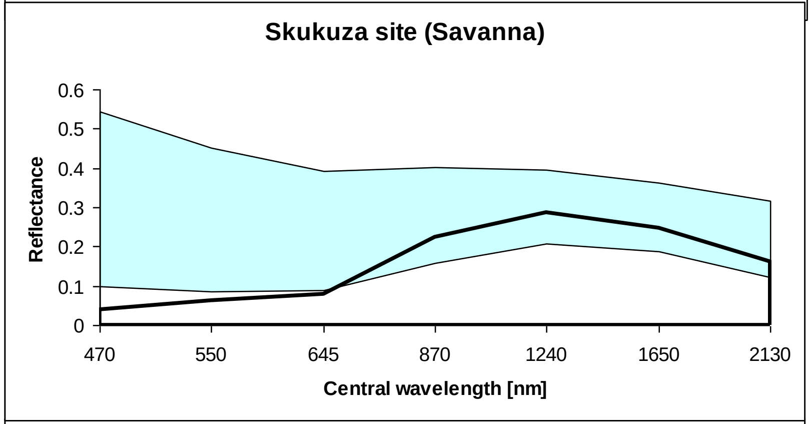
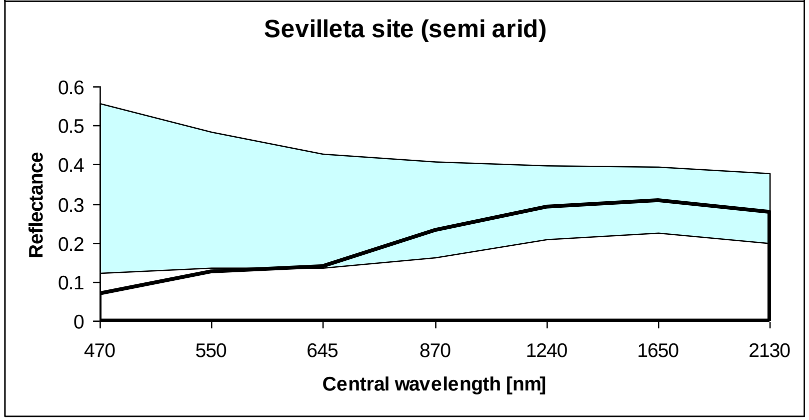






MODIS surface reflectance error budget: Calibration uncertainties

minimum error

Belterra

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	120	0001c	0000c	0001e
550	375	0005c	0003j	0001j
645	240	0002c	0003c	0005c
870	2931	0029a	0030a	0030c
1240	3083	0029f	0030c	0030c
1650	1591	0015c	0016c	0016c
2130	480	0007c	0005c	0006c
NDVIx1000		ΔNDVI x1000		
849		0001c	0002c	0003c

Skukuza

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	400	0003a	0003c	0003g
550	636	0004a	0002e	0001e
645	800	0006a	0007a	0006a
870	2226	0019a	0019a	0019a
1240	2880	0028a	0027b	0028a
1650	2483	0023a	0023b	0023a
2130	1600	0013a	0014a	0013a
NDVIx1000		ΔNDVI x1000		
471		0000a	0000a	0000a

Sevilleta

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	700	0005b	0006e	0006g
550	1246	0011j	0006j	0005g
645	1400	0016e	0011b	0003g
870	2324	0015b	0011b	0010b
1240	2929	0025b	0023b	0021b
1650	3085	0027b	0026b	0026b
2130	2800	0024b	0024b	0023b
NDVIx1000		ΔNDVI x1000		
248		0002b	0001a	0000a

maximum error

Belterra

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	120	0008j	0017i	0023d
550	375	0009i	0020i	0034i
645	240	0011i	0036i	0065i
870	2931	0038i	0057i	0081i
1240	3083	0040i	0052i	0072i
1650	1591	0036i	0045i	0070i
2130	480	0038i	0040i	0065i
NDVIx1000		ΔNDVI x1000		
849		0006i	0019i	0034i

Skukuza

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	400	0009j	0017i	0016d
550	636	0005b	0013i	0022d
645	800	0013i	0028i	0050i
870	2226	0026i	0042i	0068i
1240	2880	0038i	0043i	0059i
1650	2483	0038i	0038i	0051i
2130	1600	0037i	0031i	0043i
NDVIx1000		ΔNDVI x1000		
471		0003j	0007i	0013i

