National Aeronautics and Space Administration

Soil Moisture Active Passive Mission

SMAP

Status of Core and Candidate Validation Sites

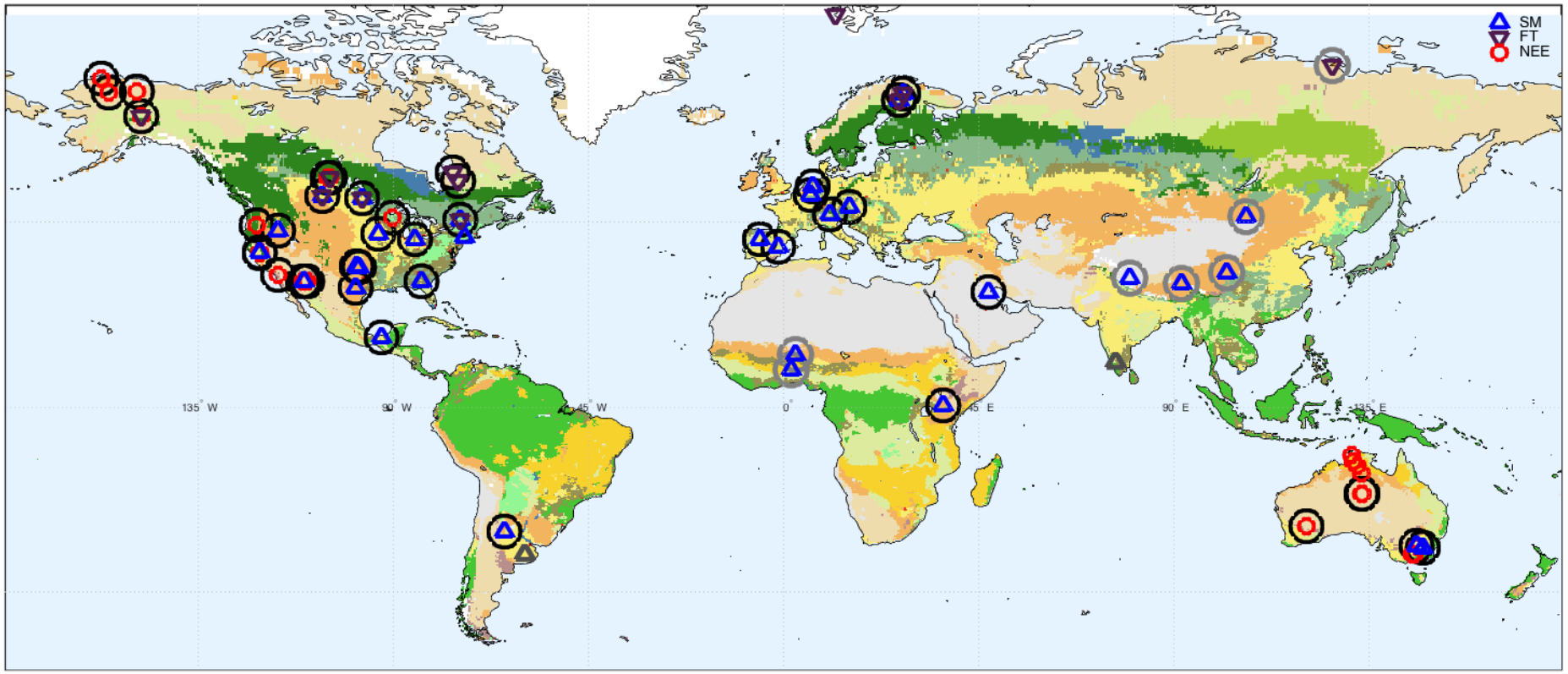
Andreas Colliander
JPL, Caltech

The 6th SMAP Cal/Val Workshop

September 1-3, 2015

Columbia, MD

In Situ Data Transfer Readiness: Core Sites



Black circles: Near real-time data access established
No circle: Near real-time data access being established
Grey circles: No near real-time data access available (data available at the end of Cal/Val Phase)
Grey triangles: installations on-going, but expected to provide useful data at some point during the Cal/Val Phase

Cal/Val Partner Data Transfer Readiness for Soil Moisture Supplemental Networks

- Automated transfers from sparse networks:
  - ☑ USCRN – done
  - ☑ SCAN – done
  - ☑ SMOSMANIA – done
  - ☑ Murrumbidgee – done
  - ☑ SAOCOM regional – done
  - ☑ Oklahoma Mesonet – being implemented
  - ❑ NEON – once installed
- Automated transfers from sparse networks utilizing alternative measurement techniques
  - ☑ GPS – done
  - ☑ COSMOS – done

In situ data transfer status: SM Core Site Candidates

- Automated transfers running

ID	Site	Area	PI
02	TERENO	Germany	Montzka
03	REMEDHUS	Spain	Martinez
04	Reynolds Creek (ARS)	Idaho	Seyfried
05	Kuwait	Kuwait	AlJassar
06	HOAL	Austria	Dorigo
07	Monash	Australia	Walker
09	AAFC	Manitoba, Ontario	McNairn
12	Twente	Holland	Su
16	ARS	Iowa, Indiana, Georgia, Arizona, Oklahoma	Cosh
17	FMI	Finland	Pulliainen
19	SAOCOM	Argentina	Thibeault
24	Mpala	Kenya	Caylor
25	Tonzi Ranch	California	Moghaddam
27	Kenaston	Saskatchewan	Berg
32	Zapotes	Mexico	Ramos
41	Valencia	Spain	Lopez-Baeza
44	EURAC	Italy	Notarnicola
48	TxSON	Texas	Caldwell

In situ data transfer status: SM Core Site Candidates

- Automated pull ready to start

ID	Site	Area	PI
08	VASKAS	Tunisia	Zribi

- Initials setup but some further details need to be worked out

ID	Site	Area	PI
26	Millbrook	New York	Temimi

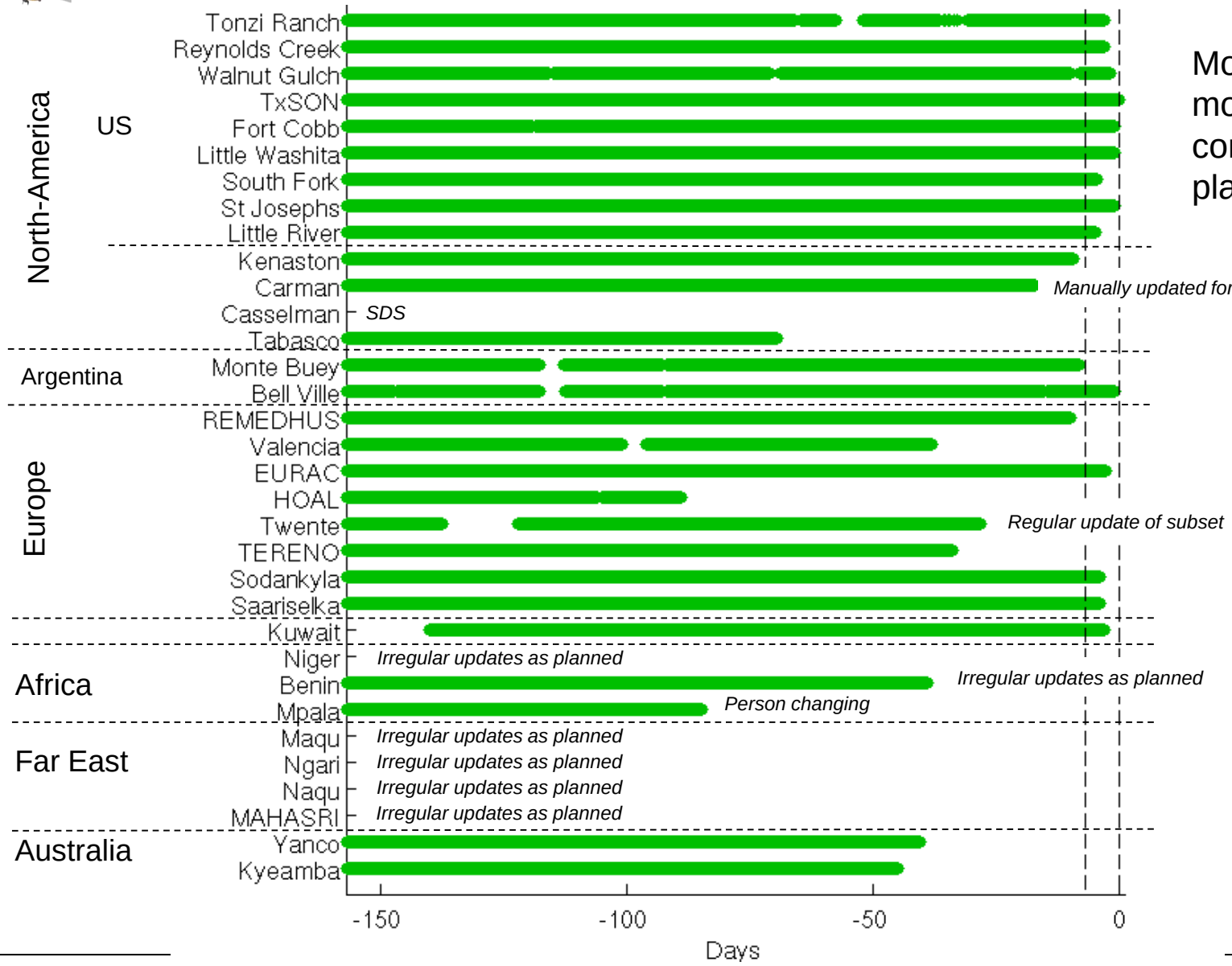
- Work needed

ID	Site	Area	PI
42	Berambadi	India	Battacharia

- Automation not expected

ID	Site	Area	PI
14	Areco	Argentina	Karszenbaum
45	AMMA	Niger, Benin	Pellarin
58	JAXA	Mongolia	Asanuma

Soil moisture core site data transfers



Most of the soil moisture transfers coming along as planned

Updated on 9/2/2015

In situ data transfer status: FT

- Automated pull running

ID	Site	Area	PI
09	AAFC	Manitoba, Ontario	McNairn
11	SNOTEL	Western USA, Alaska	TBD
11	SCAN	USA	TBD
17	FMI	Finland	Pulliainen
27	Kenaston	Saskatchewan	Berg
55	Baie-James	Quebec	Roy
58	Caribou Creek	BERMS	Smith

- Automated pull ready to start

ID	Site	Area	PI
34	BERMS	Saskatchewan	Wheater
57	Svalbard	Svalbard	Boike

NEE Partner Status

- Done/Ready

ID	Site	Area	PI
17	Sodankyla	Finland	Pulliainen
22	Metolius	Oregon	Law
34	BERMS	Saskatchewan	Wheater
35	Imnavait, Bonanza Creek	Alaska	Euskirchen
36	Park Falls	Wisconsin	Desai
37	Fort Peck	Montana	Meyers
38	Atqasuk, Ivotuk, Sky Oaks	Alaska, California	Oechel
39	Walnut Gulch, Santa Rita	Arizona	Scott
43	Tonzi	California	Baldocchi
62	Several	Australia	MacFarlane

- Ready

ID	Site	Area	PI
59	Several	Australia	Beringer

- Data format and server need to be clarified

Soil Moisture Core/Candidate Review

			Core			Candidate		
ID#	Site name	Notes	3-km[a]	9-km[b]	36-km[c]	Pixels 3-km	Pixels 9-km	Pixels 36-km
0201	TERENO	Julich, Germany				2	1	1
0301	REMEDHUS	Salamanca, Spain		1	1		2	
0401	Reynolds Creek	USDA, Idaho		3	1	1		
0501	Kuwait	Kuwait				1	1	1
0601	HOAL	Austria				1	1	
0701	Yanco	Monash, Australia	2	2	1			
0702	Kyeamba	Monash, Australia			1		1	
0901	Carman	AAFC, Canada		1	1	2		
0902	Casselman	AAFC, Canada		1		1		1
1201	Naqu	U. Twente, Tibet					1	1
1202	Maqu	U. Twente, Tibet				1	1	1
1203	Ngari	U. Twente, Tibet					2	1
1204	Twente	U. Twente, Holland			1	1	1	1
1601	Walnut Gulch	USDA, Arizona	2	3	1	1		
1602	Little Washita	USDA, Oklahoma		4	1	1		
1603	Fort Cobb	USDA, Oklahoma		2	1			
1604	Little River	USDA, Georgia	2	2	1		1	
1606	St Josephs	USDA, Indiana	1	2				1
1607	South Fork	USDA, Iowa	2	3	1			
1701	Sodankyla	FMI, Finland				1	1	1
1702	Saariselka	FMI, Finland				1		
1901	Bell Ville	SAOCOM, Argentina						1
1902	Monte Buey	SAOCOM, Argentina	1	1	1			
2401	Mpala	Princeton, Kenya				1	1	1
2501	Tonzi Ranch	SoilSCAPE, California				2	1	1
2601	Millbrook	CREST, New York				1	1	1
2701	Kenaston	Saskatoon, Canada	2	1	1			
3201	Zapotes	Mexico				2	2	1
4101	Valencia	Valencia, Spain	1	1				1
4201	Berambadi	ISRO, India						
4401	EURAC	Italy				1	1	
4501	Niger	AMMA, Niger					1	1
4502	Benin	AMMA, Benin				2	1	1
5301	Mongolia	JAXA, Mongolia						2
	Total number of pixels		13	27	13	23	21	19
	Total number of sites		8	14	13	17	16	16

Core definition:
a: at least three stations
b: at least five stations
c: at least nine stations
…or supplemental analysis to increase the confidence in scaling

36-km SM Core Sites

	Site ID	Site Name	Area	KG class	KG 1st class	Land Cover
1	0301	REMEDHUS	Spain	Csb	Temperate	croplands
2	0401	Reynolds Creek	USA (Idaho)	BSk	Arid	grasslands
3	0701	Yanco	Australia	BSk	Arid	croplands
4	0901	Carman	Canada	Dfc	Cold	croplands
5	1204	Twente	Holland	Dfc	Cold	cropland/natural mosaic
6	1601	Walnut Gulch	USA (Arizona)	BSh	Arid	shrub open
7	1602	Little Washita	USA (Oklahoma)	Cfa	Temperate	grasslands
8	1603	Fort Cobb	USA (Oklahoma)	Cfa	Temperate	grasslands
9	1604	Little River	USA (Georgia)	Cfa	Temperate	cropland/natural mosaic
10	1607	South Fork	USA (Iowa)	Dfb	Cold	croplands
11	1902	Monte Buey	Argentina	BSh	Arid	croplands
12	2701	Kenaston	Canada	Dfc	Cold	croplands
13	0201	TERENO	Germany	Cfb	Temperate	forest mixed
14	0501	Kuwait	Kuwait	Csa	Temperate	barren/sparse
15	0702	Kyeamba	Australia	Cfa	Temperate	croplands
16	1201	Naqu	Tibet	ET	Polar	grasslands
17	1202	Maqu	Tibet	Dwc	Cold	grasslands
18	1203	Ngari	Tibet	BWk	Arid	barren/sparse
19	1606	St Josephs	USA (Indiana)	Dfb	Cold	croplands
20	1701	Sodankyla	Finland	Dfc	Cold	savannas woody
21	1901	Bell Ville	Argentina	BSh	Arid	croplands
22	2401	Mpala	Kenya	Cfb	Temperate	grasslands
23	2501	Tonzi Ranch	USA (California)	Csa	Temperate	savannas woody
24	2601	Millbrook	USA (New York)	Dfa	Cold	forest decid brdlf
25	3201	Zapotes	Mexico	Am	Tropical	croplands
26	4101	Valencia	Spain	BSk	Arid	savannas woody
27	4501	Niger	Niger	BWh	Arid	grasslands
28	4502	Benin	Benin	BWh	Arid	savannas
29	5301	MAHASRI	Mongolia	Dwc	Cold	grasslands

Core Sites

9-km SM Core Sites

	Site ID	Site Name	Area	KG class	KG 1st class	Land Cover
1	0301	REMEDHUS	Spain	Csb	Temperate	croplands
2	0401	Reynolds Creek	USA (Idaho)	BSk	Arid	grasslands
3	0701	Yanco	Australia	BSk	Arid	croplands
4	0901	Carman	Canada	Dfc	Cold	croplands
5	0902	Casselman	Canada	Dfb	Cold	cropland/natural mosaic
6	1601	Walnut Gulch	USA (Arizona)	BSh	Arid	shrub open
7	1602	Little Washita	USA (Oklahoma)	Cfa	Temperate	grasslands
8	1603	Fort Cobb	USA (Oklahoma)	Cfa	Temperate	grasslands
9	1604	Little River	USA (Georgia)	Cfa	Temperate	cropland/natural mosaic
10	1606	St Josephs	USA (Indiana)	Dfb	Cold	croplands
11	1607	South Fork	USA (Iowa)	Dfb	Cold	croplands
12	1902	Monte Buey	Argentina	BSh	Arid	croplands
13	2701	Kenaston	Canada	Dfc	Cold	croplands
14	4101	Valencia	Spain	BSk	Arid	savannas woody
15	0201	TERENO	Germany	Cfb	Temperate	forest mixed
16	0501	Kuwait	Kuwait	Csa	Temperate	barren/sparse
17	0601	HOAL	Austria	Cfb	Temperate	forest mixed
18	0702	Kyeamba	Australia	Cfa	Temperate	croplands
19	1201	Naqu	Tibet	ET	Polar	grasslands
20	1202	Maqu	Tibet	Dwc	Cold	grasslands
21	1203	Ngari	Tibet	BWk	Arid	barren/sparse
22	1204	Twente	Holland	Dfc	Cold	cropland/natural mosaic
23	1701	Sodankyla	Finland	Dfc	Cold	savannas woody
24	2401	Mpala	Kenya	Cfb	Temperate	grasslands
25	2501	Tonzi Ranch	USA (California)	Csa	Temperate	savannas woody
26	2601	Millbrook	USA (New York)	Dfa	Cold	forest decid brdlf
27	3201	Zapotes	Mexico	Am	Tropical	croplands
28	4401	EURAC	Italy	ET	Polar	shrub open
29	4501	Niger	Niger	BWh	Arid	grasslands
30	4502	Benin	Benin	BWh	Arid	savannas

Core Sites

3-km SM Core Sites

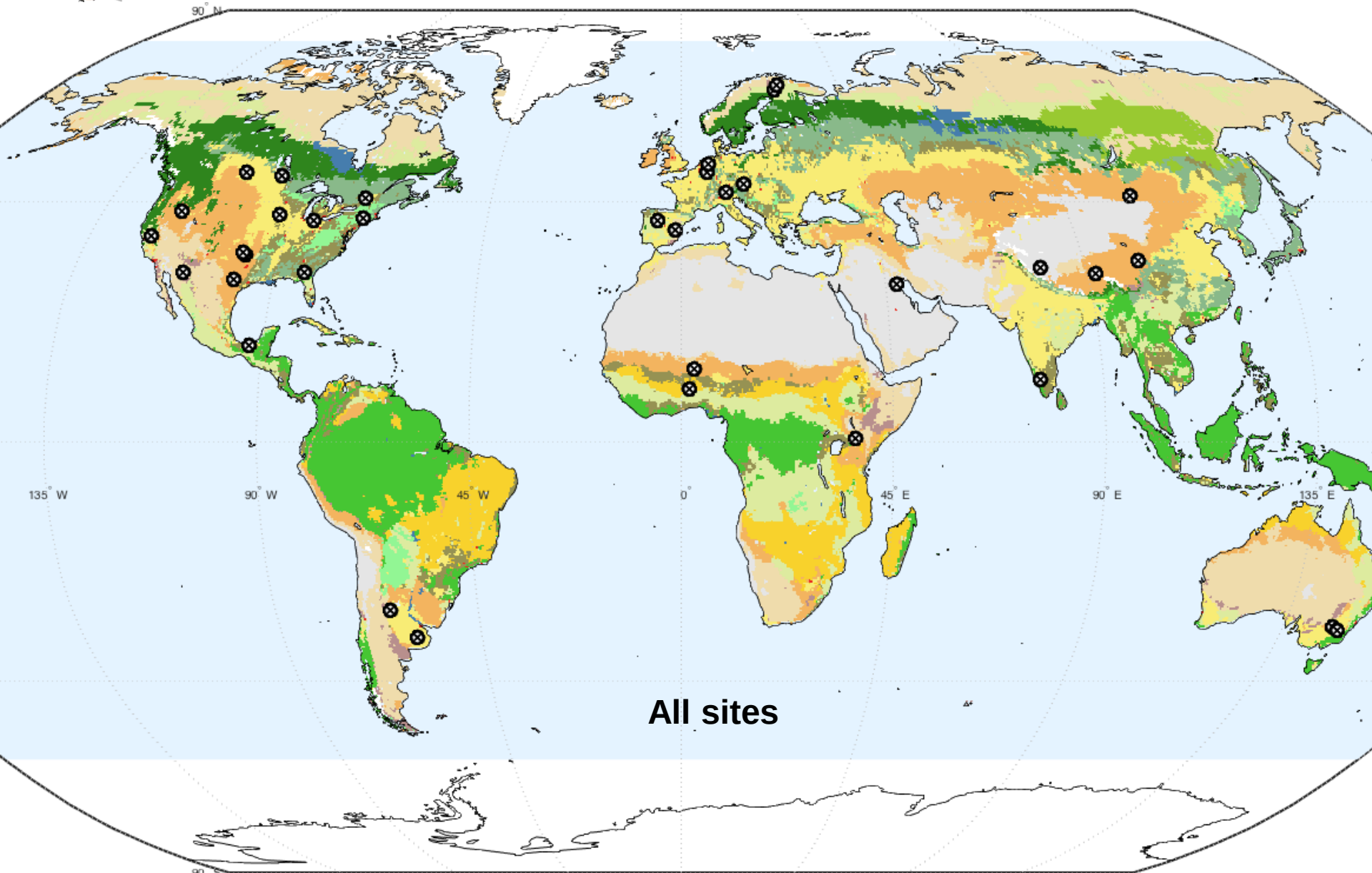
	Site ID	Site Name	Area	KG class	KG 1st class	Land Cover
1	0701	Yanco	Australia	BSk	Arid	croplands
2	1601	Walnut Gulch	USA (Arizona)	BSh	Arid	shrub open
3	1604	Little River	USA (Georgia)	Cfa	Temperate	cropland/natural mosaic
4	1606	St Josephs	USA (Indiana)	Dfb	Cold	croplands
5	1607	South Fork	USA (Iowa)	Dfb	Cold	croplands
6	1902	Monte Buey	Argentina	BSh	Arid	croplands
7	2701	Kenaston	Canada	Dfc	Cold	croplands
8	4101	Valencia	Spain	BSk	Arid	savannas woody
9	0201	TERENO	Germany	Cfb	Temperate	forest mixed
10	0401	Reynolds Creek	USA (Idaho)	BSk	Arid	grasslands
11	0501	Kuwait	Kuwait	Csa	Temperate	barren/sparse
12	0601	HOAL	Austria	Cfb	Temperate	forest mixed
13	0901	Carman	Canada	Dfc	Cold	croplands
14	0902	Casselman	Canada	Dfb	Cold	cropland/natural mosaic
15	1202	Maqu	Tibet	Dwc	Cold	grasslands
16	1204	Twente	Holland	Dfc	Cold	cropland/natural mosaic
17	1602	Little Washita	USA (Oklahoma)	Cfa	Temperate	grasslands
18	1701	Sodankyla	Finland	Dfc	Cold	savannas woody
19	1702	Saariselka	Finland	Dfc	Cold	savannas woody
20	2401	Mpala	Kenya	Cfb	Temperate	grasslands
21	2501	Tonzi Ranch	USA (California)	Csa	Temperate	savannas woody
22	2601	Millbrook	USA (New York)	Dfa	Cold	forest decid brdlf
23	3201	Zapotes	Mexico	Am	Tropical	croplands
24	4401	EURAC	Italy	ET	Polar	shrub open
25	4502	Benin	Benin	BWh	Arid	savannas

Core Sites

Global Coverage of SM Core Sites

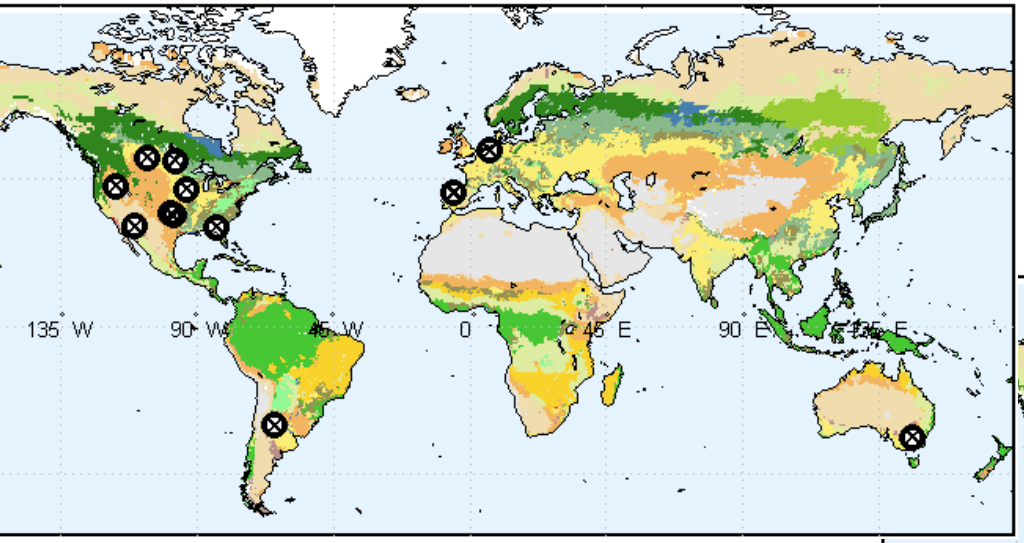
- Question: how well the core sites represent the global diversity of climate and land cover conditions?
- Coverage evaluated with respect to
  1. Land cover types
     - IGBP land cover
  2. Climate classes and
     - Koeppen-Geiger land classification scheme
- The candidate sites divided into two categories
  - Core (selected as core site)
    - Provides concurrent updates of the data (the exact requirement?)
    - Quality of the data meets the minimum standard
    - Scaling function established
  - Candidate
    - Latency
    - Developing level of quality
    - Installations on-going