Sevilleta

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	700	0010f	0018i	0017c
550	1246	0020c	0018i	0023d
645	1400	0024c	0022i	0029i
870	2324	0026f	0022f	0035i
1240	2929	0040f	0036f	0044j
1650	3085	0044f	0039f	0048j
2130	2800	0040f	0038j	0049j
NDVIx1000		ΔNDVI x1000		
248		0003a	0003i	0003e

average error

Belterra

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	120	3	4	8
550	375	6	8	11
645	240	5	10	18
870	2931	30	34	40
1240	3083	32	34	39
1650	1591	21	22	28
2130	480	15	13	20
NDVIx1000		ΔNDVI x1000		
849		2	5	9

Skukuza

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	400	4	6	9
550	636	4	5	7
645	800	8	11	15
870	2226	21	23	28
1240	2880	30	30	34
1650	2483	27	26	29
2130	1600	19	18	21
NDVIx1000		ΔNDVI x1000		
471		1	1	2

Sevilleta

λ [nm]	ρ x10000	Clear	Average	Hazy
		Δρx10000		
470	700	7	9	9
550	1246	15	12	11
645	1400	18	14	13
870	2324	19	16	17
1240	2929	30	28	29
1650	3085	33	32	32
2130	2800	29	29	29
NDVIx1000		ΔNDVI x1000		
248		2	1	1

MODIS surface reflectance error budget: Pressure,Ozone,Water Vapor

pressure average error

		Belterra					Skukuza					Sevilleta		
		Clear	Average	Hazy			Clear	Average	Hazy			Clear	Average	Hazy
λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000	
470	120	0	0	0	470	400	0	0	0	470	700	1	0	0
550	375	2	1	1	550	636	0	0	0	550	1246	1	1	1
645	240	3	3	3	645	800	1	1	1	645	1400	1	1	0
870	2931	1	1	1	870	2226	2	1	1	870	2324	1	1	1
1240	3083	1	1	1	1240	2880	0	0	0	1240	2929	0	0	0
1650	1591	2	2	2	1650	2483	1	1	1	1650	3085	1	0	1
2130	480	2	2	2	2130	1600	1	1	1	2130	2800	2	1	1
NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000	
849		3	3	2	471		0	1	0	248		0	0	0

ozone average error

		Belterra					Skukuza					Sevilleta		
		Clear	Average	Hazy			Clear	Average	Hazy			Clear	Average	Hazy
λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000	
470	120	0	0	0	470	400	0	0	0	470	700	0	0	0
550	375	6	6	6	550	636	5	5	5	550	1246	6	6	7
645	240	3	3	3	645	800	4	4	3	645	1400	4	4	4
870	2931	3	3	3	870	2226	7	7	7	870	2324	11	11	11
1240	3083	2	2	2	1240	2880	3	3	3	1240	2929	5	5	5
1650	1591	3	3	3	1650	2483	3	3	3	1650	3085	4	4	4
2130	480	3	3	3	2130	1600	4	4	4	2130	2800	3	3	3
NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000	
849		2	2	2	471		1	1	1	248		1	1	1

water vapor average error

		Belterra					Skukuza					Sevilleta		
		Clear	Average	Hazy			Clear	Average	Hazy			Clear	Average	Hazy
λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000	
470	120	1	0	0	470	400	3	1	1	470	700	5	3	2
550	375	1	0	0	550	636	4	2	2	550	1246	8	5	3
645	240	2	1	1	645	800	7	4	3	645	1400	12	8	6
870	2931	5	4	3	870	2226	6	4	3	870	2324	10	6	4
1240	3083	2	2	1	1240	2880	3	2	1	1240	2929	4	2	2
1650	1591	0	0	0	1650	2483	1	0	0	1650	3085	2	1	0
2130	480	4	2	2	2130	1600	13	8	6	2130	2800	21	13	10
NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000	
849		2	1	1	471		2	2	1	248		2	2	1

MODIS surface reflectance error budget:
Empirical relationship SWIR-Visible

empirical relationship average error

		Belterra					**Skukuza**					**Sevilleta**		
		Clear	Average	Hazy			Clear	Average	Hazy			Clear	Average	Hazy
λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000	
470	120	52	51	51	470	400	52	51	51	470	700	51	51	51
550	375	49	52	56	550	636	52	58	62	550	1246	47	59	63
645	240	52	57	58	645	800	52	60	62	645	1400	52	65	68
870	2931	10	9	10	870	2226	21	25	27	870	2324	29	37	39
1240	3083	11	6	6	1240	2880	16	10	10	1240	2929	29	17	18
1650	1591	17	13	13	1650	2483	19	10	10	1650	3085	41	13	12
2130	480	37	17	16	2130	1600	31	13	14	2130	2800	42	11	10
NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000	
849		30	33	34	471		22	25	25	248		11	14	15

MODIS surface reflectance error budget: Aerosol model

Aerosol model error : Smoke Low Absorption vs Urban Clean

		Belterra					Skukuza					Sevilleta		
		Clear	Average	Hazy			Clear	Average	Hazy			Clear	Average	Hazy
λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000	
470	120	2	4	8	470	400	1	5	9	470	700	1	8	10
550	375	4	9	19	550	636	2	2	10	550	1246	4	13	26
645	240	5	7	21	645	800	5	6	17	645	1400	6	10	17
870	2931	12	75	123	870	2226	10	50	86	870	2324	10	41	67
1240	3083	10	52	91	1240	2880	10	46	82	1240	2929	9	42	73
1650	1591	10	28	53	1650	2483	9	31	57	1650	3085	10	36	60
2130	480	13	16	30	2130	1600	11	17	32	2130	2800	10	25	40
NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000	
849		2	3	15	471		1	5	11	248		0	5	8

Aerosol model error : Urban pollluted vs Urban Clean

		Belterra					Skukuza					Sevilleta		
		Clear	Average	Hazy			Clear	Average	Hazy			Clear	Average	Hazy
λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000	
470	120	1	6	8	470	400	1	8	13	470	700	1	15	22
550	375	3	17	29	550	636	2	8	13	550	1246	9	41	60
645	240	3	15	28	645	800	4	15	20	645	1400	10	41	56
870	2931	27	166	272	870	2226	20	105	172	870	2324	20	94	153
1240	3083	21	118	194	1240	2880	19	102	168	1240	2929	20	97	158
1650	1591	11	42	73	1650	2483	14	62	102	1650	3085	17	82	131
2130	480	7	17	35	2130	1600	8	25	44	2130	2800	13	52	85
NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000	
849		2	13	24	471		1	17	28	248		0	8	14

Aerosol model error : Smoke High Absorption vs Urban Clean

		Belterra					Skukuza					Sevilleta		
		Clear	Average	Hazy			Clear	Average	Hazy			Clear	Average	Hazy
λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000		λ [nm]	ρ x10000		Δρx10000	
470	120	2	8	12	470	400	2	13	18	470	700	2	20	31
550	375	5	22	37	550	636	3	11	17	550	1246	12	52	83
645	240	5	13	26	645	800	6	19	26	645	1400	13	48	77
870	2931	33	203	333	870	2226	24	136	220	870	2324	24	121	200
1240	3083	25	145	239	1240	2880	23	130	212	1240	2929	24	122	203
1650	1591	15	67	109	1650	2483	18	87	140	1650	3085	21	104	172
2130	480	11	24	35	2130	1600	12	40	63	2130	2800	16	72	118
NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000		NDVIx1000			ΔNDVI x1000	
849		2	10	20	471		1	16	29	248		0	8	15

MODIS surface reflectance error budget: Summary

SUMMARY

Belterra

λ [nm]	ρ x10000	Clear (Δρx10000)	Average (Δρx10000)	Hazy (Δρx10000)
470	120	52	51	52
550	375	49	55	64
645	240	52	59	65
870	2931	40	152	246
1240	3083	38	110	179
1650	1591	29	52	84
2130	480	41	28	42
NDVIx1000		ΔNDVI x1000		
849		30	34	40

Skukuza

λ [nm]	ρ x10000	Clear (Δρx10000)	Average (Δρx10000)	Hazy (Δρx10000)
470	400	52	52	53
550	636	52	58	64
645	800	53	62	67
870	2226	35	103	164
1240	2880	38	97	158
1650	2483	35	66	104
2130	1600	40	36	53
NDVIx1000		ΔNDVI x1000		
471		22	28	33

Sevilleta

λ [nm]	ρ x10000	Clear (Δρx10000)	Average (Δρx10000)	Hazy (Δρx10000)
470	700	51	53	55
550	1246	51	70	85
645	1400	57	74	85
870	2324	41	95	146
1240	2929	45	93	148
1650	3085	55	81	125
2130	2800	56	60	87
NDVIx1000		ΔNDVI x1000		
248		11	15	19