Global Coverage of Soil Moisture Sites

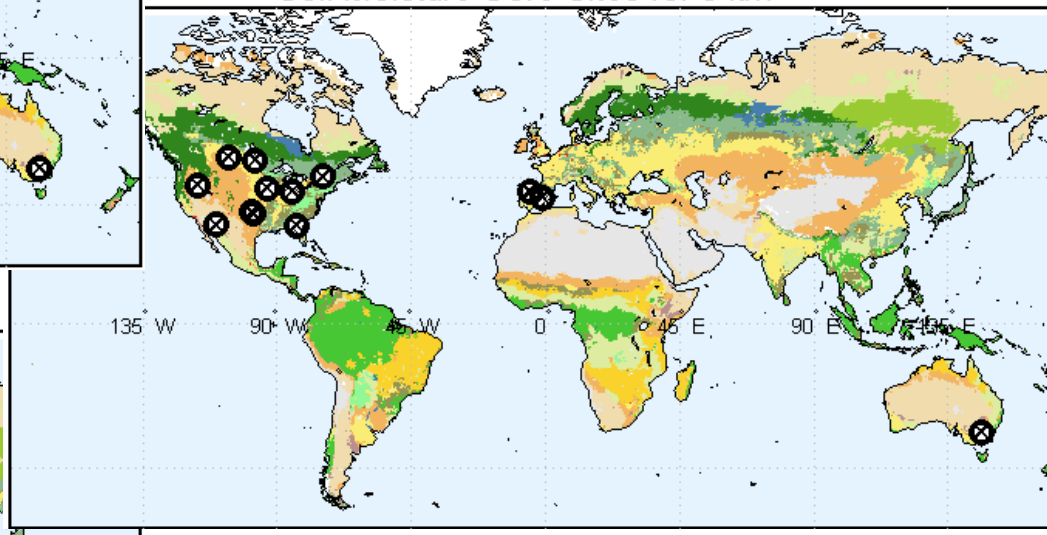


Global Coverage of Soil Moisture Sites

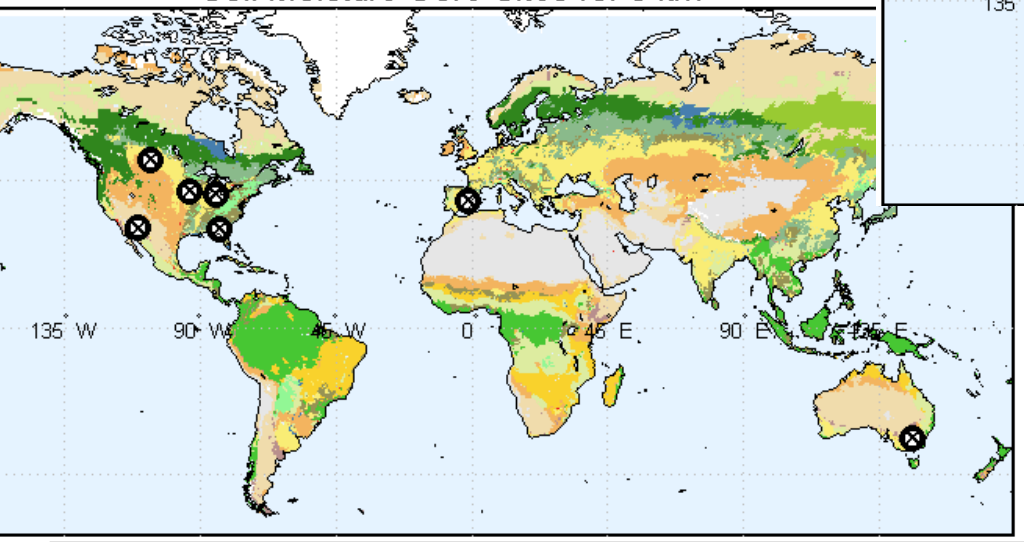
Soil Moisture Core Sites for 36 km



Soil Moisture Core Sites for 9 km



Soil Moisture Core Sites for 3 km

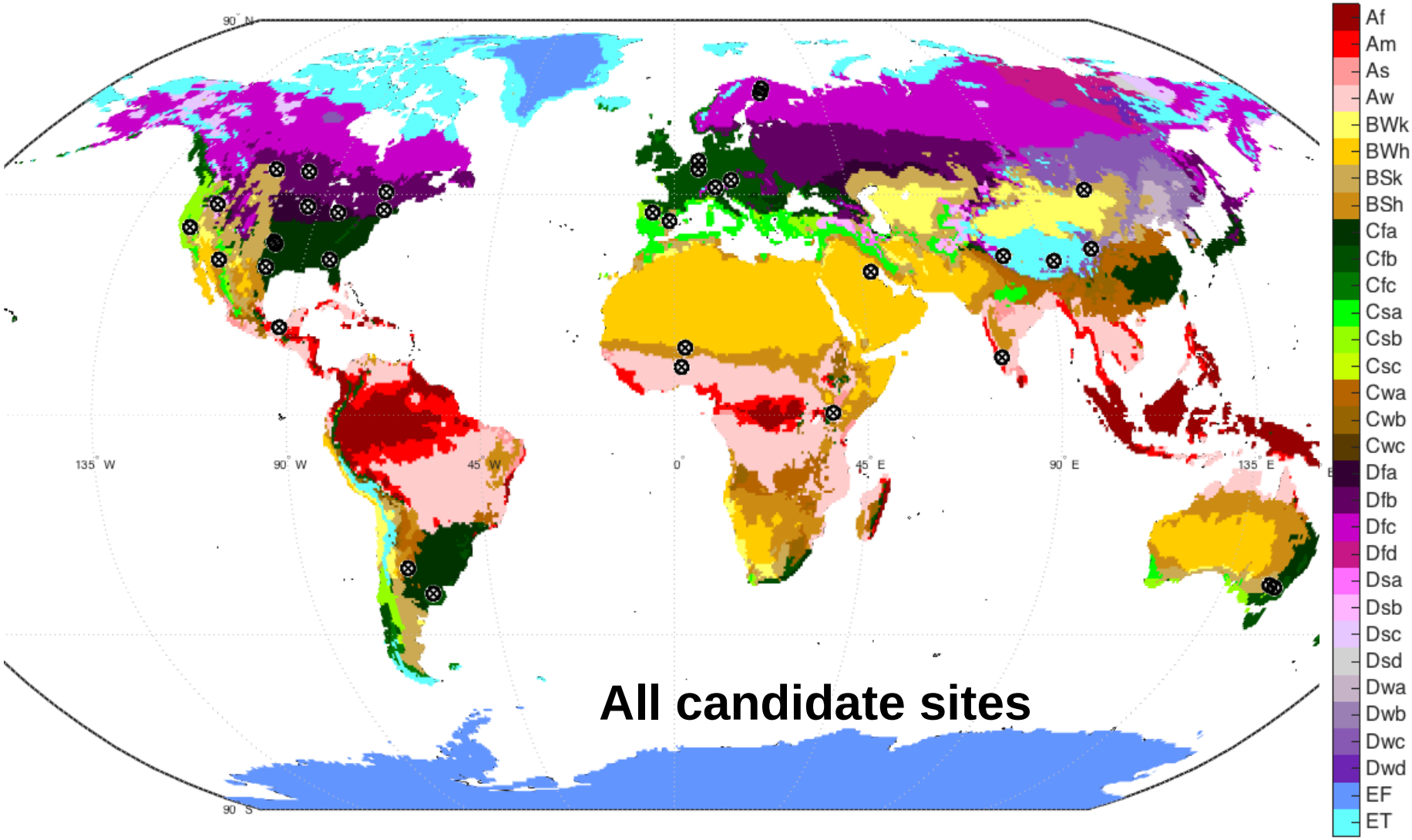


Global Coverage of Soil Moisture Sites

Land Cover Type		36 km		9 km		3 km	
	land fraction*	All	Core	All	Core	All	Core
Shrub Closed	1 %						
Shrub Open	22 %	1	1	1	1	1	1
Savannas Woody	14 %	3		3	1	4	1
Savannas	9 %	1		1		1	
Grasslands	16 %	8	3	7	3	4	
Croplands	13 %	10	6	9	6	7	4
Cropland/Natural Mosaic	7 %	2	2	3	2	3	1
Barren/Sparse	19 %	2		2		1	
Forest Mixed	-	1		2		2	
Forest Evergreen Needle Leaf	-						
Forest Evergreen Broad Leaf	-						
Forest Deciduous Needle leaf	-						
Forest Deciduous Broad leaf	-	1		1		1	
Covered land fraction* based on land cover		99 %	58 %	99 %	71 %	99 %	55 %

*) excluding forest, permanent ice, urban and wetlands

Global Coverage of SM core sites: Climate Classes

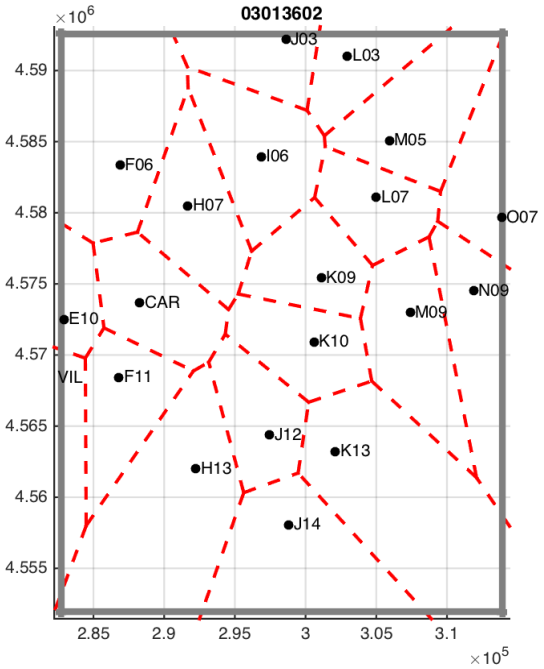


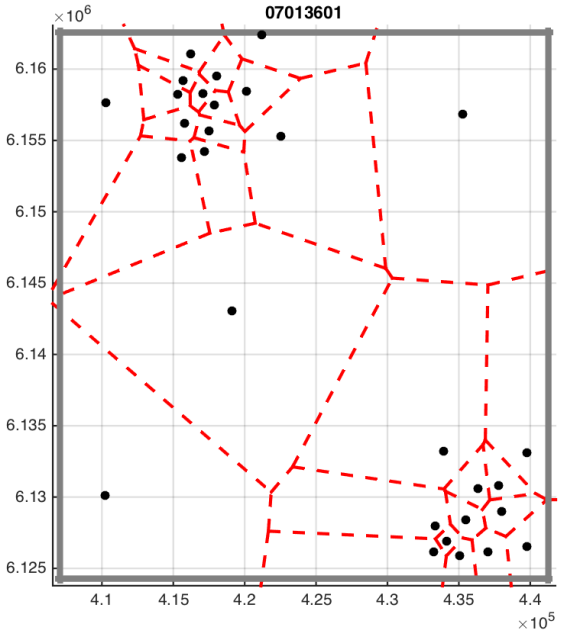
Global Coverage of SM core sites: Climate Classes

KG Class	KG 1st	KG 2nd	KG 3rd	36 km		9 km		3 km	
				All	Core	All	Core	All	Core
Af	Tropical	Rainforest							
Am		Monsoon		1		1		1	
Aw		Savannah							
BWh	Arid	Desert	Hot	2				1	
BWk			Cold	1					
BSh		Steppe	Hot	3	2	2	2	2	2
BSk			Cold	3	2	3	3	3	2
Csa	Temperate	Dry Summer	Hot Summer	2		2		2	
Csb			Warm Summer	1	1	1	1		
Csc			Cold Summer						
Cwa		Dry Winter	Hot Summer						
Cwb			Warm Summer						
Cwc			Cold Summer			1			
Cfa		Without Dry Season	Hot Summer	4	3	4	3	2	1
Cfb			Warm Summer	2		3		3	
Cfc			Cold Summer						
Dsa	Cold	Dry Summer	Hot Summer						
Dsb			Warm Summer						
Dsc			Cold Summer						
Dsd			Very Cold Summer						
Dwa		Dry Winter	Hot Summer						
Dwb			Warm Summer						
Dwc			Cold Summer	2		1		1	
Dwd			Very Cold Summer						
Dfa		Without Dry Season	Hot Summer	1		1		1	
Dfb			Warm Summer	2	1	3	3	3	2
Dfc			Cold Summer	4	3	4	2	5	1
Dfd			Very Cold Summer						
ET	Polar	Tundra		1		2		1	
EF		Frost							

Spatial Scaling (36 km)

- Default scaling based on Voronoi diagrams
- Other approaches:
  - Soil type based
  - Inverse distance weighting based
  - Straight average





Soil Moisture Core and Candidate Site Walk-Through

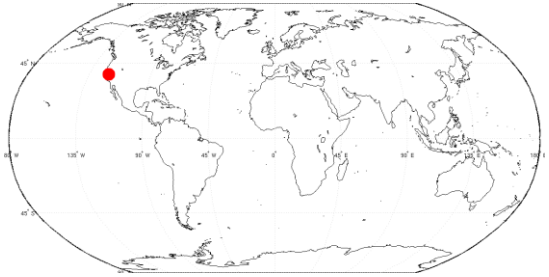
Jet Propulsion Laboratory
California Institute of Technology

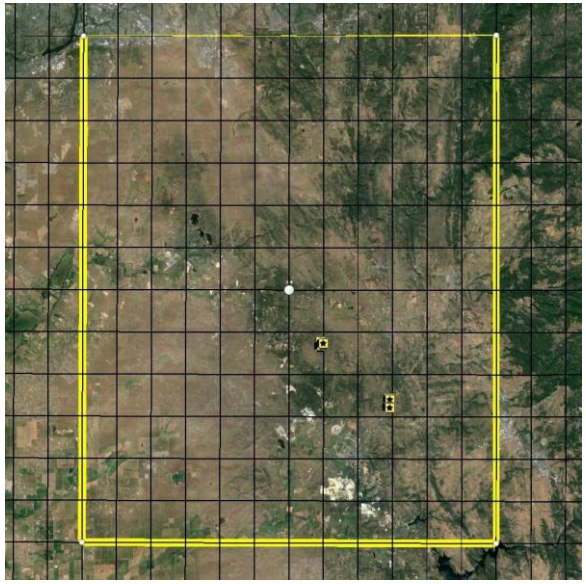
Tonzi Ranch (Candidate Pixel)

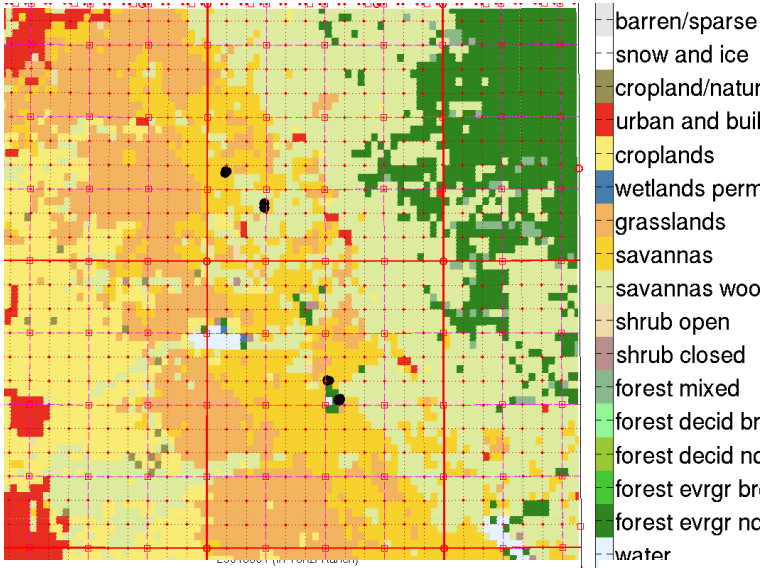
2501-36-01

Displaced ref pixel over Tonzi Ranch CA

USA (California)
Lat: 38.47, Lon: -121.00
PI: Mahta Moghaddam

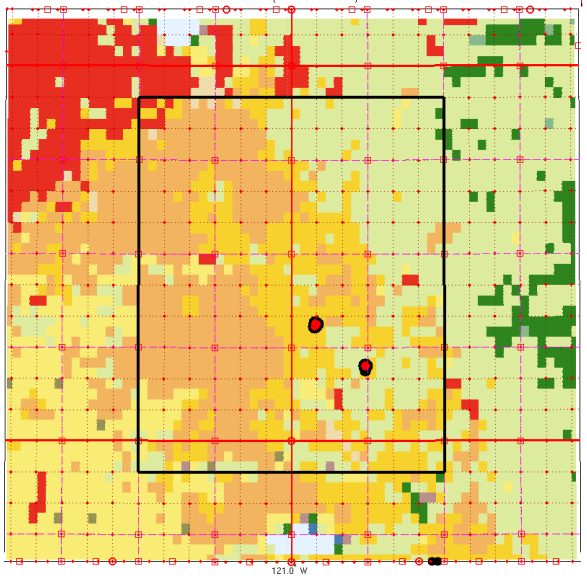




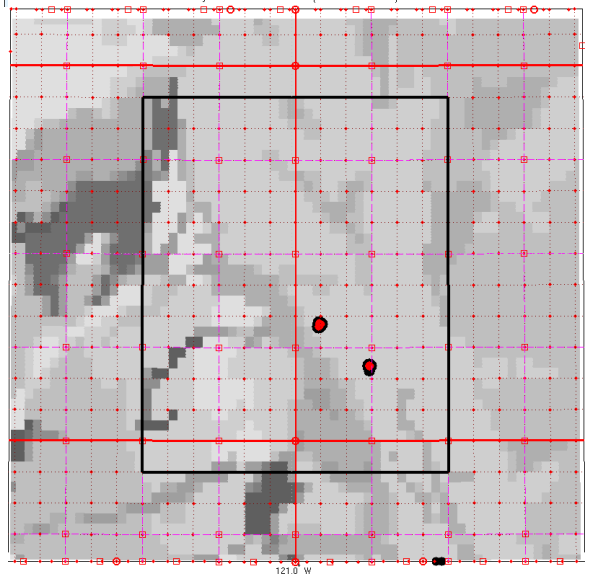


Climate class:
Temperate (Csa)
Dominant landcover:
Grasslands

Soil texture:
S-%: 42
C-%: 20
BD: 1.61



Clay fraction

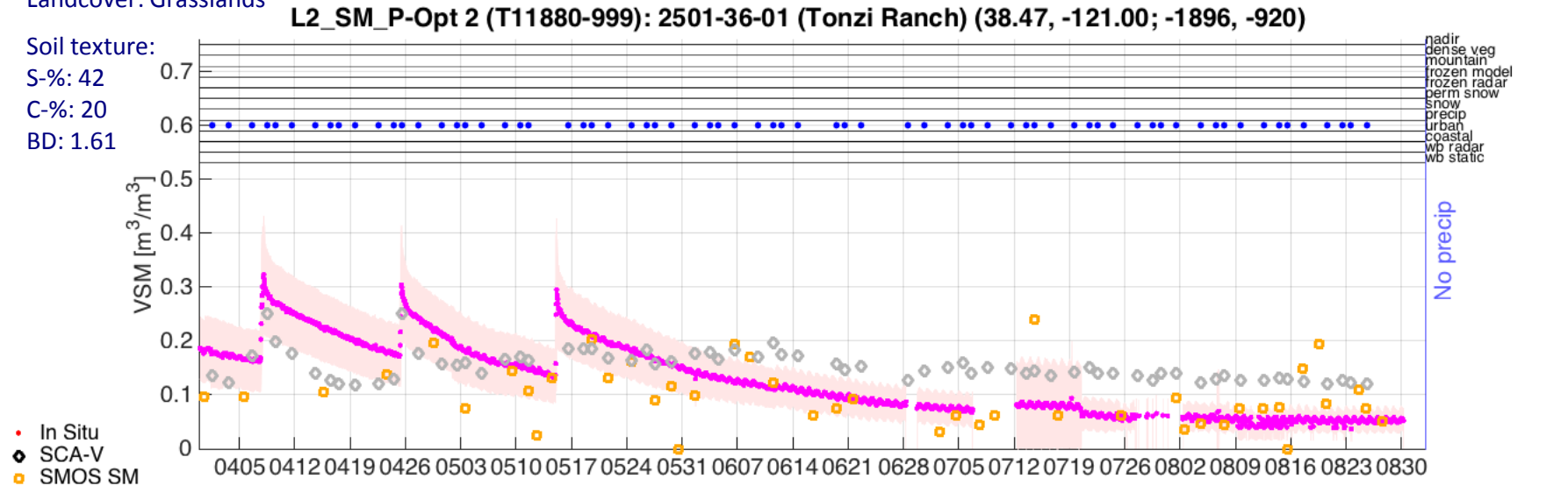


Climate class: Temperate (Csa)
Landcover: Grasslands

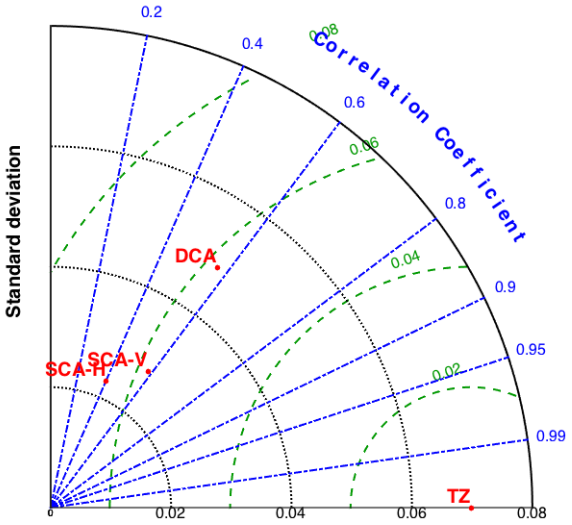
Tonzi Ranch (Candidate Pixel)

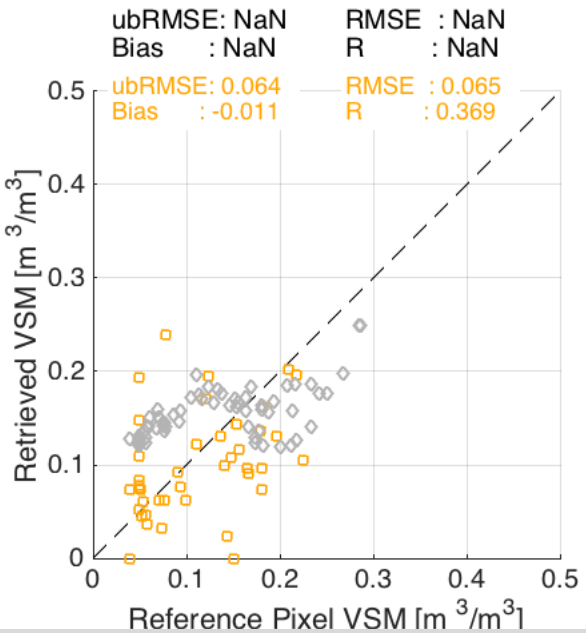
Jet Propulsion Laboratory
California Institute of Technology

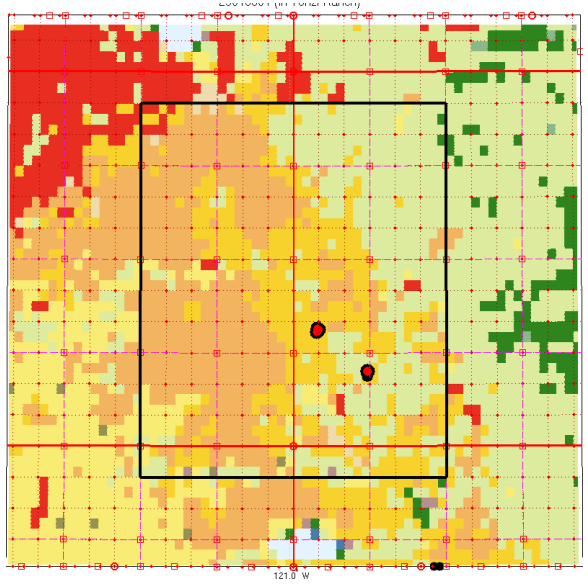
Soil texture:
S-%: 42
C-%: 20
BD: 1.61



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

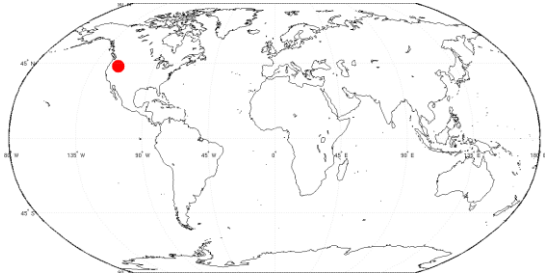
Jet Propulsion Laboratory
California Institute of Technology