AVHRR Pathfinder atmospheric correction, theoretical uncertainties estimates

- Calibration: 10% absolute, 4% band to band
- Water vapor 0.7g/cm^2 (NCEP or none)
- Ozone 30 Dobsons (London climatology)
- No aerosol correction

AVHRR Pathfinder Error budget summary

belterra		clear	avg	hazy	skukuza		clear	avg	hazy			clear	avg	hazy
640	448	**56**	**506**	**803**	640	858	**90**	**457**	**727**	640	1427	**149**	**396**	**628**
846	2367	**200**	**217**	**338**	846	1964	**164**	**225**	**370**	846	2166	**179**	**212**	**349**
3750	448	**20**	**26**	**31**	3750	858	**42**	**44**	**46**	3750	1427	**73**	**74**	**74**
NDVI	682	**33**	**195**	**266**	NDVI	392	**42**	**124**	**168**	NDVI	206	**46**	**68**	**90**

AVHRR Long Term Data Record: Atmospheric correction, theoretical uncertainties estimates

- Calibration: 4% absolute, 2% band to band
- Water vapor 0.3g/cm^2 (Split window band 4-5)
- Ozone 10 Dobsons (EP-TOMS)
- Aerosol correction based on 3.75mic assumed (0.01 error on the empirical relationship)

LTDR planned : improved calibration,ozone,water vapor, aerosol correction

belterra		clear	avg	hazy	skukuza		clear	avg	hazy	sevilleta		clear	avg	hazy
640	448	**101**	**100**	**100**	640	858	**101**	**101**	**100**	640	1427	**106**	**104**	**104**
846	2367	**85**	**133**	**196**	846	1964	**75**	**101**	**141**	846	2166	**81**	**97**	**132**
3750	448	**14**	**15**	**25**	3750	858	**20**	**22**	**26**	3750	1427	**30**	**33**	**37**
NDVI	682	**56**	**58**	**64**	NDVI	392	**43**	**47**	**54**	NDVI	206	**30**	**33**	**38**

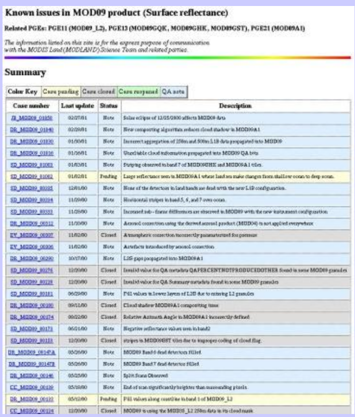
Production and Distribution

- Use a MODAPS-like environment for production.
- Benefit from the MODIS production experience.

-Data products will be kept online and distributed by ftp and through a web page.
-Make intermediate data sets available for evaluators.
-Transition the data sets to the DAAC later in the project when the datasets are validated.

Quality Assessment

Known Issues Tracking



Known issues in MOD09 product (Surface reflectance)

Related PGEs: PGE11 (MOD09_L2), PGE13 (MOD09GQK, MOD09GHK, MOD09GST), PGE21 (MOD09A1)

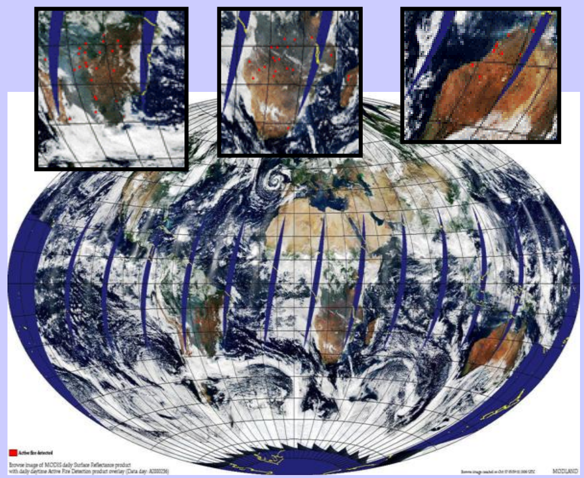
The information listed on this site is for the express purpose of communication with the MODIS Land (MODLAND) Science Team and related parties.