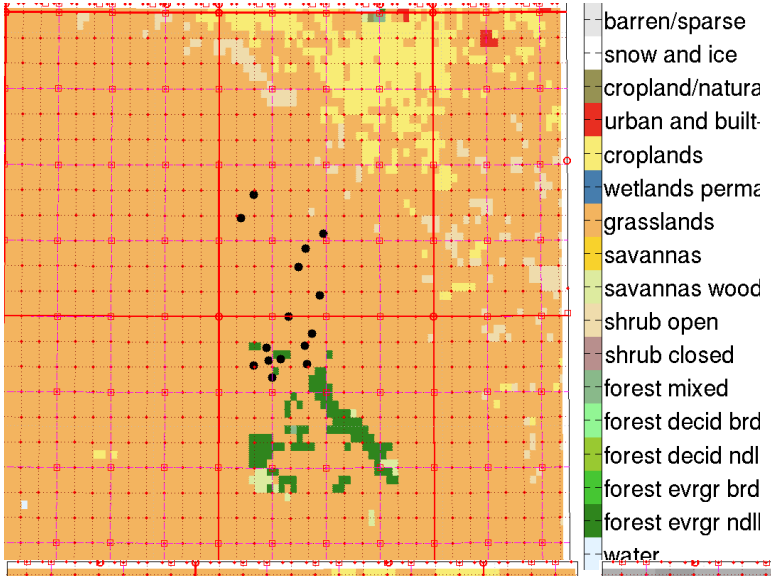
Reynolds Creek (Core Pixel)

0401-36-01

Displaced ref pixel Reynolds Creek ID (scaling by M. Cosh)

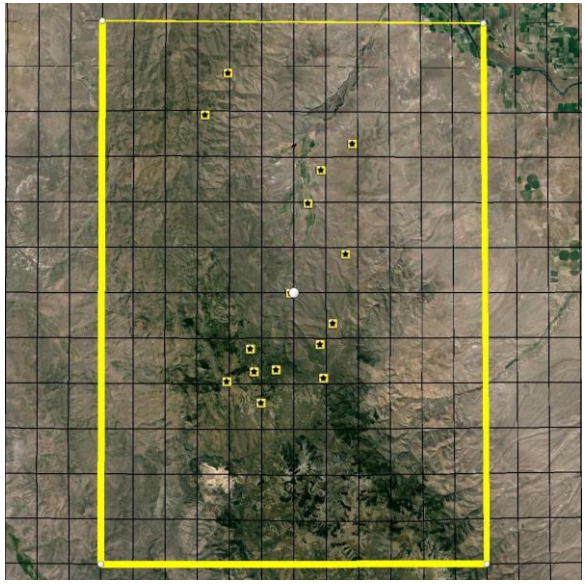
USA (Idaho)
Lat: 43.14, Lon: -116.76
PI: Mark Seyfried

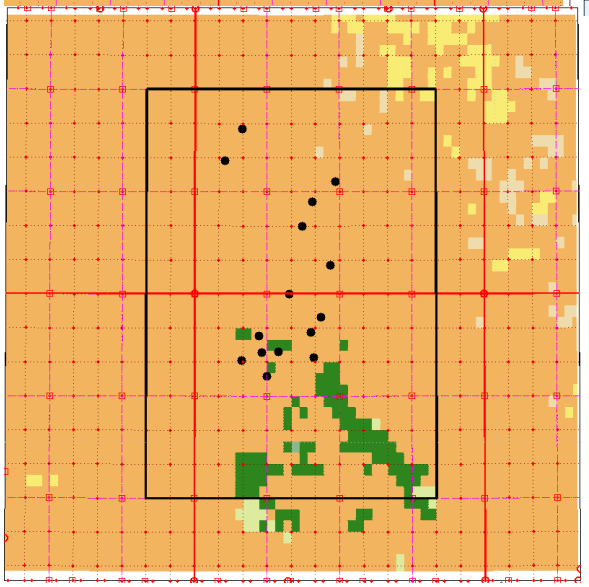




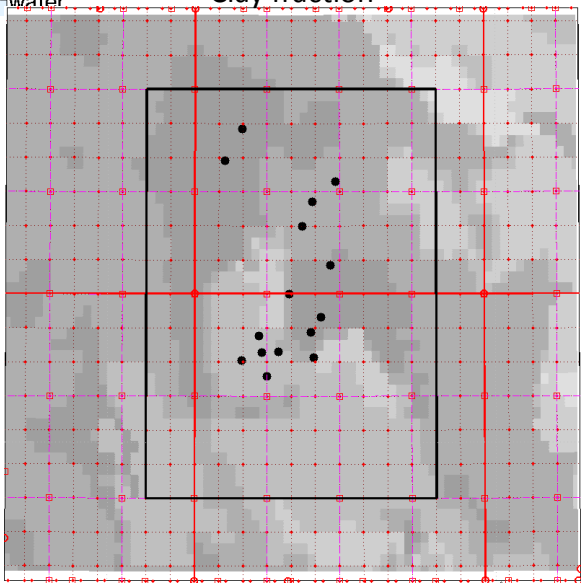
Climate class:
Arid (BSk)
Dominant landcover:
Grasslands

Soil texture:
S-%: 37
C-%: 26
BD: 1.41





Clay fraction

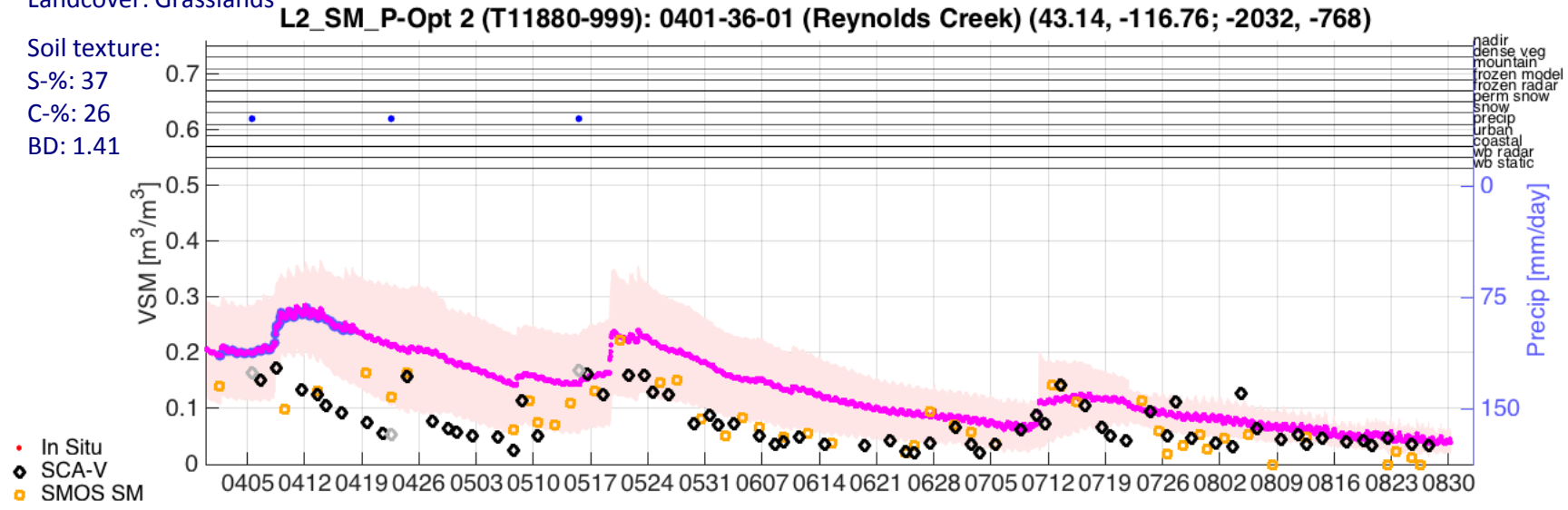


Climate class: Arid (BSk)
Landcover: Grasslands

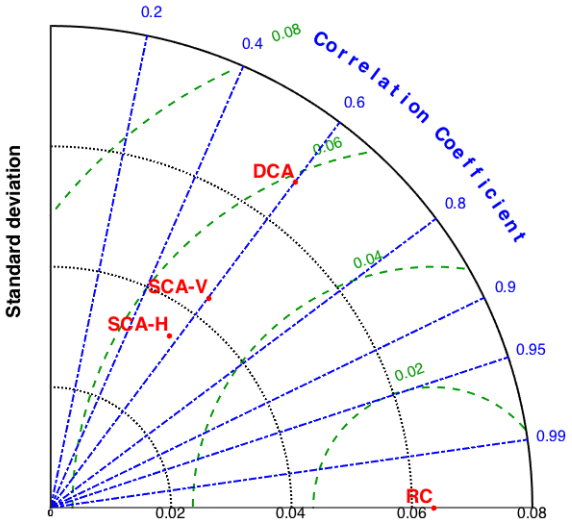
Reynolds Creek (Core Pixel)

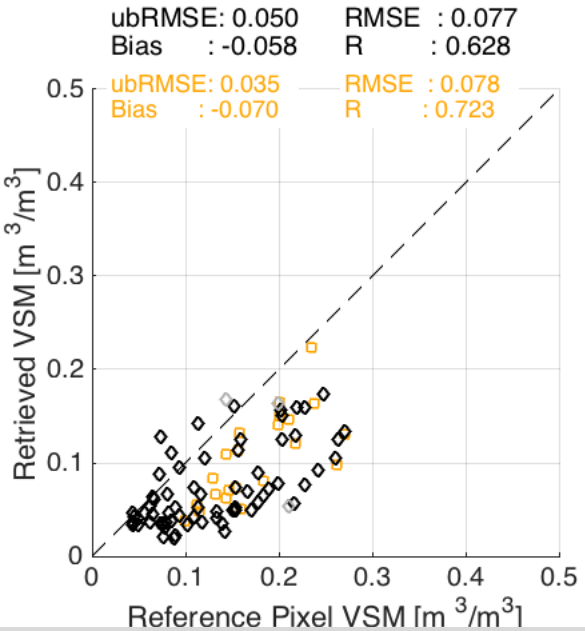
Jet Propulsion Laboratory
California Institute of Technology

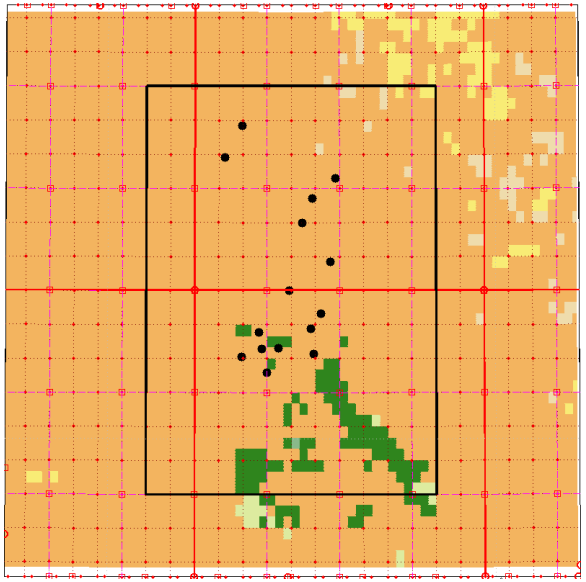
Soil texture:
S-%: 37
C-%: 26
BD: 1.41



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

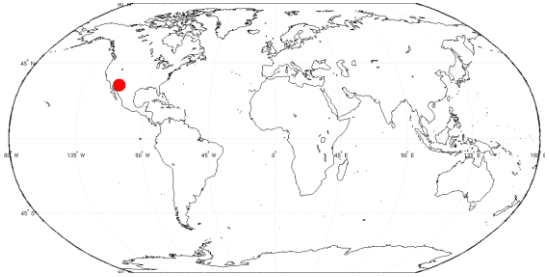
Walnut Gulch (Core Pixel)

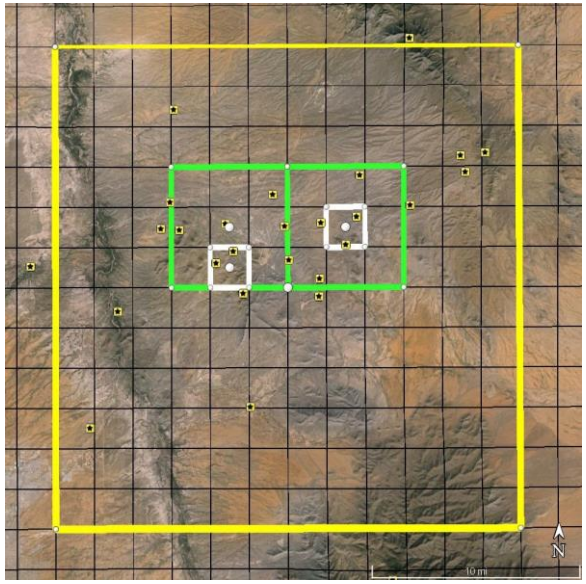
1601-36-01

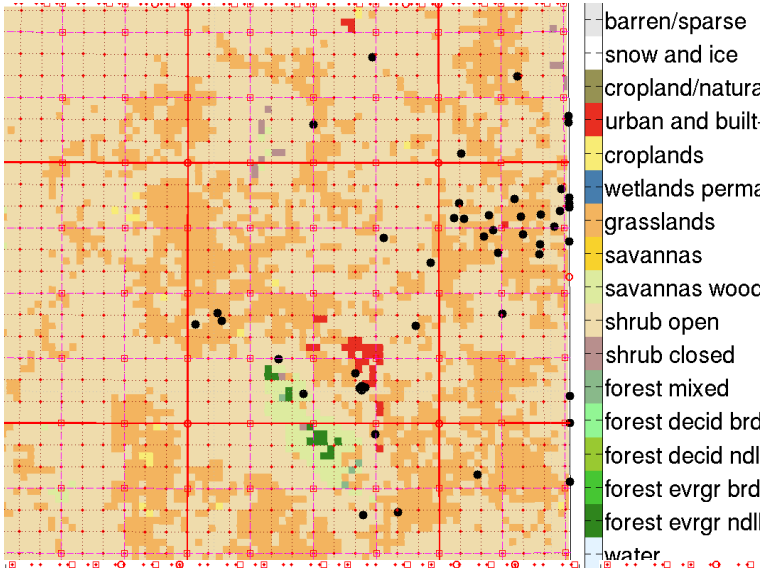
Displaced ref pixel over Walnut Gulch AZ (scaling by M. Cosh)

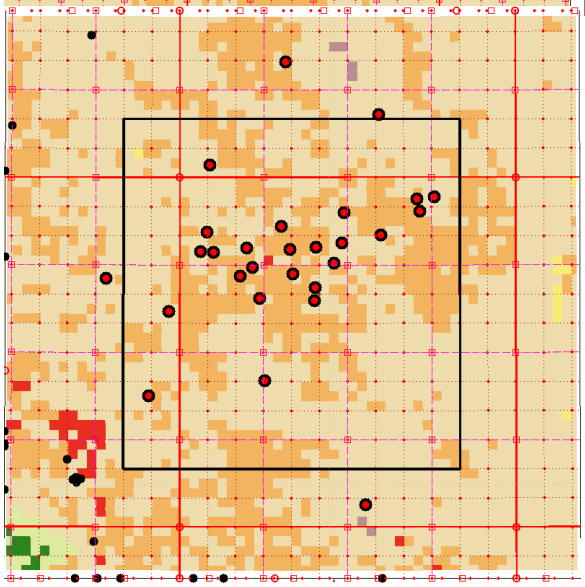
Jet Propulsion Laboratory
California Institute of Technology

USA (Arizona)
Lat: 31.68, Lon: -110.04
PI: Michael Cosh

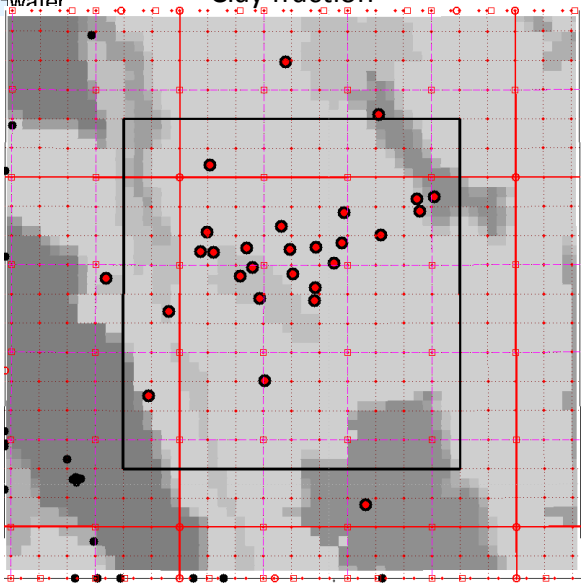








Clay fraction



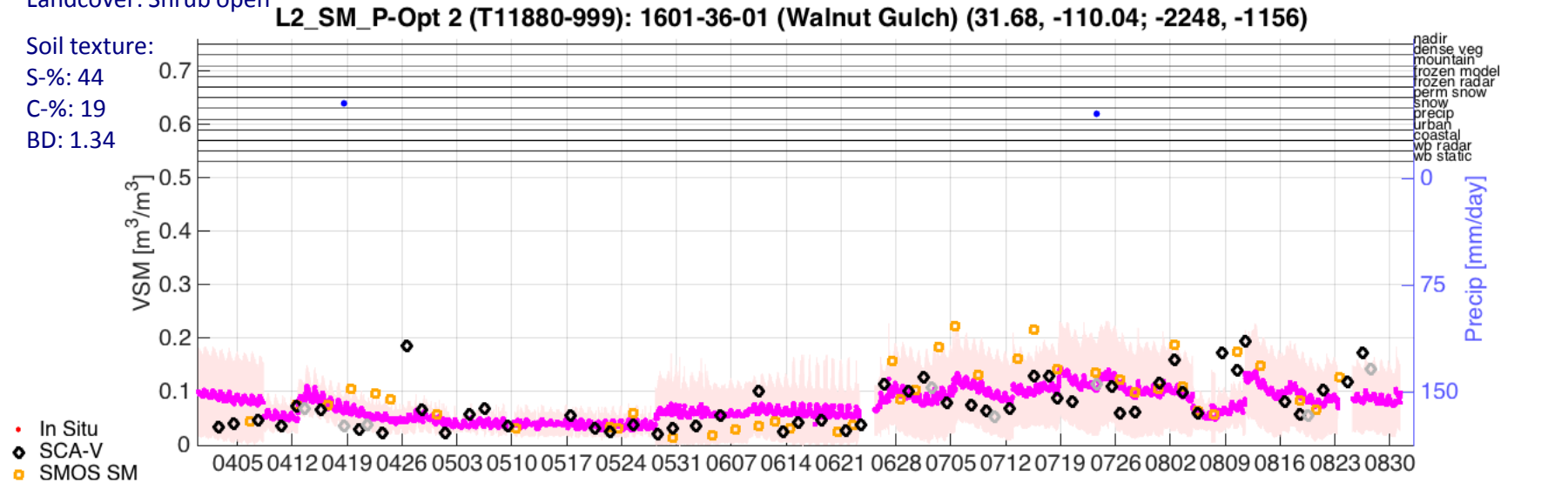
Climate class:
Arid (BSk)
Dominant landcover:
Shrub open
Soil texture:
S-%: 44
C-%: 19
BD: 1.34

Climate class: Arid (BSk)
Landcover: Shrub open

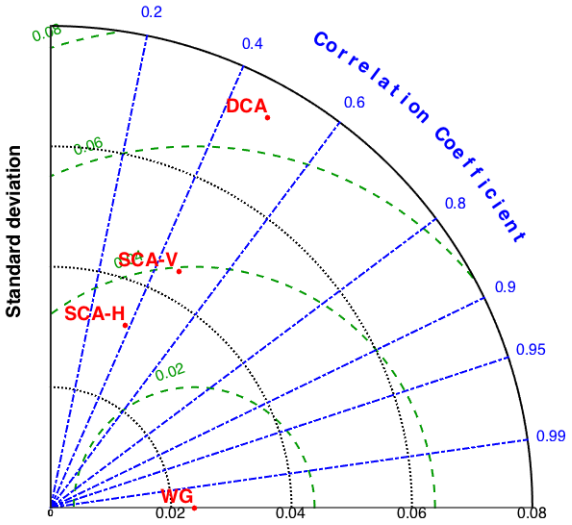
Walnut Gulch (Core Pixel)

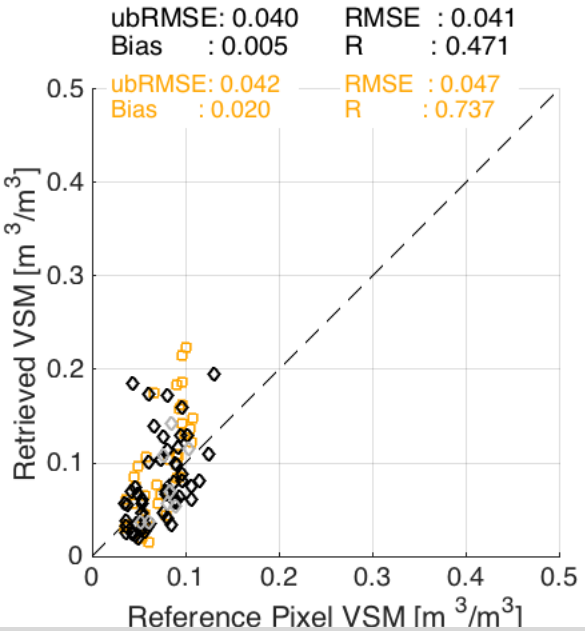
Jet Propulsion Laboratory
California Institute of Technology

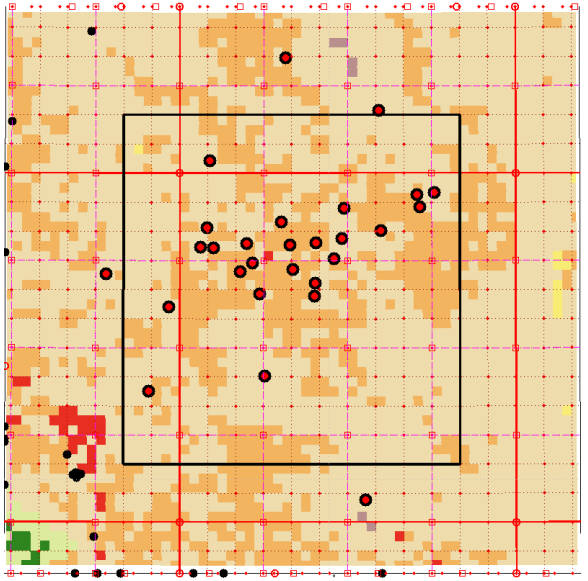
Soil texture:
S-%: 44
C-%: 19
BD: 1.34



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

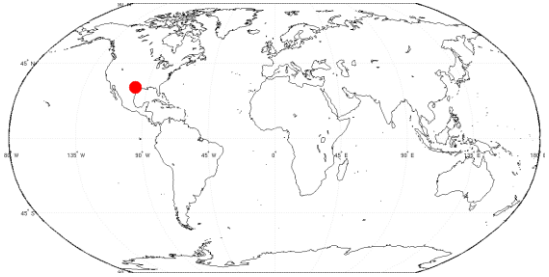
Jet Propulsion Laboratory
California Institute of Technology

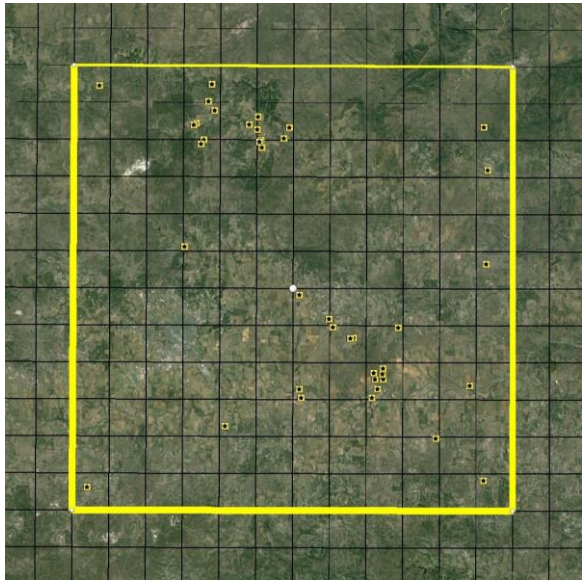
TxSON (Candidate Pixel)

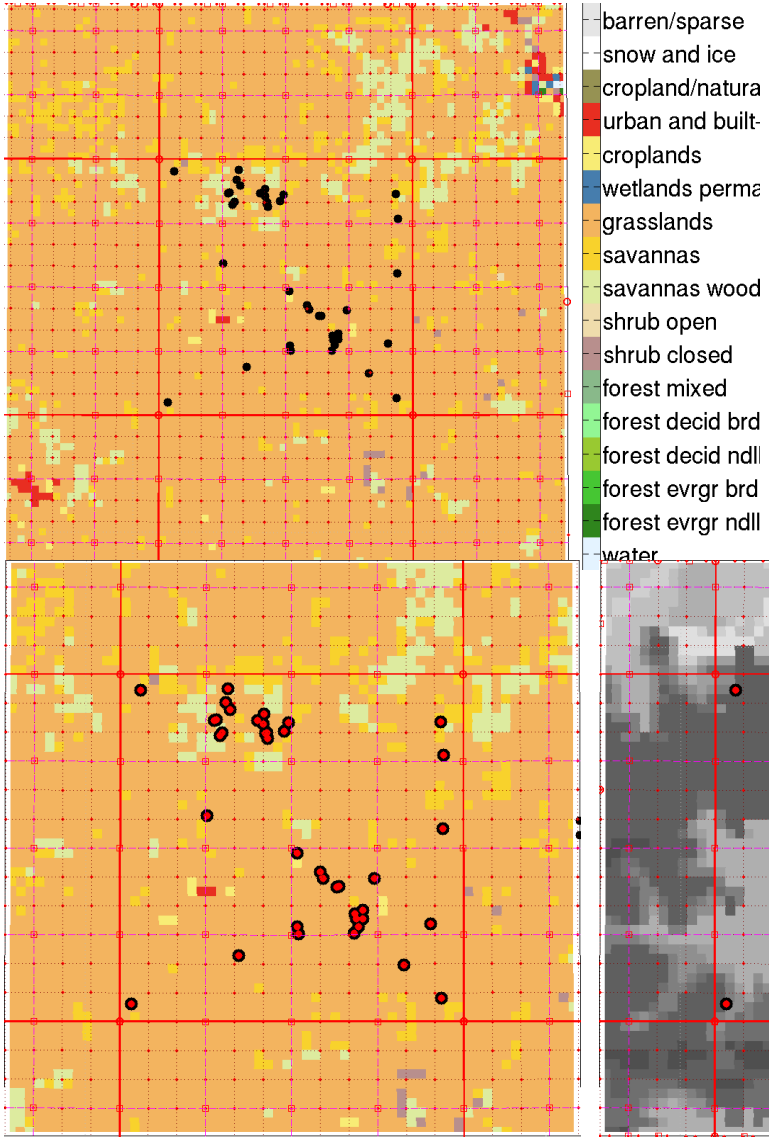
4801-36-01

Ref pixel over UT Austin site; Thiessen Polygon

USA
Lat: 30.31, Lon: -98.78
PI: Todd Caldwell



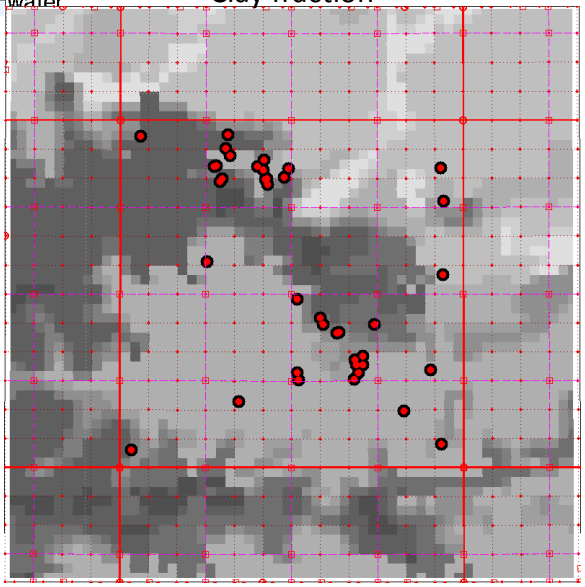




Climate class:
Temperate (Cfa)
Dominant landcover:
Grasslands

Soil texture:
S-%: 33
C-%: 33
BD: 1.42

Clay fraction

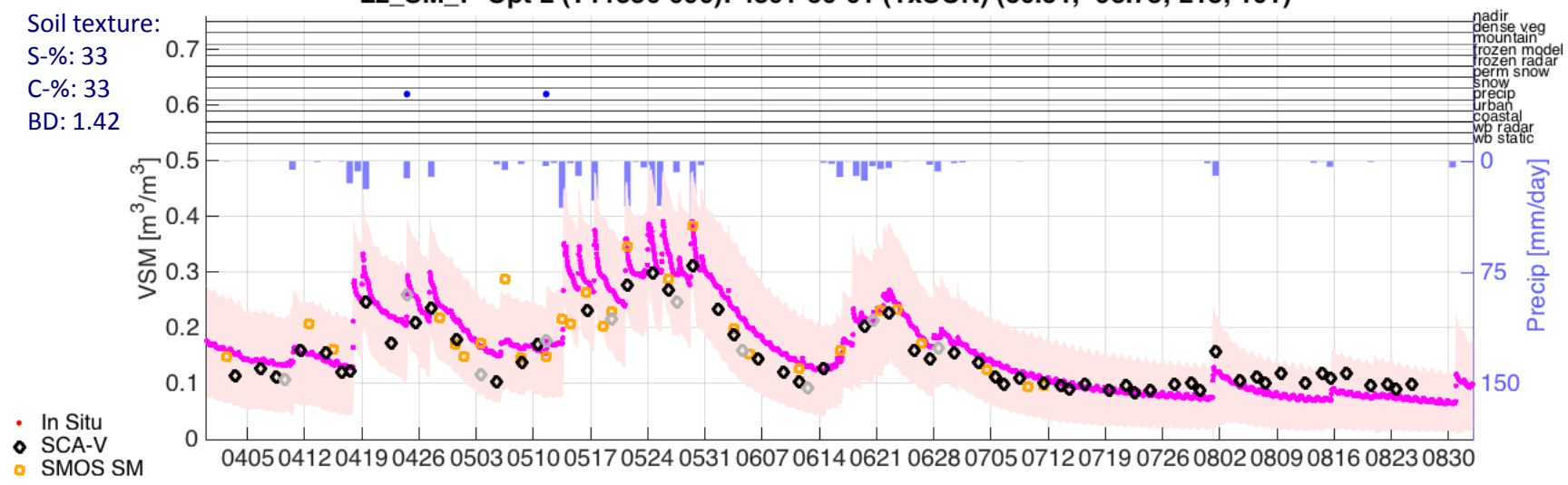


Climate class: Temperate (Cfa)
Landcover: Grasslands

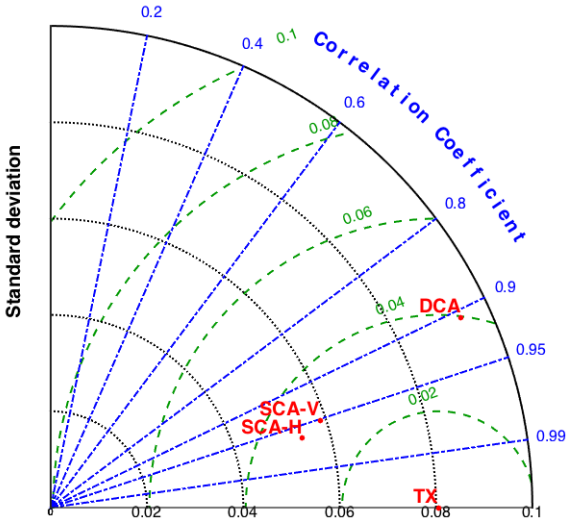
TxSON (Candidate Pixel)

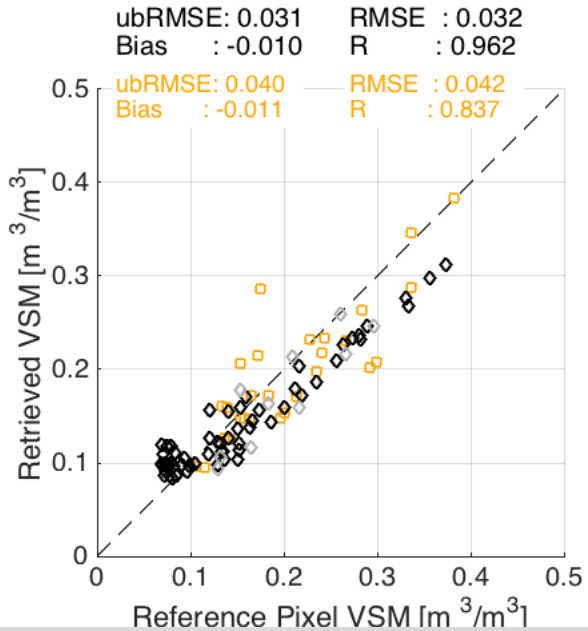
Jet Propulsion Laboratory
California Institute of Technology

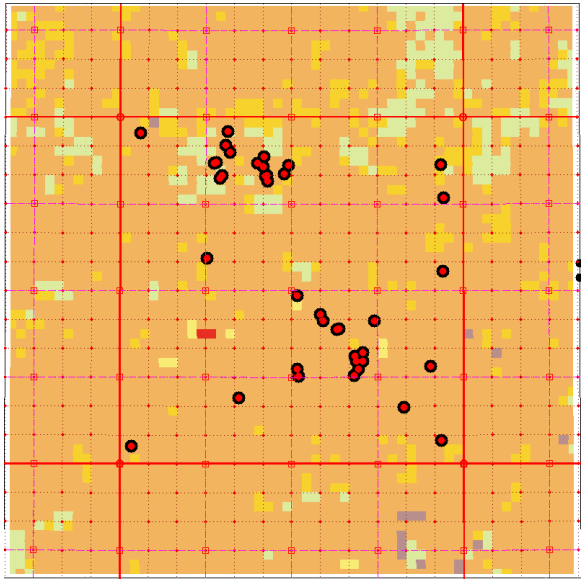
Soil texture:
S-%: 33
C-%: 33
BD: 1.42



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

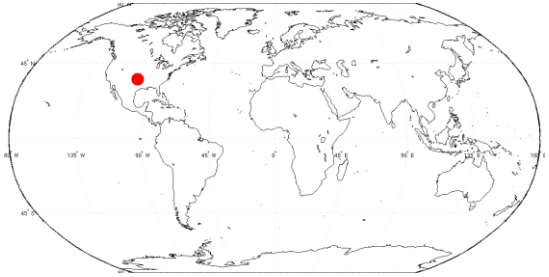
Fort Cobb (Core Pixel)

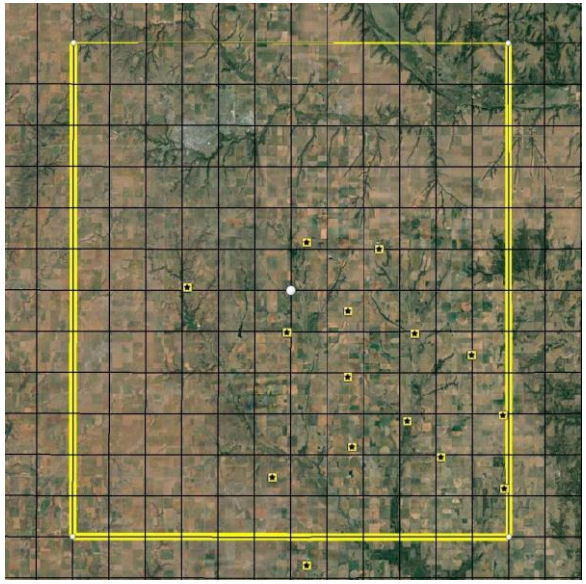
1603-36-01

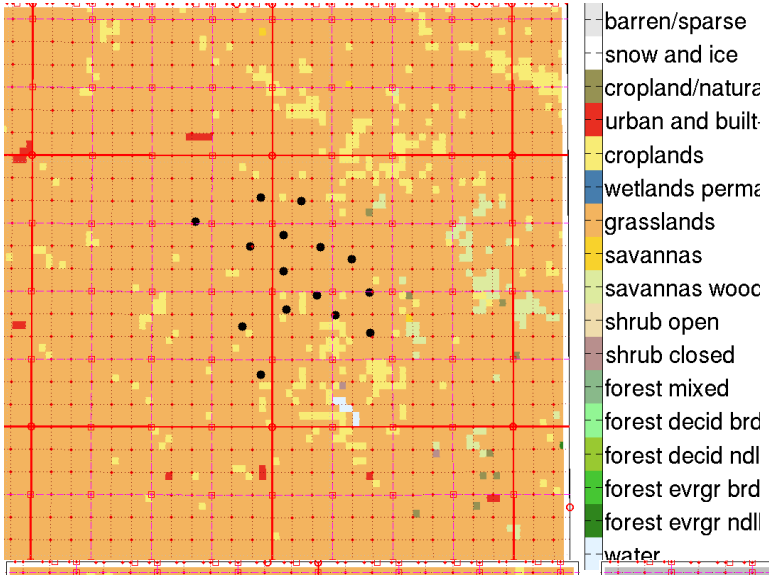
Displaced ref pixel over Fort Cobb OK (scaling by M. Cosh)

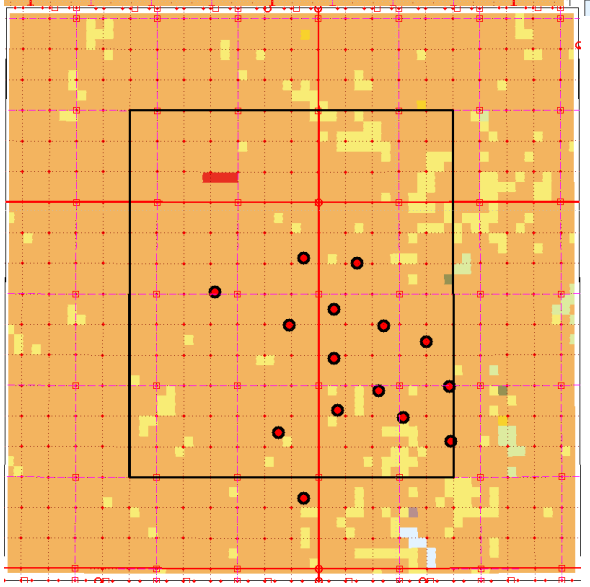
Jet Propulsion Laboratory
California Institute of Technology

USA (Oklahoma)
Lat: 35.42, Lon: -98.62
PI: Michael Cosh

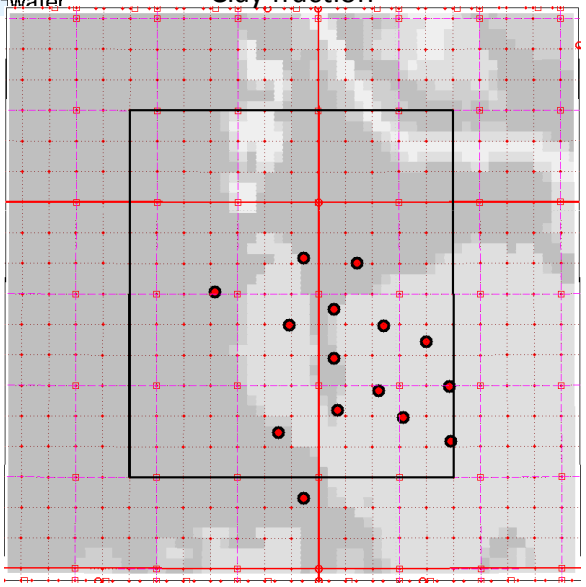








Clay fraction



Climate class:
Temperate (Cfa)
Dominant landcover:
Grasslands

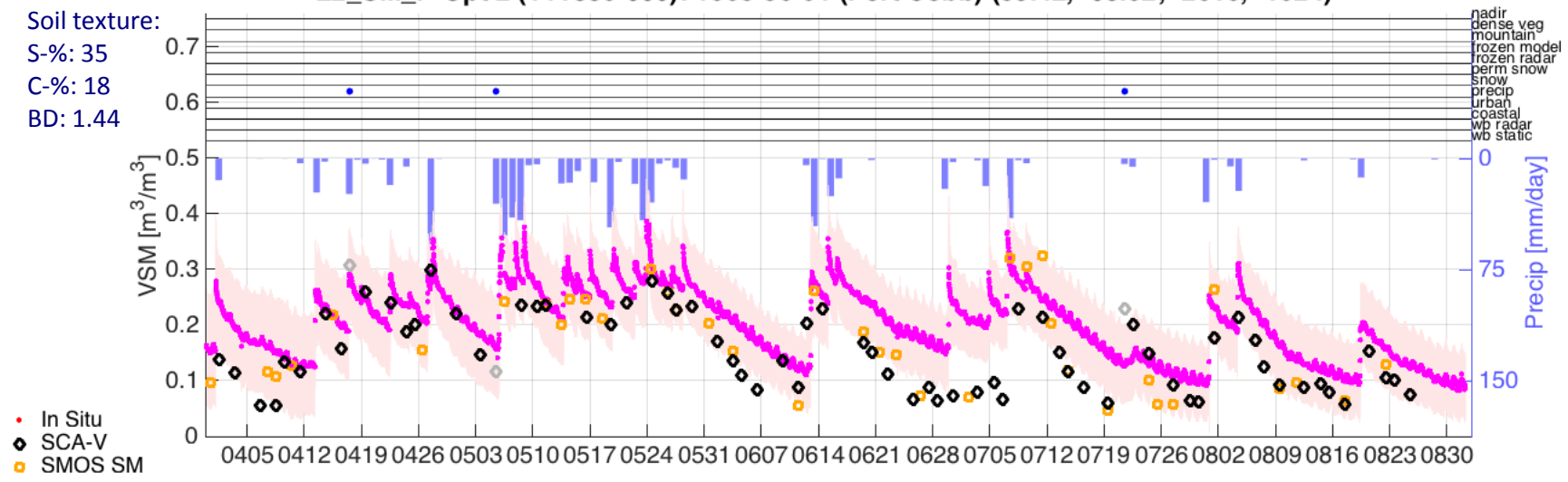
Soil texture:
S-%: 35
C-%: 18
BD: 1.44

Climate class: Temperate (Cfa)
Landcover: Grasslands

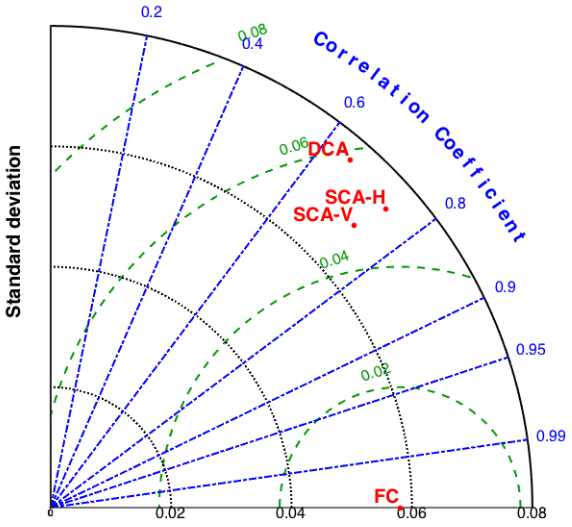
Fort Cobb (Core Pixel)

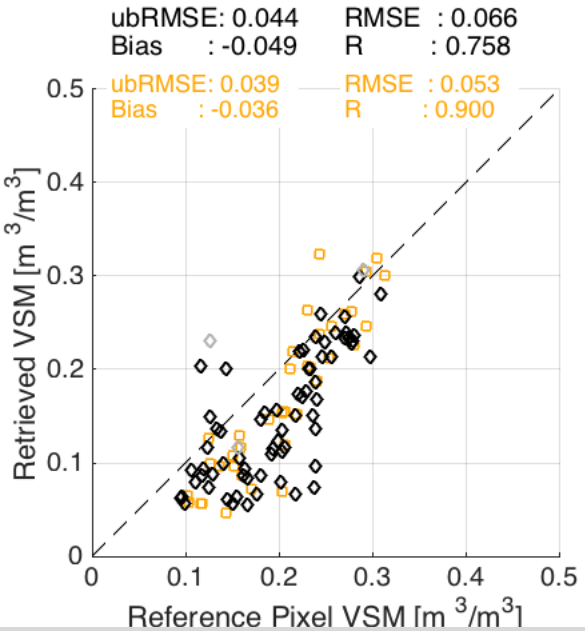
Jet Propulsion Laboratory
California Institute of Technology

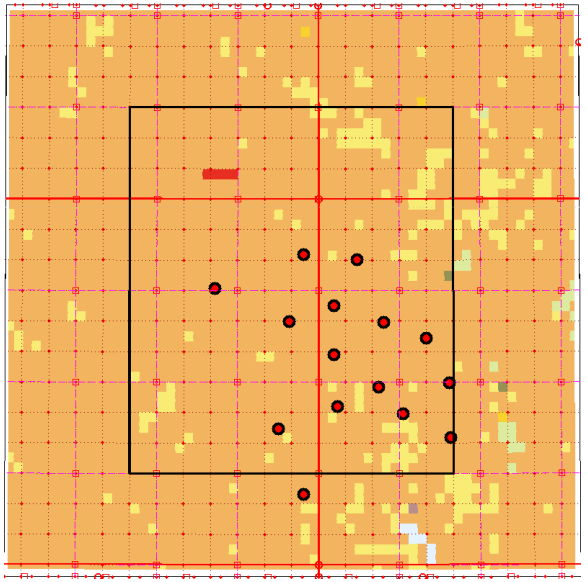
Soil texture:
S-%: 35
C-%: 18
BD: 1.44



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

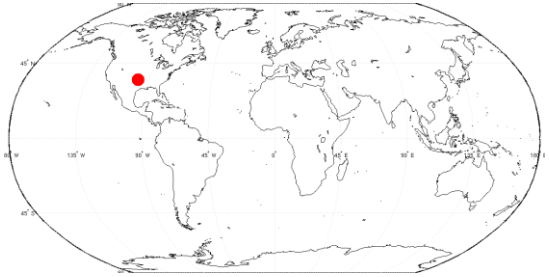
Jet Propulsion Laboratory
California Institute of Technology

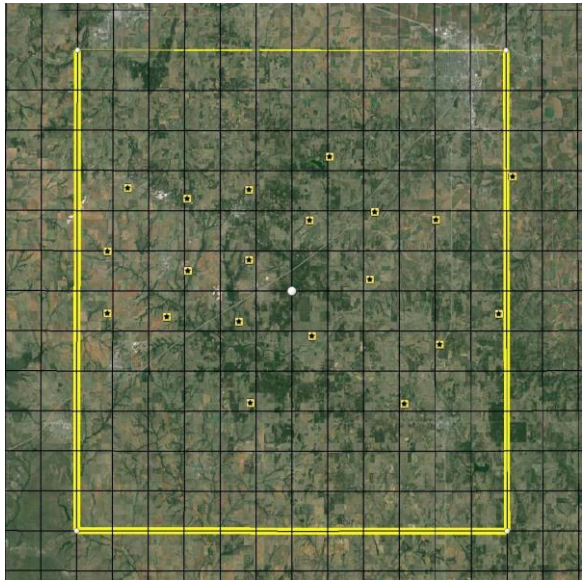
Little Washita (Core Pixel)

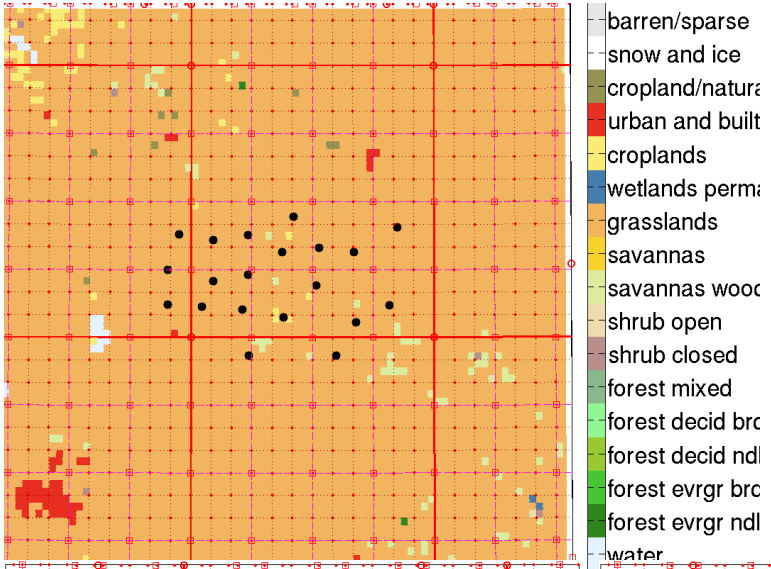
1602-36-01

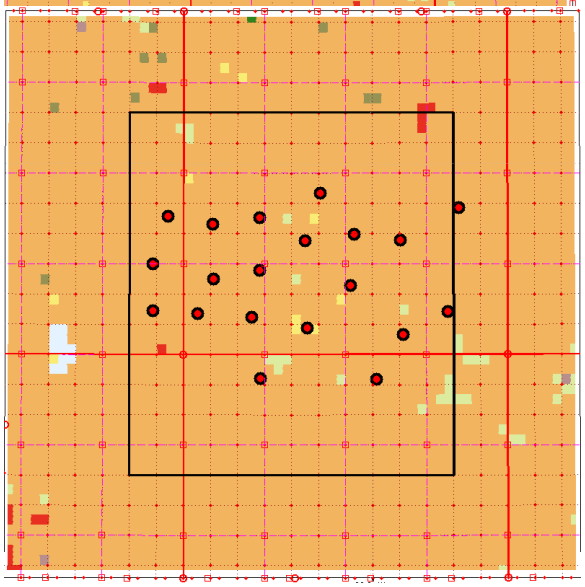
Displaced ref pixel over Little Washita OK (scaling by M. Cosh)