Summary

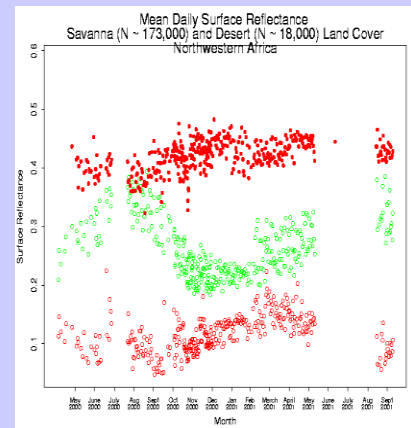
Color Key	Case pending	Case closed	Case reopened	QA note

Case number	Last update	Status	Description
JB_MOD09_01050	02/27/01	Note	Solar eclipse of 12/25/2000 affects MOD09 data
DR_MOD09_01040	02/20/01	Note	New compositing algorithm reduces cloud shadow in MOD09A1
DR_MOD09_01030	01/30/01	Note	Incorrect aggregation of 250m and 500m L1B data propagated into MOD09
DR_MOD09_01016	01/16/01	Note	Unreliable cloud information propagated into MOD09 QA bits
SD_MOD09_01003	01/03/01	Note	Striping observed in band 7 of MOD09GHK and MOD09A1 tiles.
SD_MOD09_01002	01/02/01	Pending	Large reflectance seen in MOD09A1 where land sea mask changes from shallow ocean to deep ocean.
SD_MOD09_00035	12/01/00	Note	None of the detectors in land bands are dead with the new L1B configuration.
SD_MOD09_00034	11/29/00	Note	Horizontal stripes in band 5, 6, and 7 over ocean.
SD_MOD09_00333	11/28/00	Note	Increased sub - frame differences are observed in MOD09 with the new instrument configuration.
DR_MOD09_00312	11/10/00	Note	Aerosol correction using the derived aerosol product (MOD04) is not applied everywhere
EV_MOD09_00307	11/02/00	Closed	Atmospheric correction incorrectly parameterized for pressure
EV_MOD09_00306	11/02/00	Note	Artefacts introduced by aerosol correction
DR_MOD09_00290	10/17/00	Note	L2G gaps propagated into MOD09A1
SD_MOD09_00276	12/20/00	Closed	Invalid value for QA metadata QAPERCENTNOTPRODUCEDOTHER found in some MOD09 granules
SD_MOD09_00228	12/20/00	Closed	Invalid value for QA Summary metadata found in some MOD09 granules
SD_MOD09_00181	06/29/00	Note	Fill values in lower layers of L2G due to missing L2 granules
DR_MOD09_00180	09/11/00	Closed	Cloud shadow MOD09A1 compositing issue
DR_MOD09_00174	08/22/00	Closed	Relative Azimuth Angle in MOD09A1 incorrectly defined
SD_MOD09_00171	06/01/00	Note	Negative reflectance values seen in band2
SD_MOD09_00153	12/20/00	Closed	stripes in MOD09GST tiles due to improper coding of cloud flag.
DR_MOD09_00147A	05/26/00	Note	MOD09 Band 6 dead detectors filled.
DR_MOD09_00147B	05/26/00	Note	MOD09 Band 7 dead detector filled
DR_MOD09_00146	05/25/00	Note	Split Scans Observed
CC_MOD09_00139	05/19/00	Note	End of scan significantly brighter than surrounding pixels.
DR_MOD09_00132	05/12/00	Pending	Fill values along coastline in band 1 of MOD09_L2
CC_MOD09_00124	12/20/00	Closed	MOD09 is using the MOD35_L2 250m data in its cloud mask

Global Browse



Time series analysis



Community Outreach

- Advisory panel: will include members from different disciplines and agencies (NOAA NESDIS, USDA, CRSC, …).

-Workshops/Sessions held throughout the project to refine requirements and provide feedback on products.

- Publish team's evaluation of existing and intermediate datasets on the web and request input and comments from users.

-Participation in scientific conferences and peer reviewed publications.

Summary

- The creation of a Long Term Land Surface Data record with documented and comparable accuracy across instruments is feasible.
- The long term trend observed with precursor AVHRR datasets needs to be verified.
- A beta version of the AVHRR data set will become available for evaluation in June 2005.
- The user community involved in the definition and evaluation of the data sets (Pathfinder approach).
- Incremental release of the products (Beta => Provisional => Validated) as they are generated (MODIS approach).