USA (Oklahoma)
Lat: 34.88, Lon: -98.09
PI: Michael Cosh





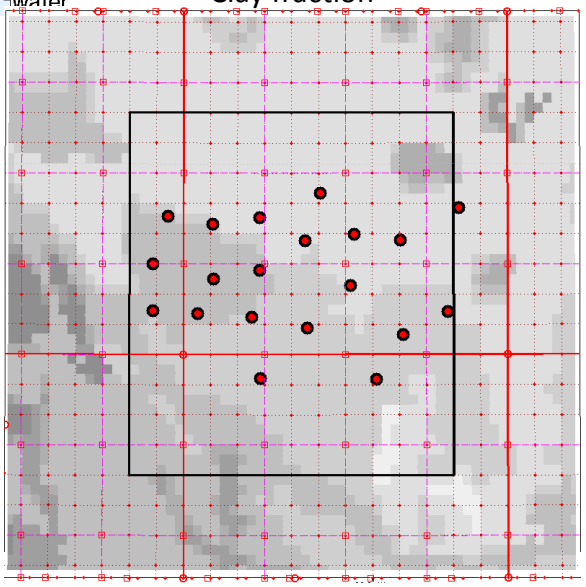




Climate class:
Temperate (Cfa)
Dominant landcover:
Grasslands

Soil texture:
S-%: 51
C-%: 16
BD: 1.44

Clay fraction

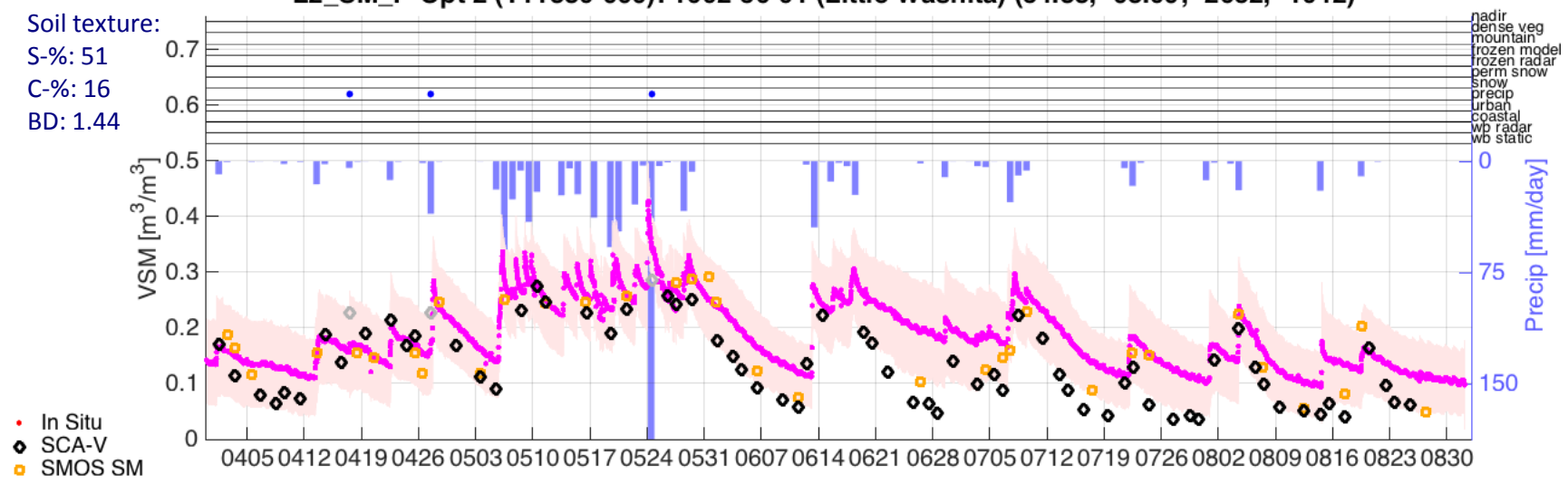


Climate class: Temperate (Cfa)
Landcover: Grasslands

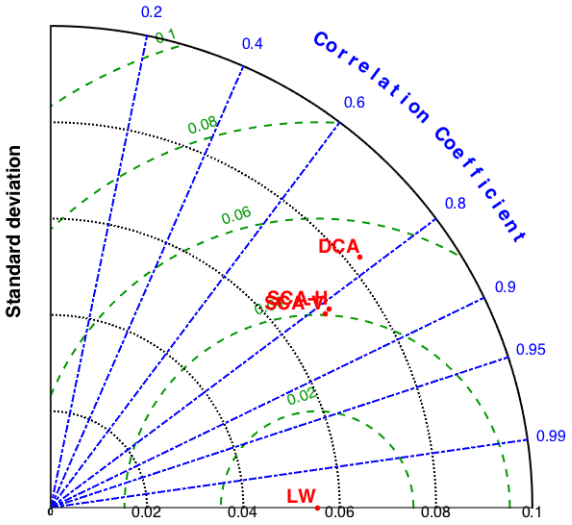
Little Washita (Core Pixel)

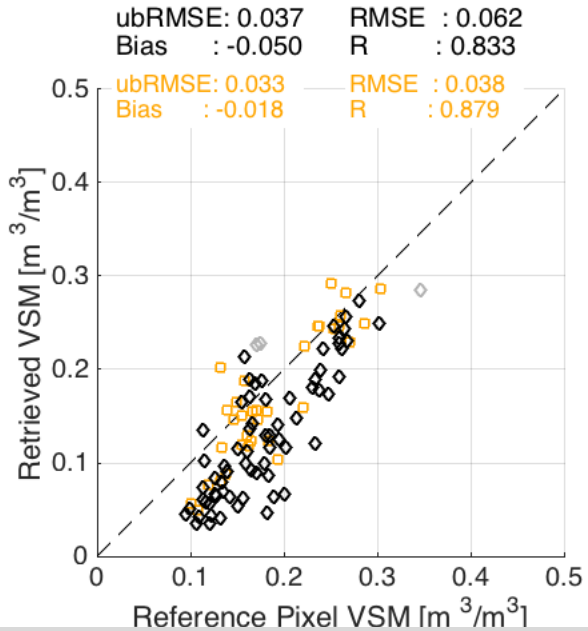
Jet Propulsion Laboratory
California Institute of Technology

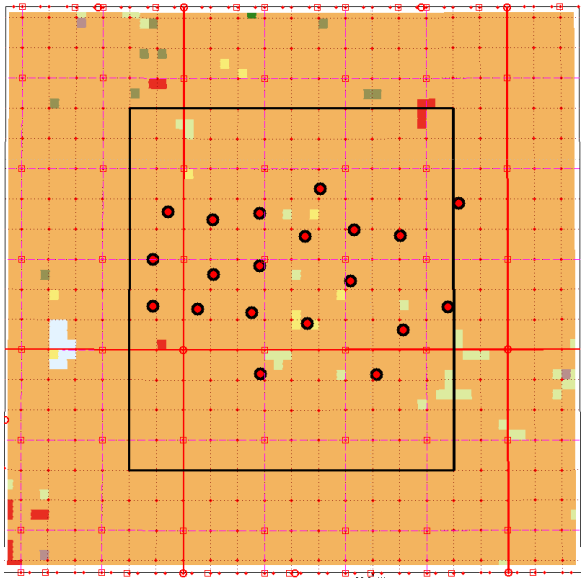
Soil texture:
S-%: 51
C-%: 16
BD: 1.44



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

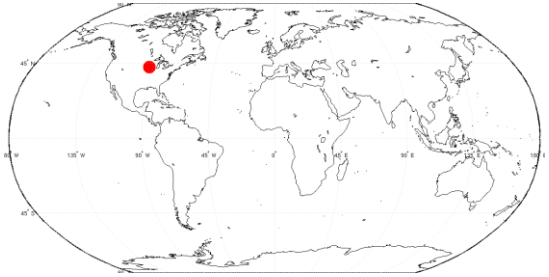
South Fork (Core Pixel)

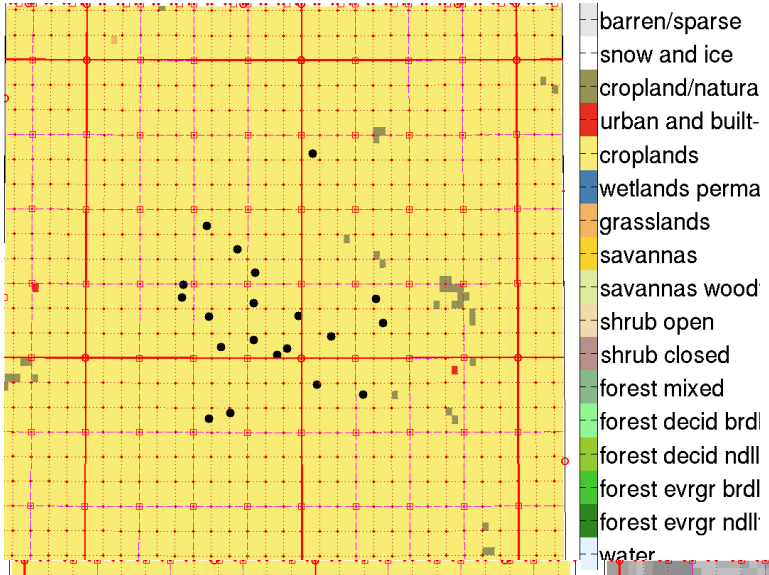
1607-36-01

Displaced ref pixel over South Fork IA (scaling by M. Cosh)

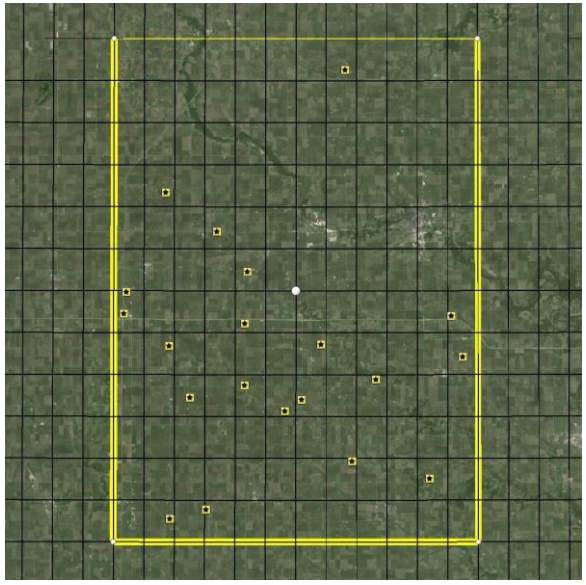
Jet Propulsion Laboratory
California Institute of Technology

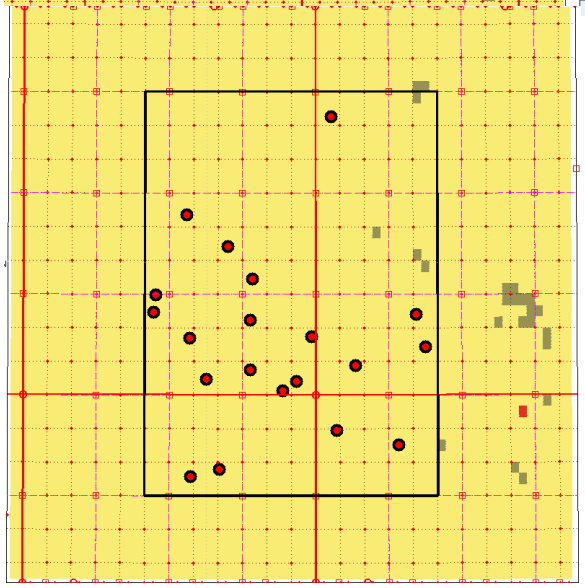
USA (Iowa)
Lat: 42.47, Lon: -93.39
PI: Michael Cosh



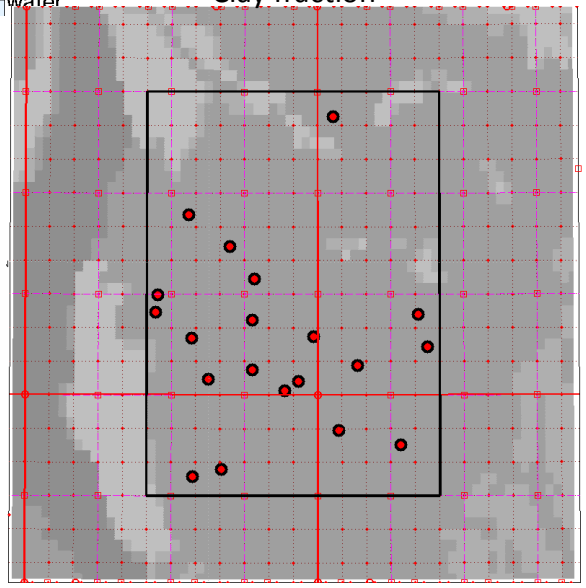


Climate class:
Cold (Dfa)
Dominant landcover:
Croplands
Soil texture:
S-%: 37
C-%: 30
BD: 1.35





Clay fraction

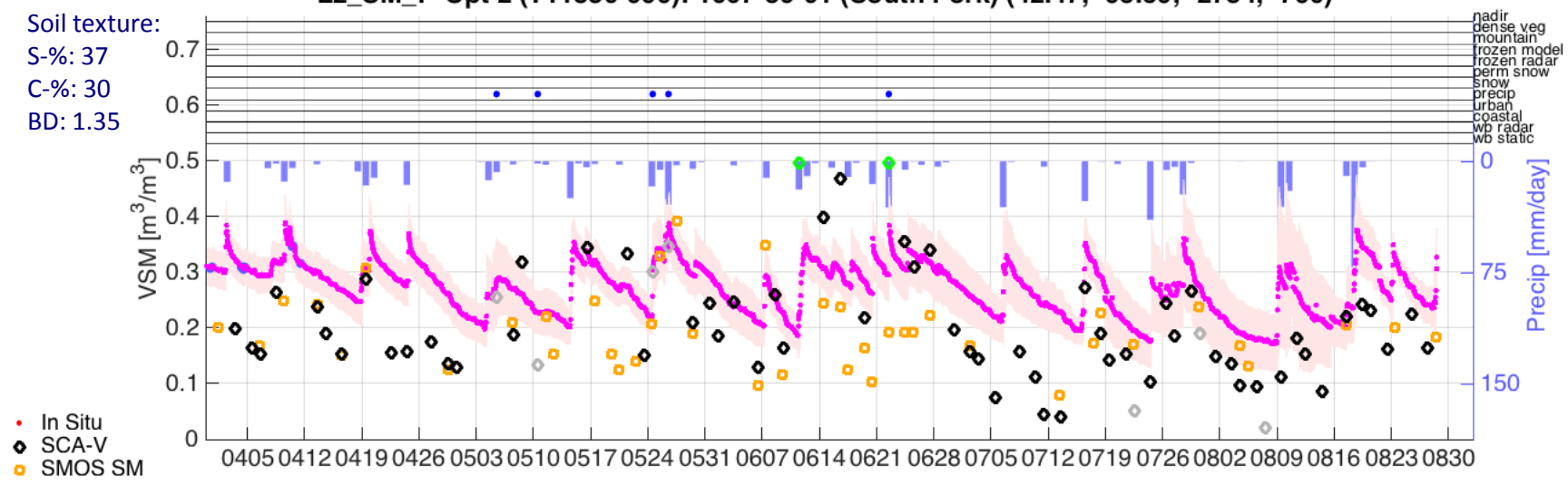


Climate class: Cold (Dfa)
Landcover: Croplands

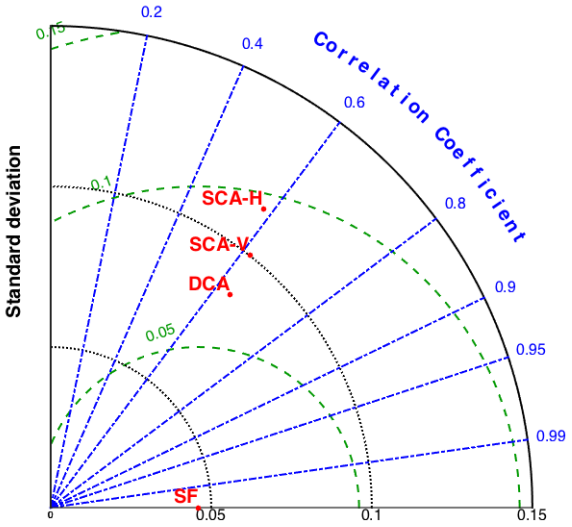
South Fork (Core Pixel)

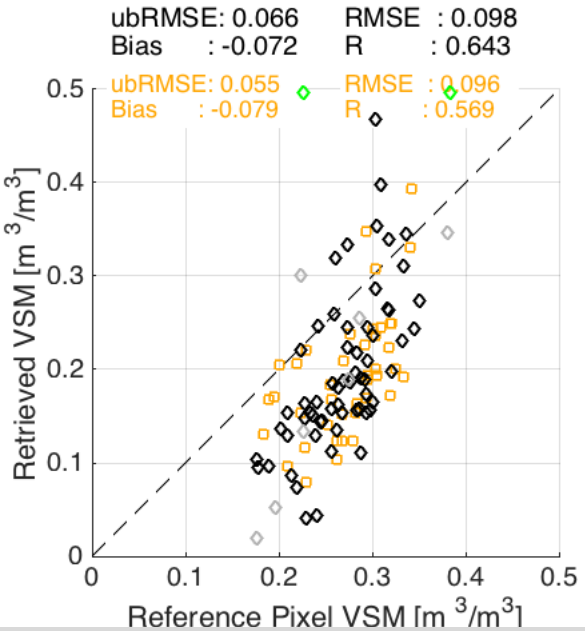
Jet Propulsion Laboratory
California Institute of Technology

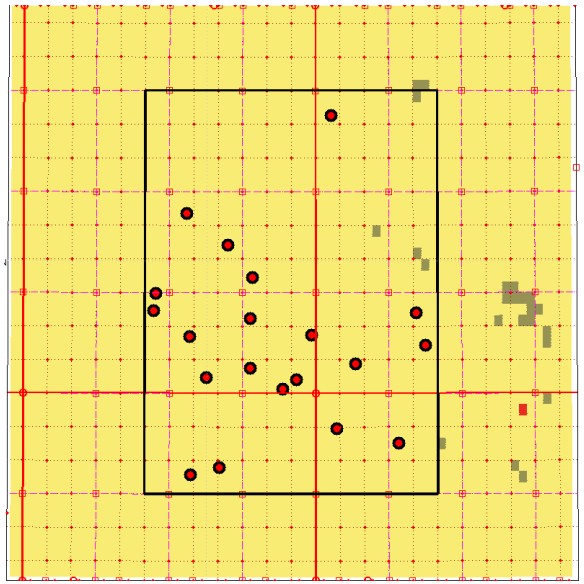
Soil texture:
S-%: 37
C-%: 30
BD: 1.35



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

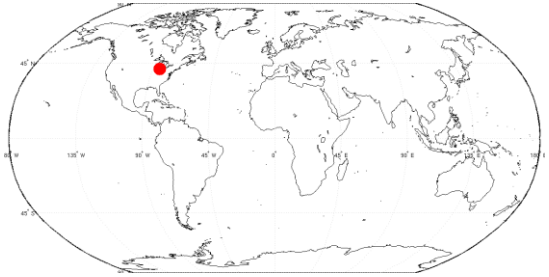
St Josephs (Candidate Pixel)

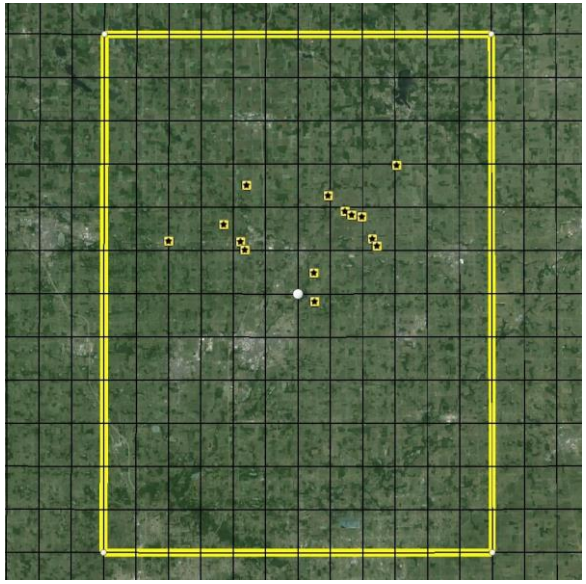
1606-36-01

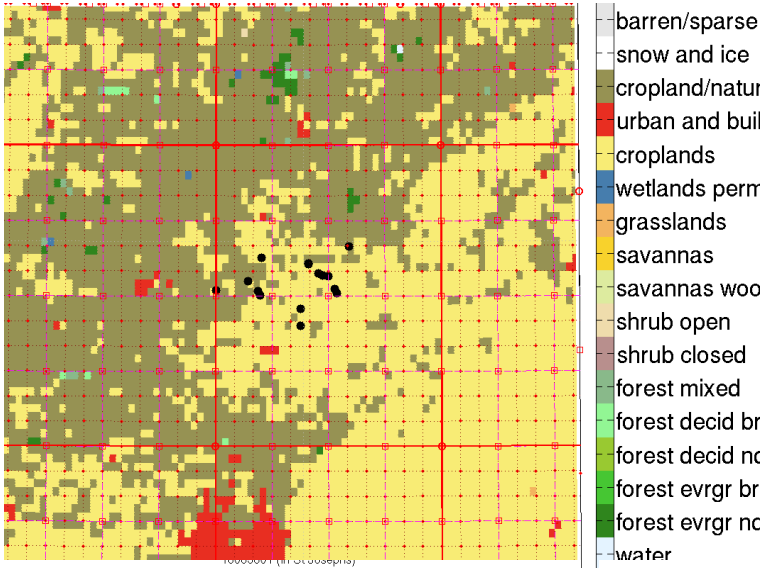
Displaced ref pixel over St. Joseph's IN (scaling by M. Cosh)

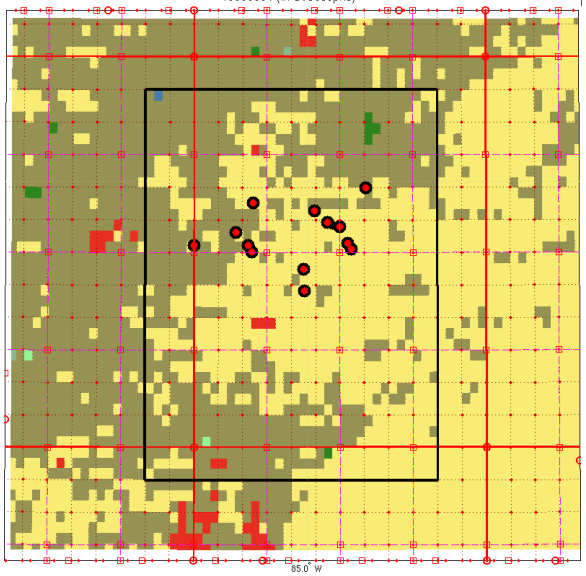
Jet Propulsion Laboratory
California Institute of Technology

USA (Indiana)
Lat: 41.40, Lon: -85.02
PI: Michael Cosh

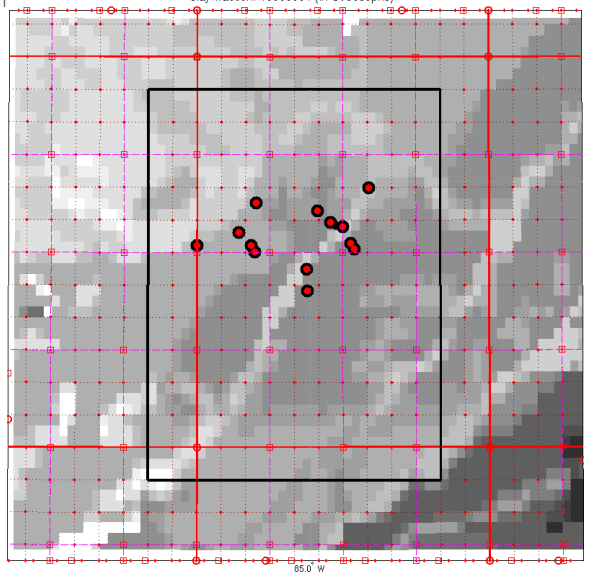








Clay fraction



Climate class:
Cold (Dfa)
Dominant landcover:
Croplands

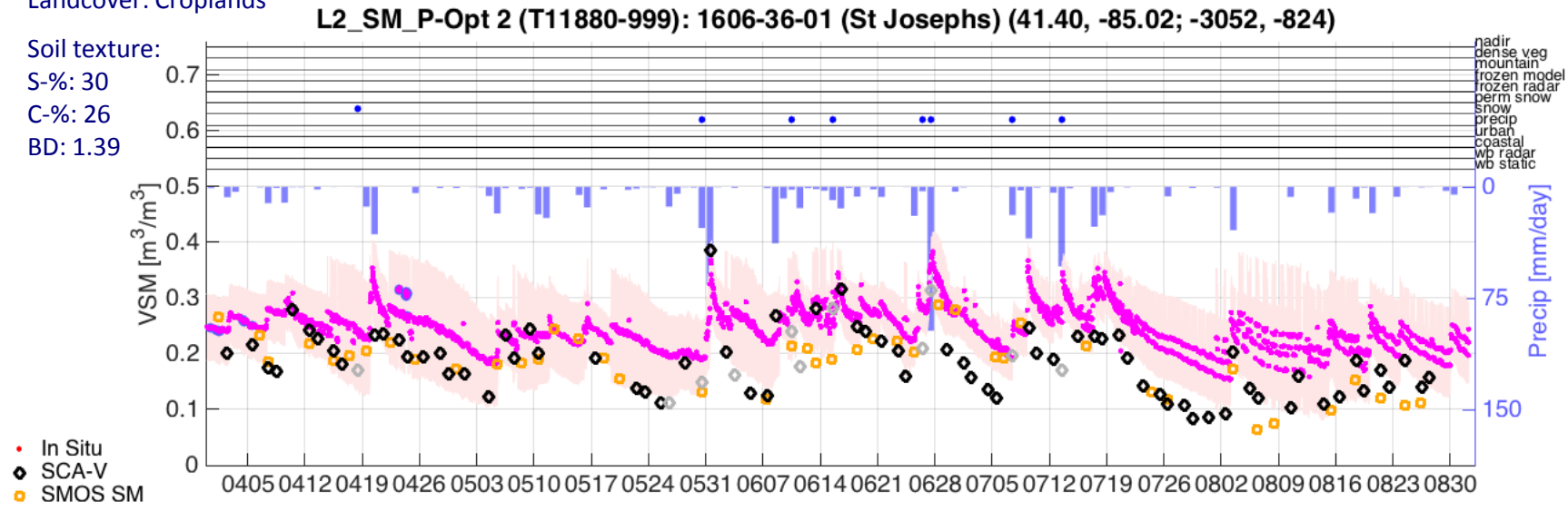
Soil texture:
S-%: 30
C-%: 26
BD: 1.39

Climate class: Cold (Dfa)
Landcover: Croplands

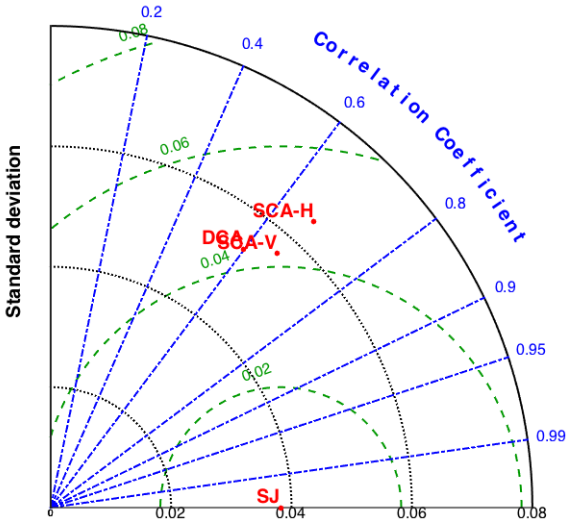
St Josephs (Candidate Pixel)

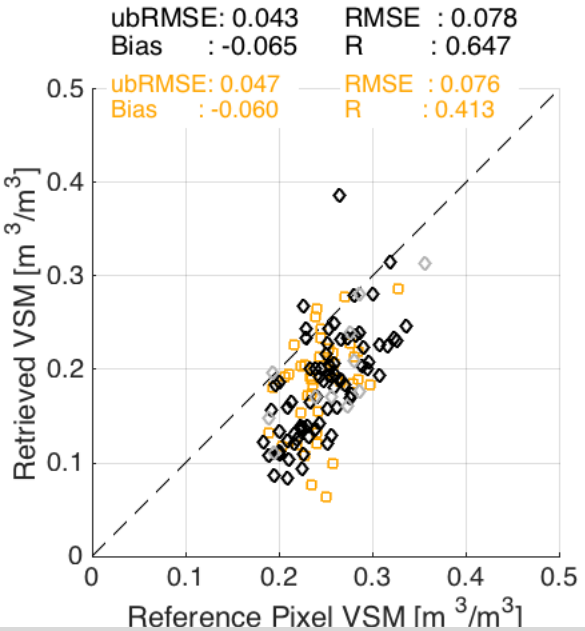
Jet Propulsion Laboratory
California Institute of Technology

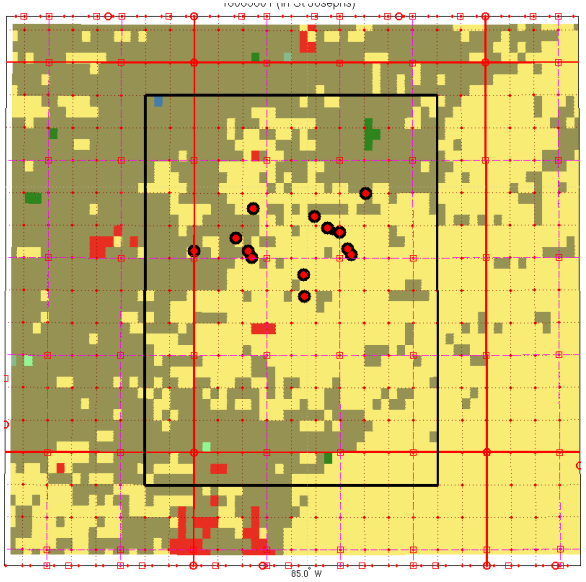
Soil texture:
S-%: 30
C-%: 26
BD: 1.39



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

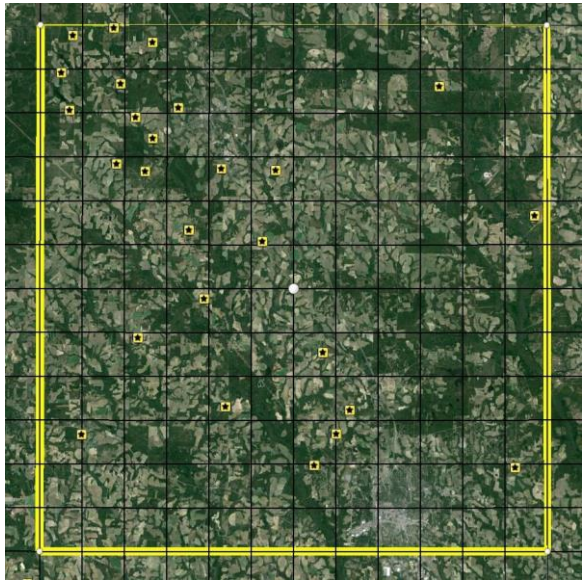
Little River (Core Pixel)

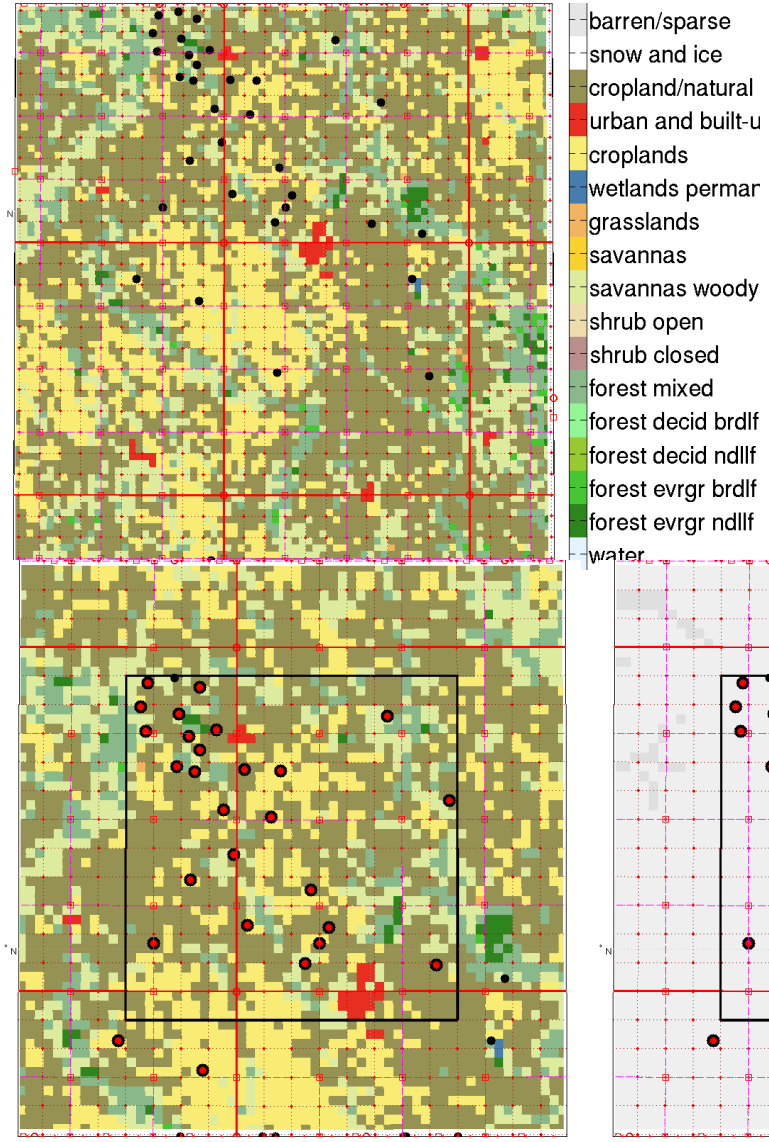
1604-36-01

Displaced ref pixel over Little River GA (scaling by M. Cosh)

Jet Propulsion Laboratory
California Institute of Technology

USA (Georgia)
Lat: 31.60, Lon: -83.59
PI: Michael Cosh

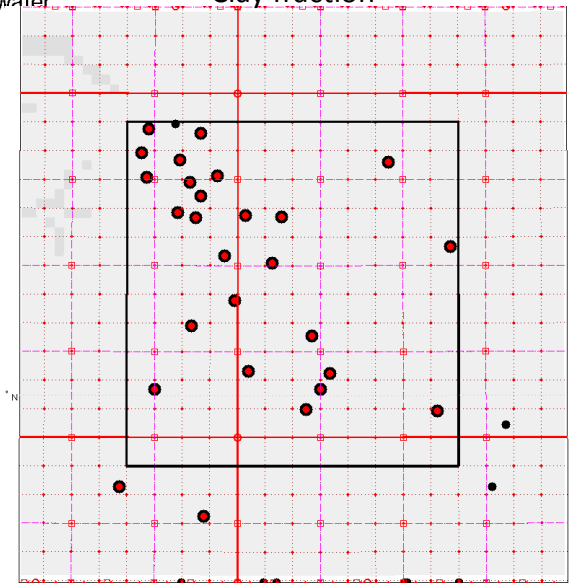




Climate class:
Temperate (Cfa)
Dominant landcover:
Cropland/natural mosaic

Soil texture:
S-%: 80
C-%: 7
BD: 1.47

Clay fraction

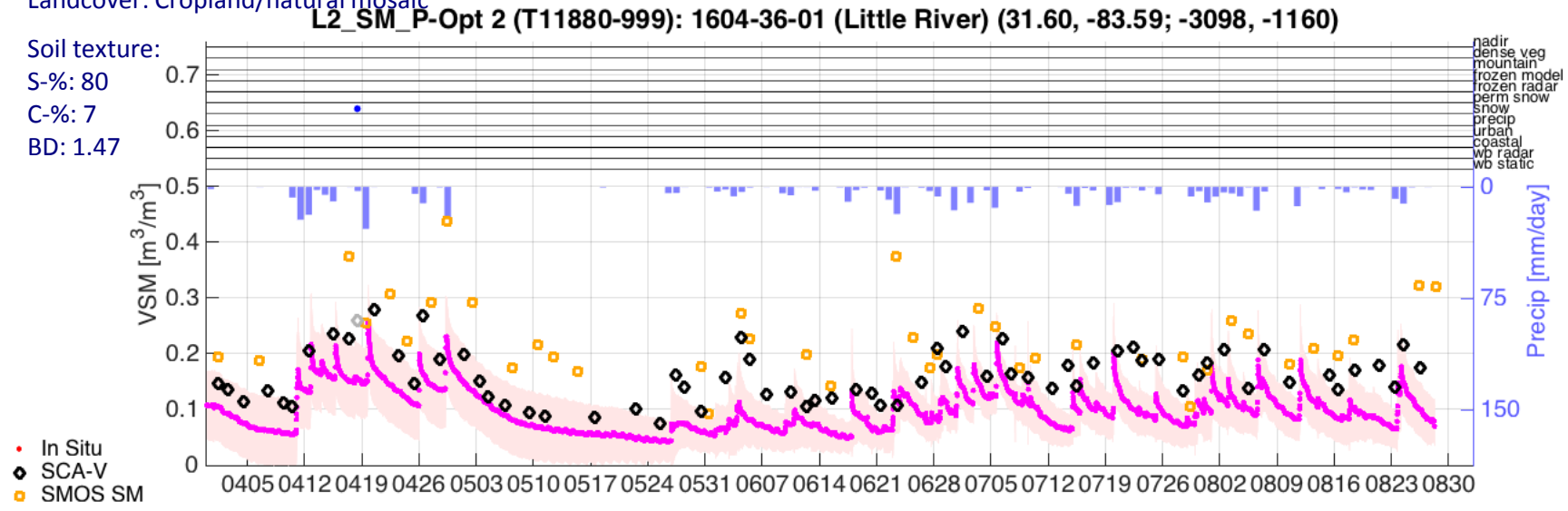


Climate class: Temperate (Cfa)
Landcover: Cropland/natural mosaic

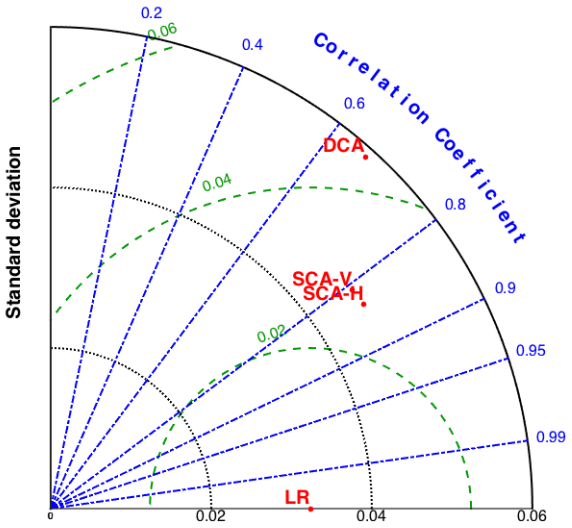
Little River (Core Pixel)

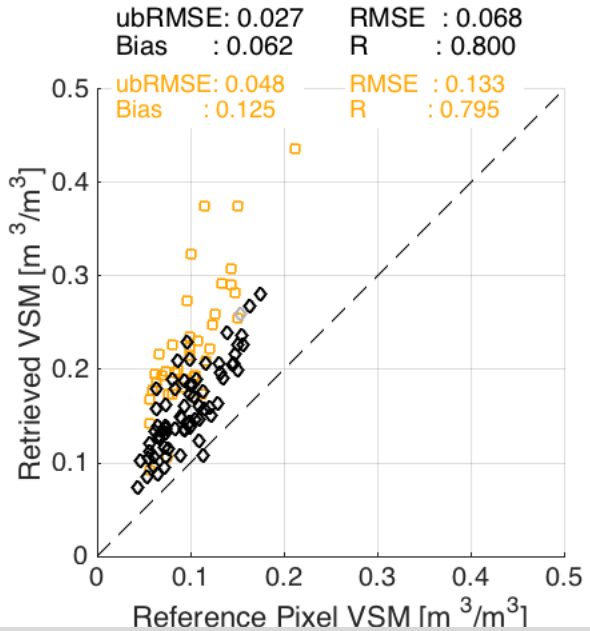
Jet Propulsion Laboratory
California Institute of Technology

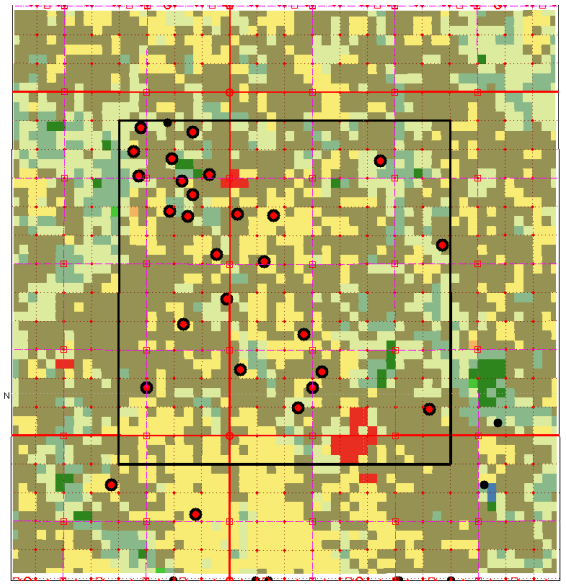
Soil texture:
S-%: 80
C-%: 7
BD: 1.47



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

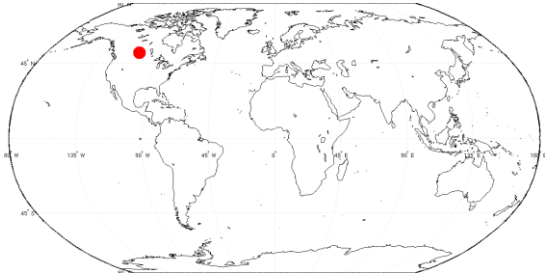
Kenaston (Core Pixel)

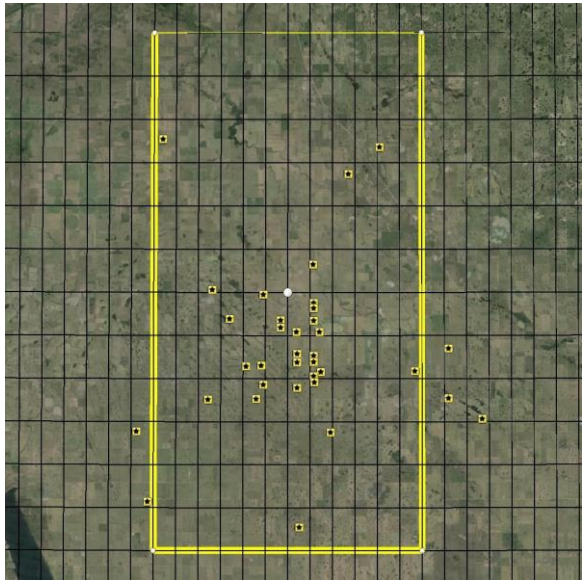
2701-36-01

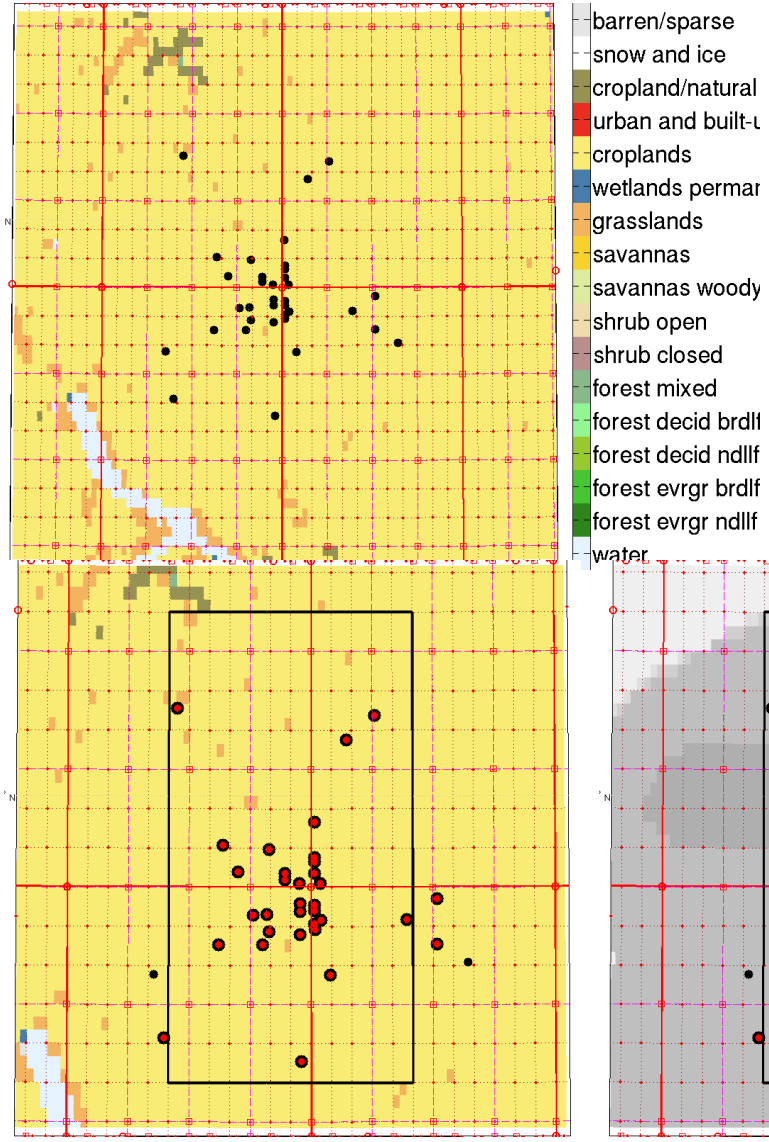
Displaced ref pixel over Kenaston Canada; Thiessen Polygon

Jet Propulsion Laboratory
California Institute of Technology

Canada
Lat: 51.45, Lon: -106.46
PI: Aaron Berg



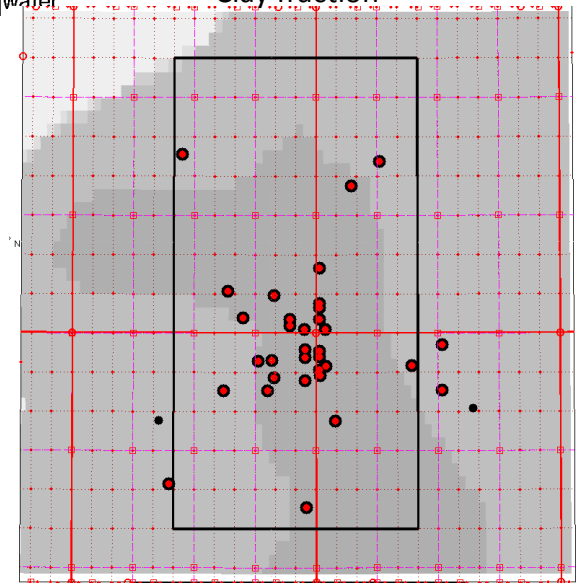




Climate class:
Cold (Dfb)
Dominant landcover:
Croplands

Soil texture:
S-%: 32
C-%: 23
BD: 1.22

Clay fraction

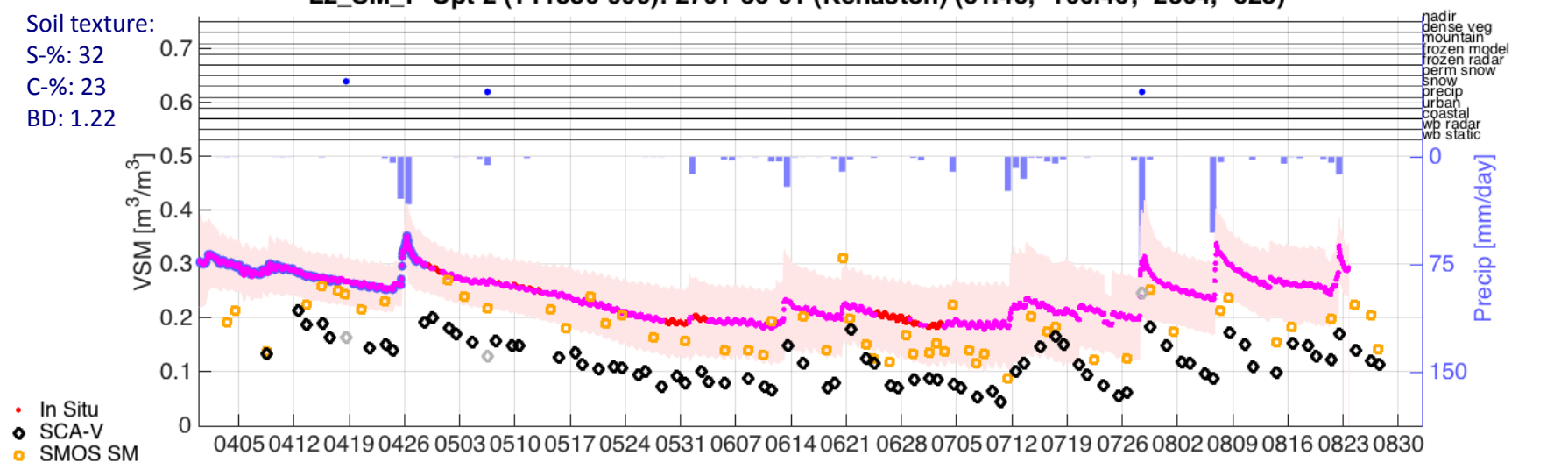


Climate class: Cold (Dfb)
Landcover: Croplands

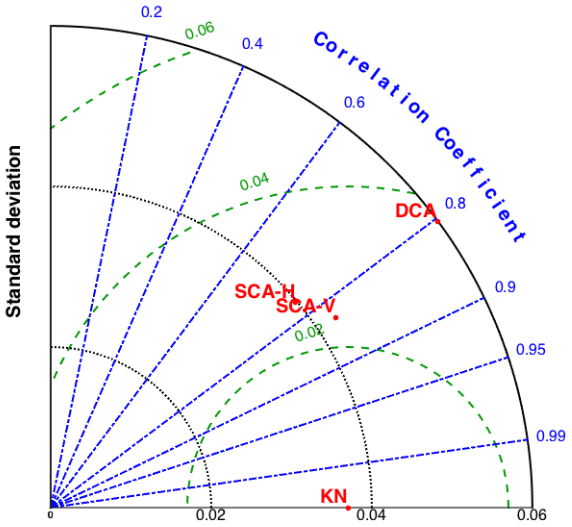
Kenaston (Core Pixel)

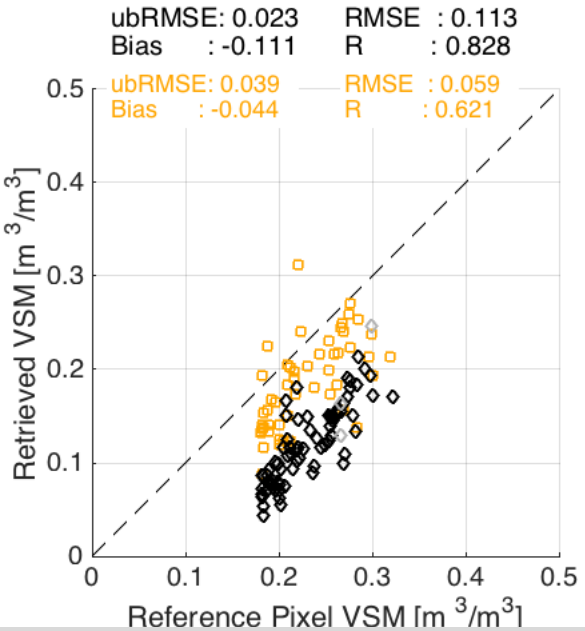
Jet Propulsion Laboratory
California Institute of Technology

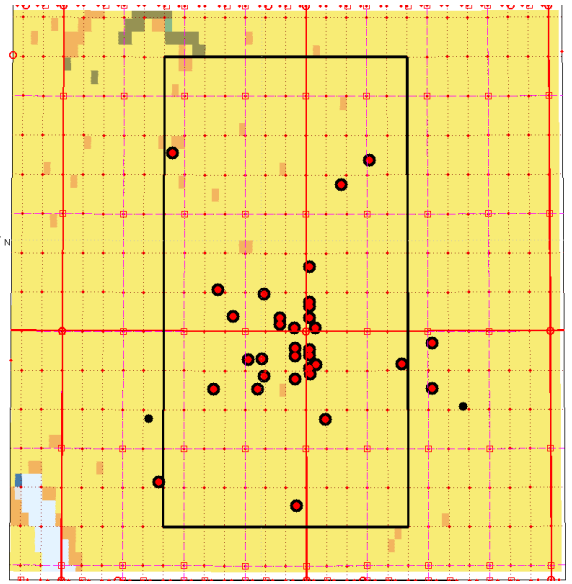
Soil texture:
S-%: 32
C-%: 23
BD: 1.22



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

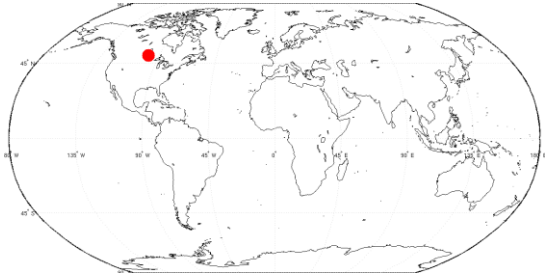
Carman (Core Pixel)

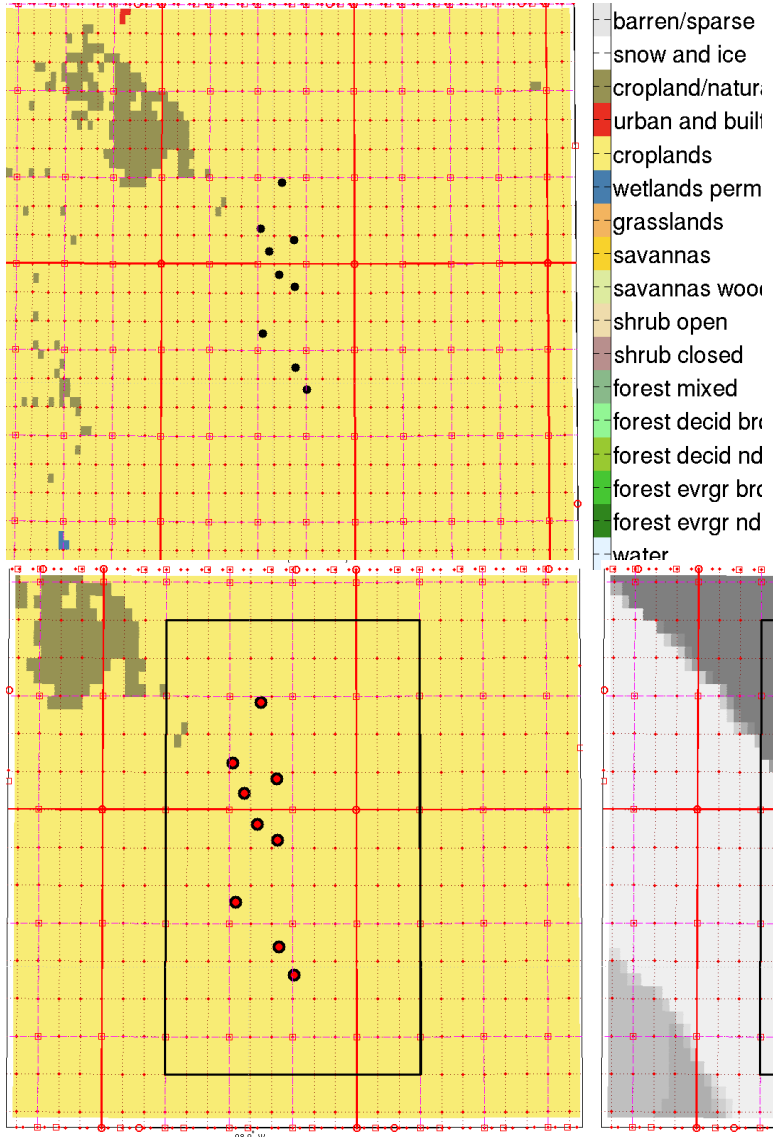
Jet Propulsion Laboratory
California Institute of Technology

0901-36-01

Displaced ref pixel over Carman Canada; Soil type based weighting (A. Pacheco)

Canada
Lat: 49.61, Lon: -97.94
PI: Heather McNairn

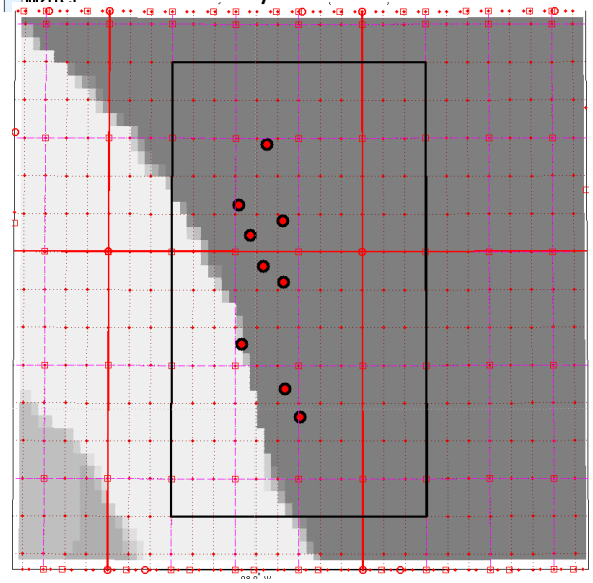




Climate class:
Cold (Dfb)
Dominant landcover:
Croplands

Soil texture:
S-%: 23
C-%: 35
BD: 1.18

Clay fraction

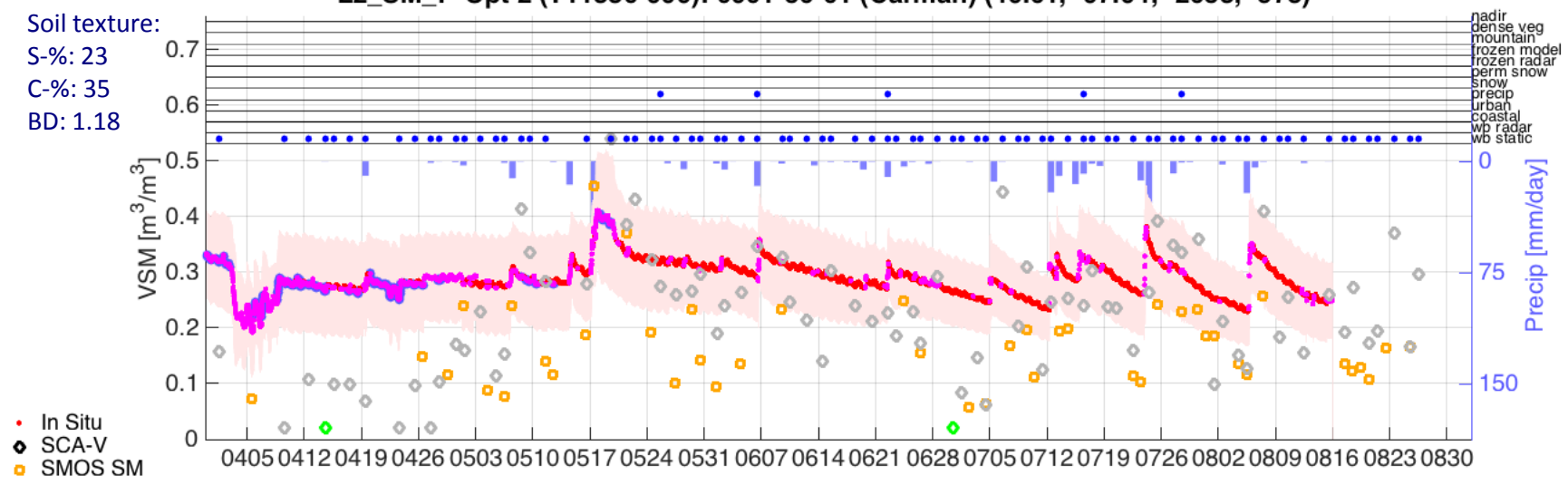


Climate class: Cold (Dfb)
Landcover: Croplands

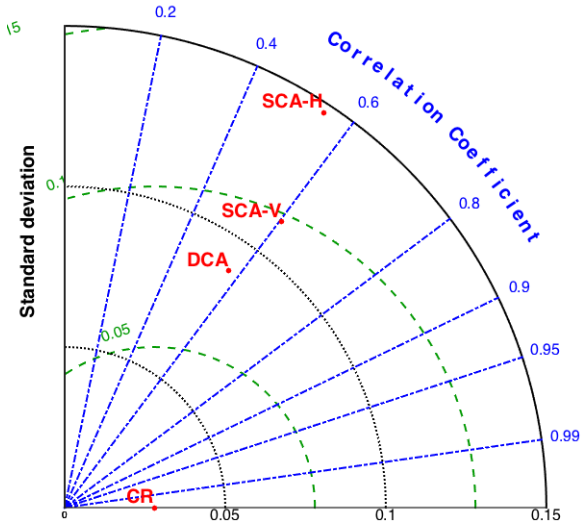
Carman (Core Pixel)

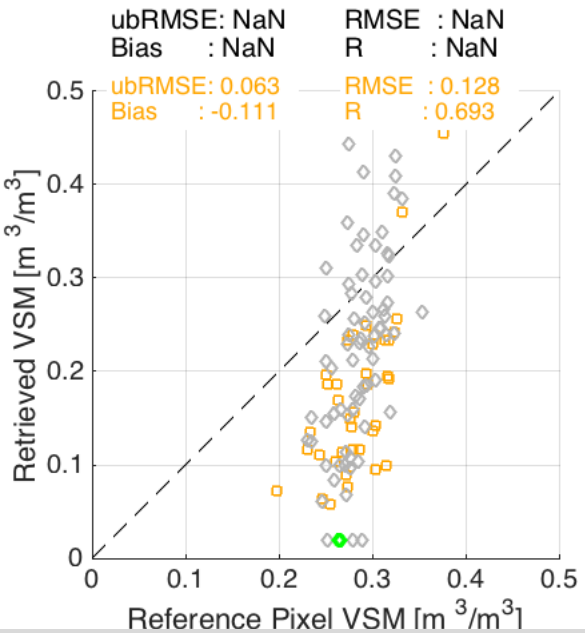
Jet Propulsion Laboratory
California Institute of Technology

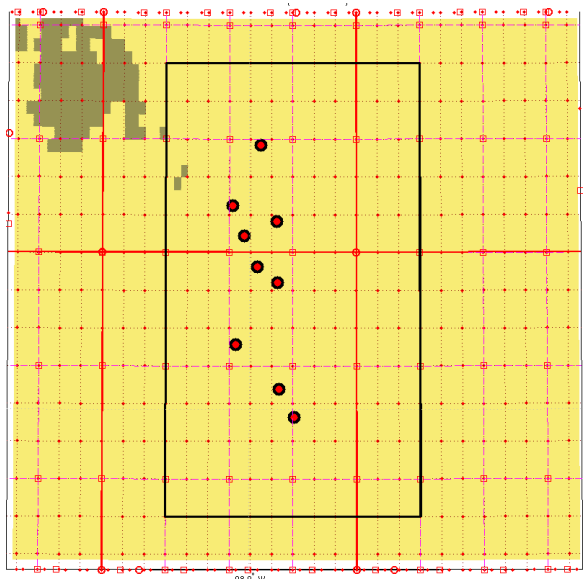
Soil texture:
S-%: 23
C-%: 35
BD: 1.18



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

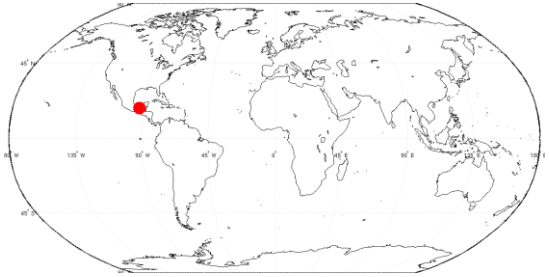
Jet Propulsion Laboratory
California Institute of Technology

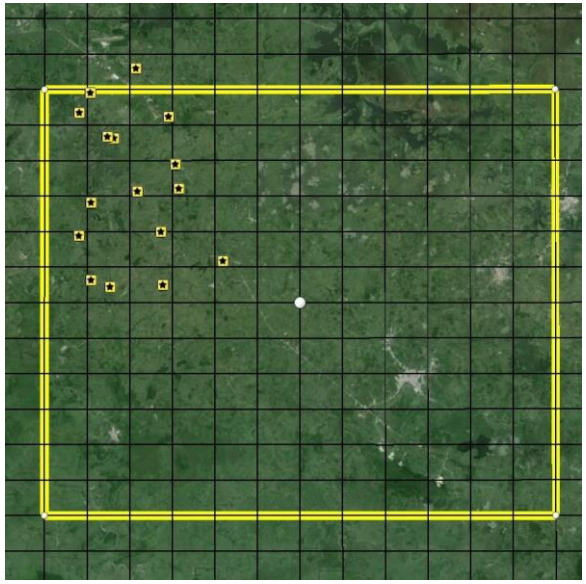
Tabasco (Candidate Pixel)

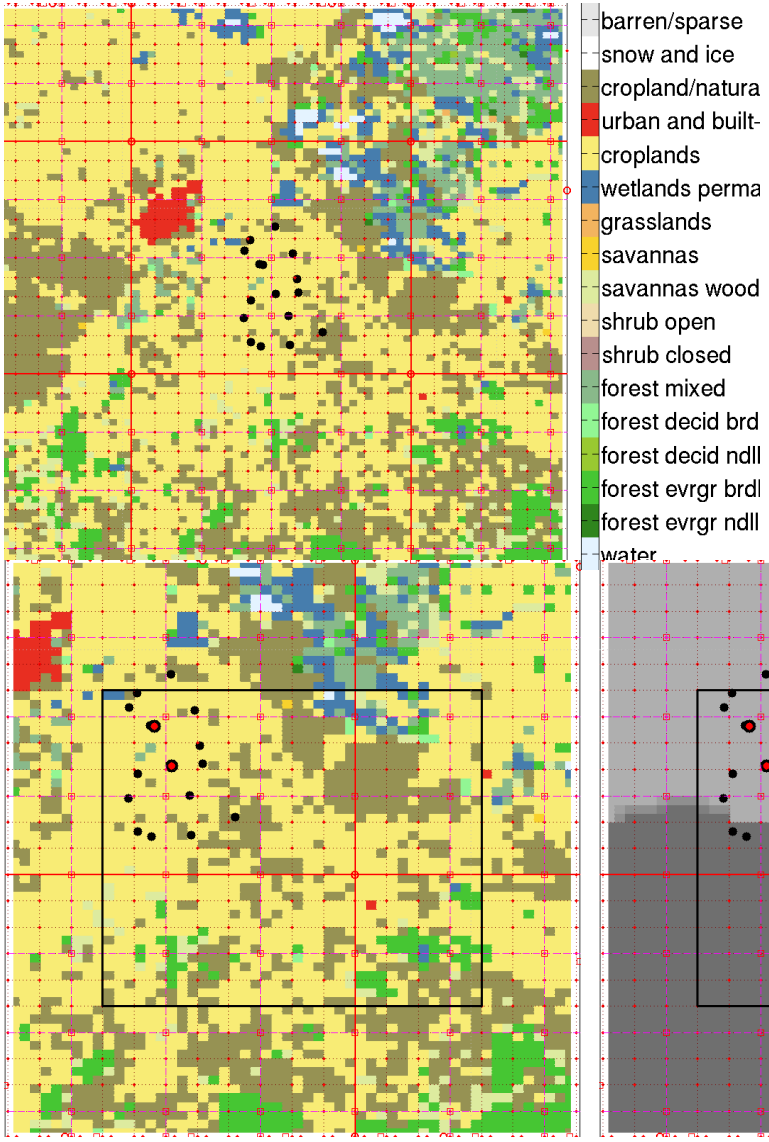
3201-36-01

Displaced ref pixel over Tabasco Mexico

Mexico
Lat: 17.81, Lon: -92.68
PI: Judith Ramos Hernandez

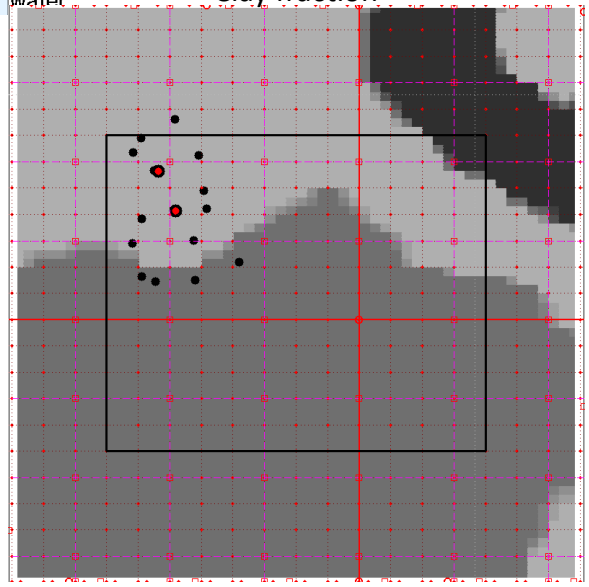






Climate class:
Tropical (Am)
Dominant landcover:
Croplands
Soil texture:
S-%: 38
C-%: 39
BD: 1.47

Clay fraction

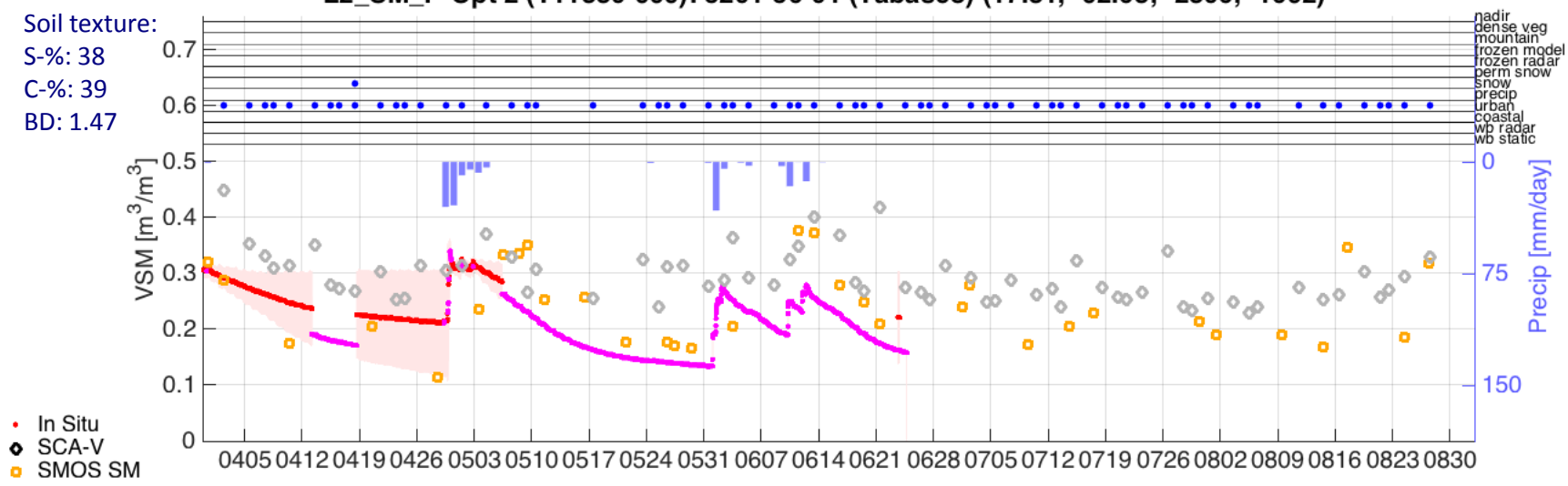


Climate class: Tropical (Am)
Landcover: Croplands

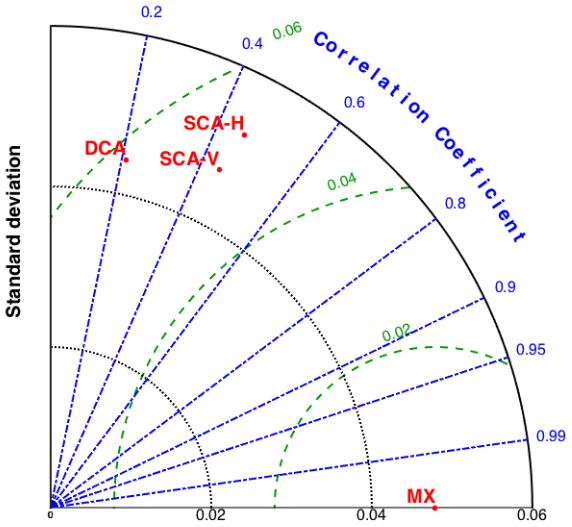
Tabasco (Candidate Pixel)

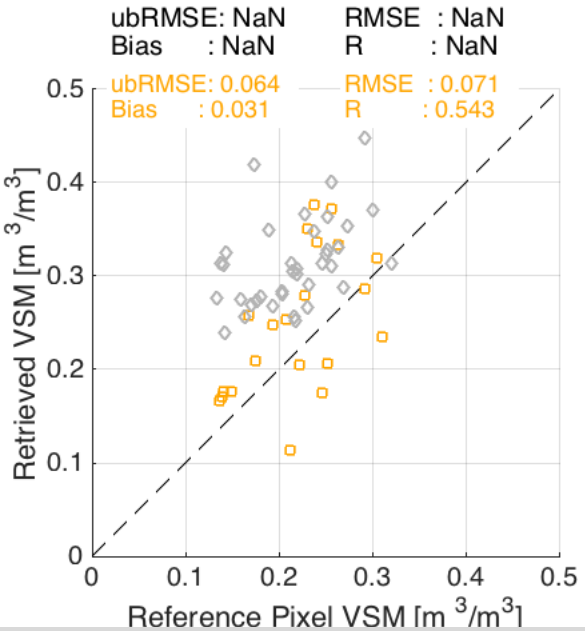
Jet Propulsion Laboratory
California Institute of Technology

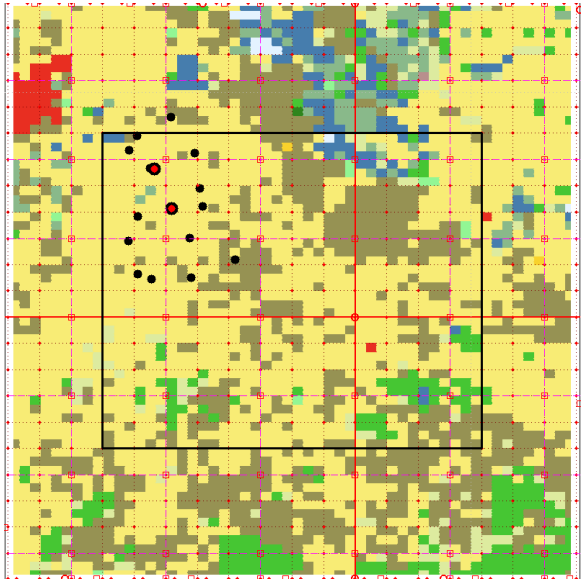
Soil texture:
S-%: 38
C-%: 39
BD: 1.47



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

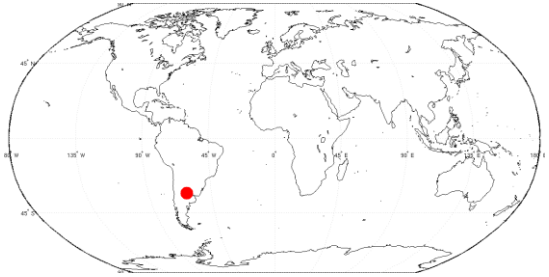
Jet Propulsion Laboratory
California Institute of Technology

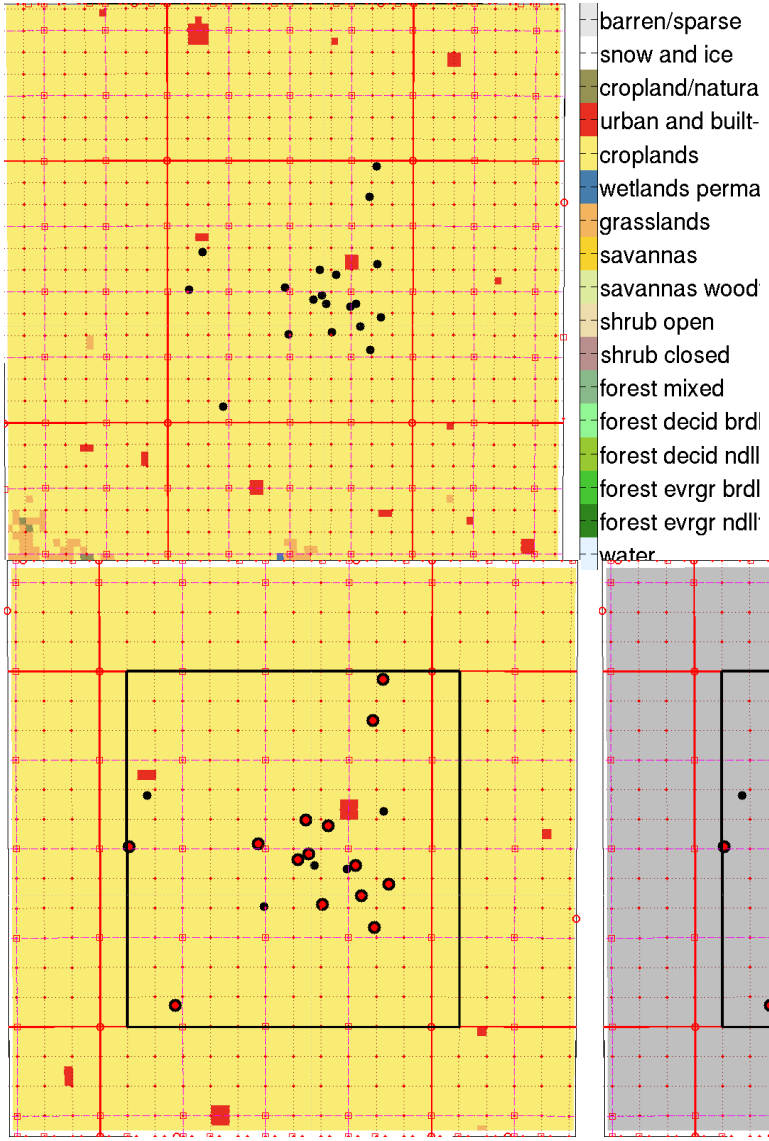
Monte Buey (Core Pixel)

1902-36-01

Displaced ref pixel at Monte Buey; Thiessen Polygon

Argentina
Lat: -32.96, Lon: -62.52
PI: Marc Thibeault

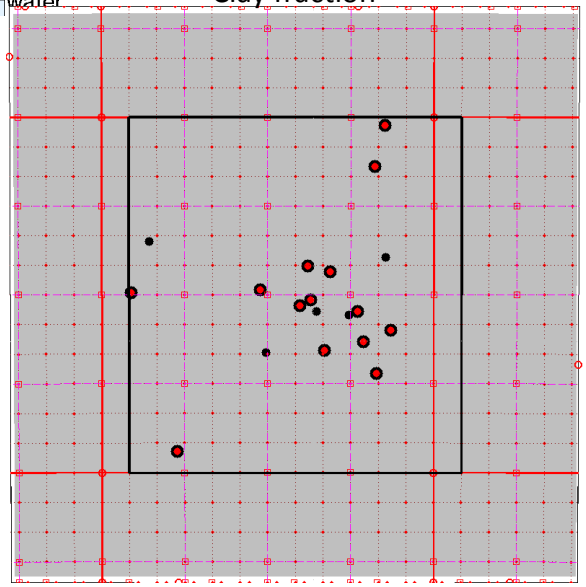




Climate class:
Temperate (Cwa)
Dominant landcover:
Croplands

Soil texture:
S-%: 24
C-%: 19
BD: 1.30

Clay fraction

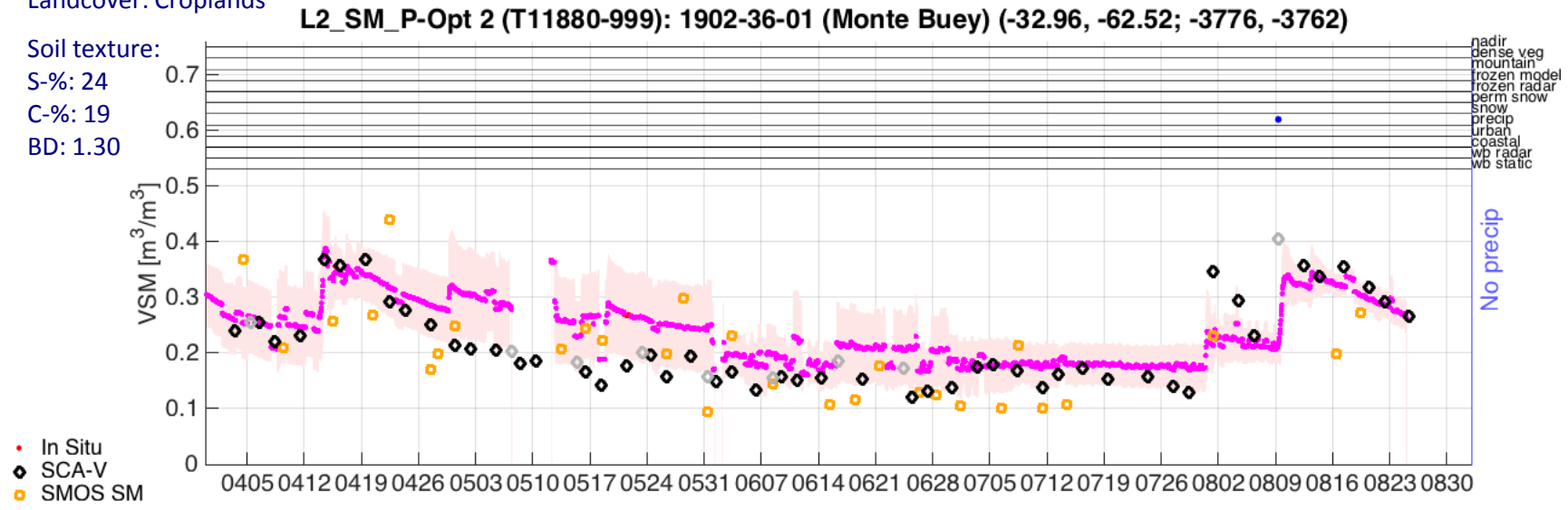


Climate class: Temperate (Cwa)
Landcover: Croplands

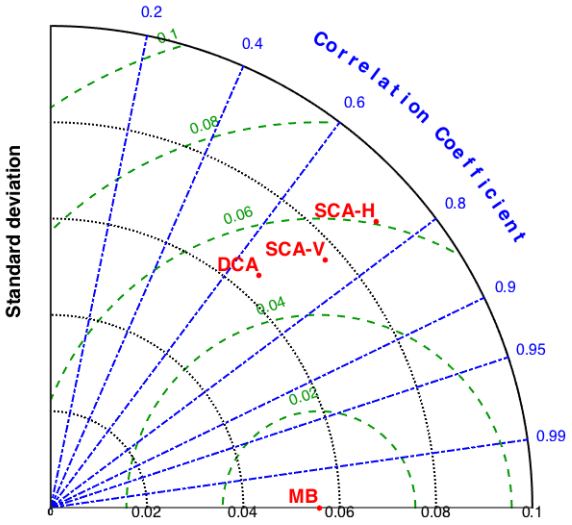
Monte Buey (Core Pixel)

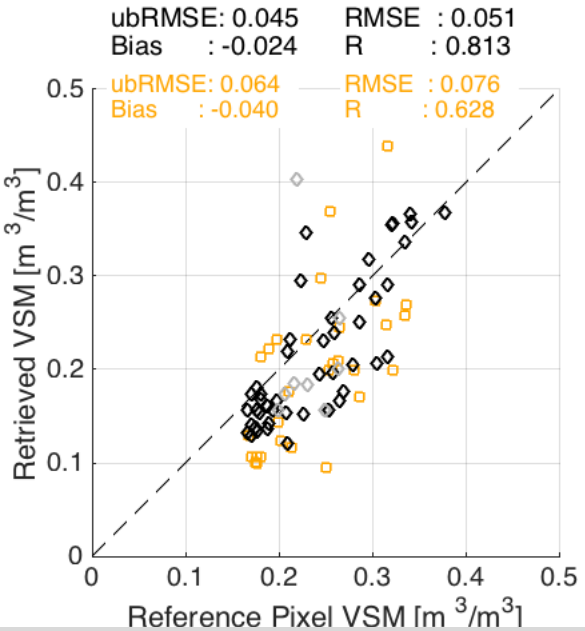
Jet Propulsion Laboratory
California Institute of Technology

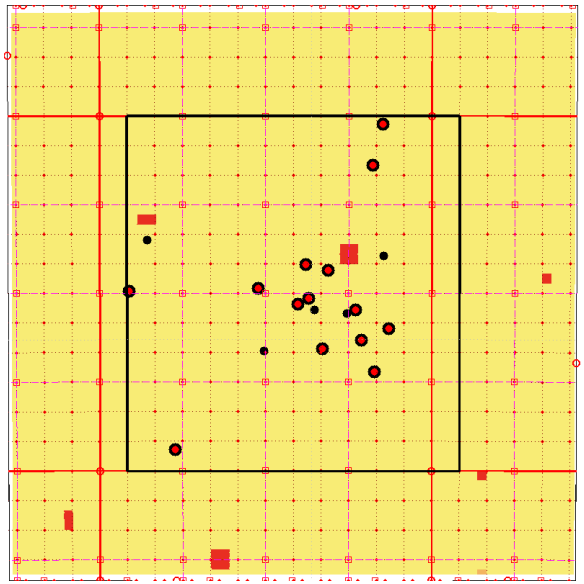
Soil texture:
S-%: 24
C-%: 19
BD: 1.30



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

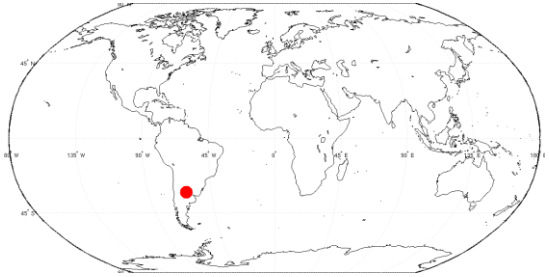
Jet Propulsion Laboratory
California Institute of Technology

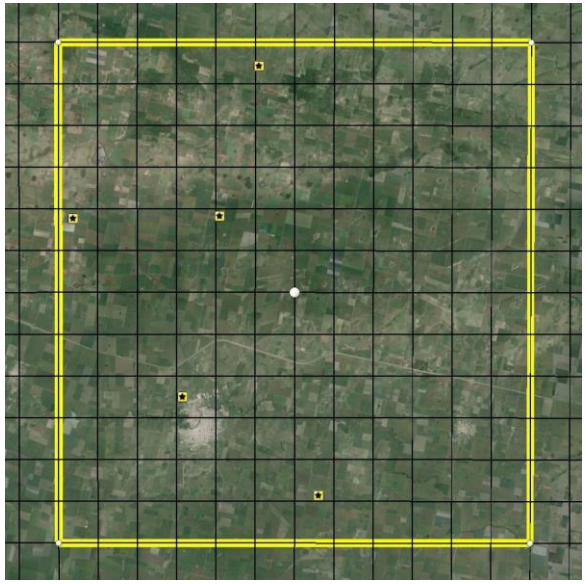
Bell Ville (Candidate Pixel)

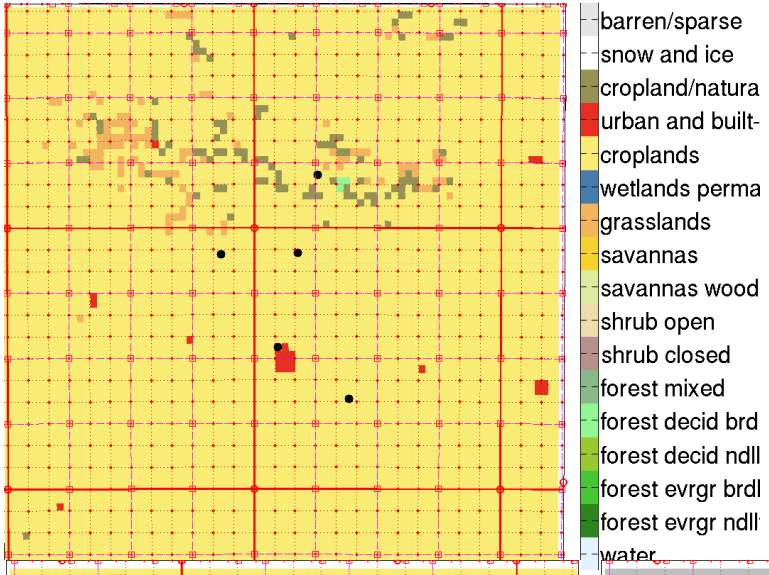
1901-36-01

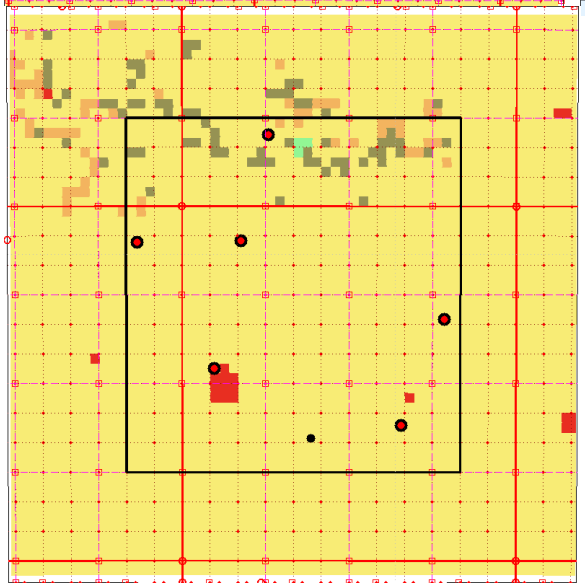
Displaced ref pixel at Bell Ville; Thiessen Polygon

Argentina
Lat: -32.54, Lon: -62.61
PI: Marc Thibeault





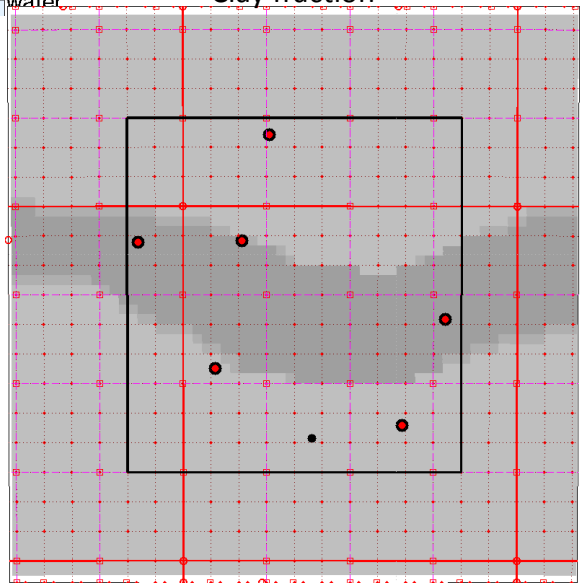




Climate class:
Temperate (Cwa)
Dominant landcover:
Croplands

Soil texture:
S-%: 17
C-%: 22
BD: 1.30

Clay fraction

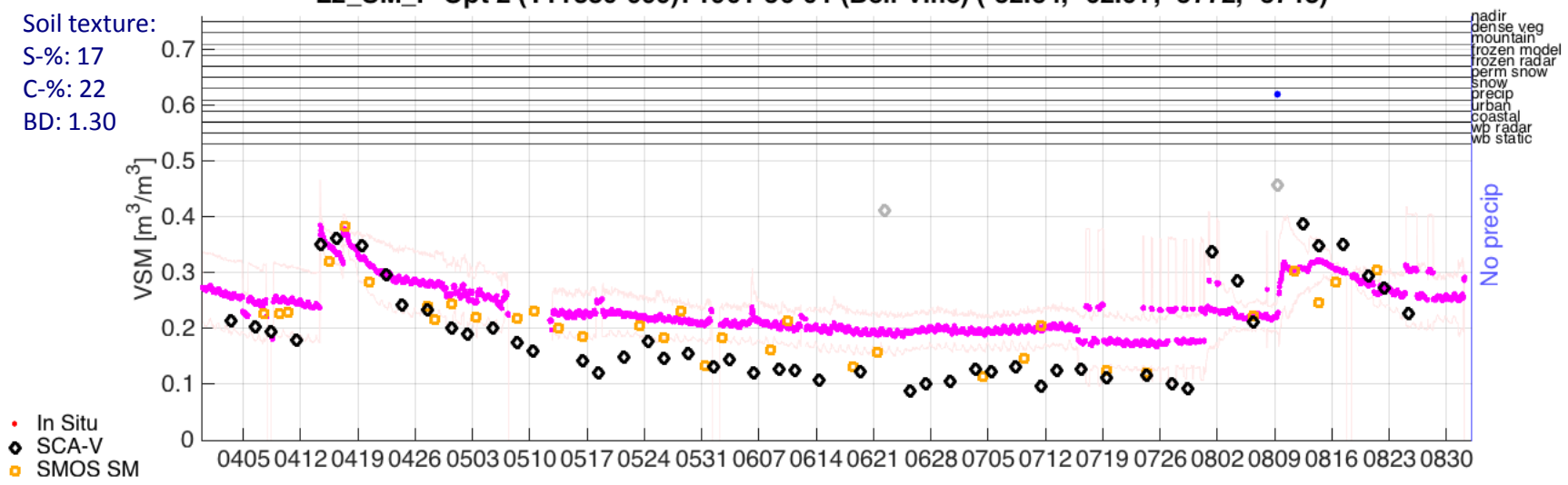


Climate class: Temperate (Cwa)
Landcover: Croplands

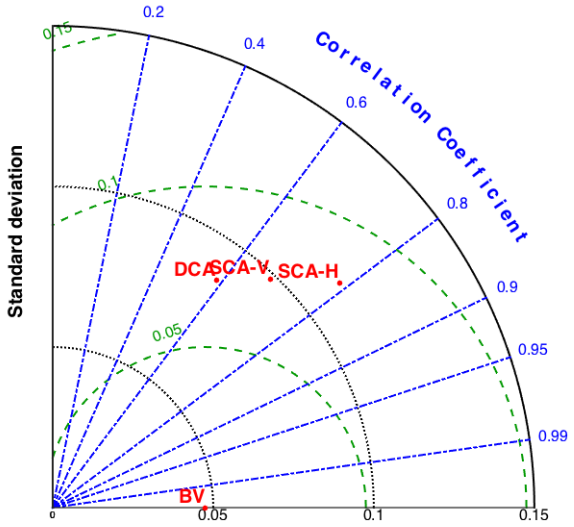
Bell Ville (Candidate Pixel)

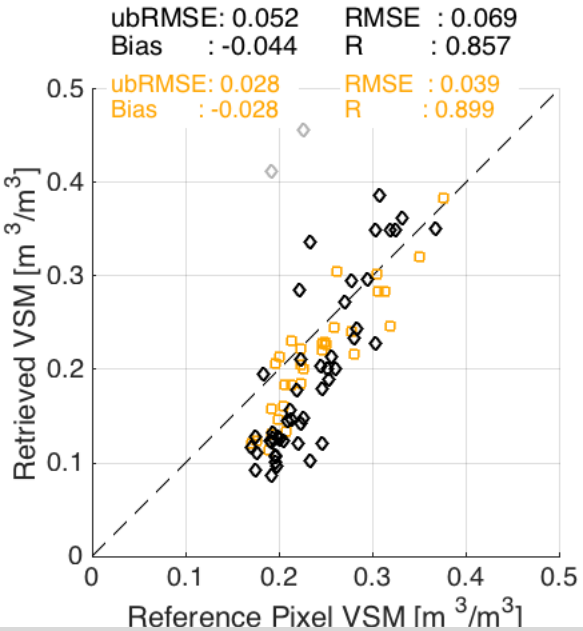
Jet Propulsion Laboratory
California Institute of Technology

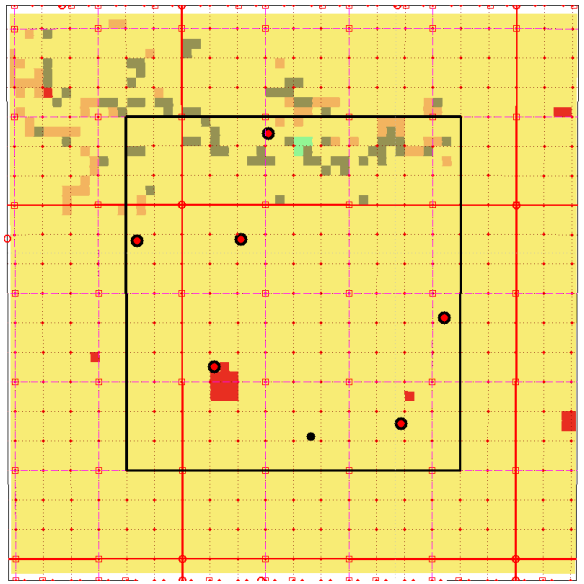
Soil texture:
S-%: 17
C-%: 22
BD: 1.30



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

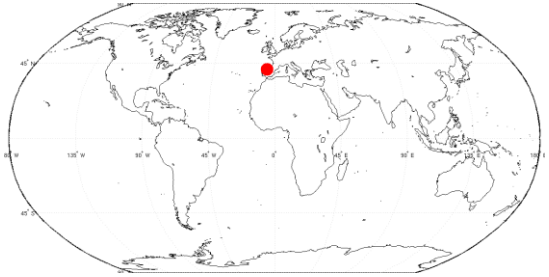
REMEDHUS (Core Pixel)

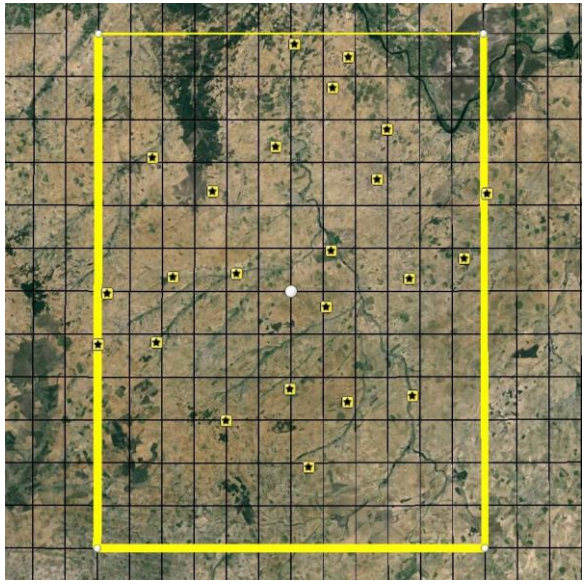
Jet Propulsion Laboratory
California Institute of Technology

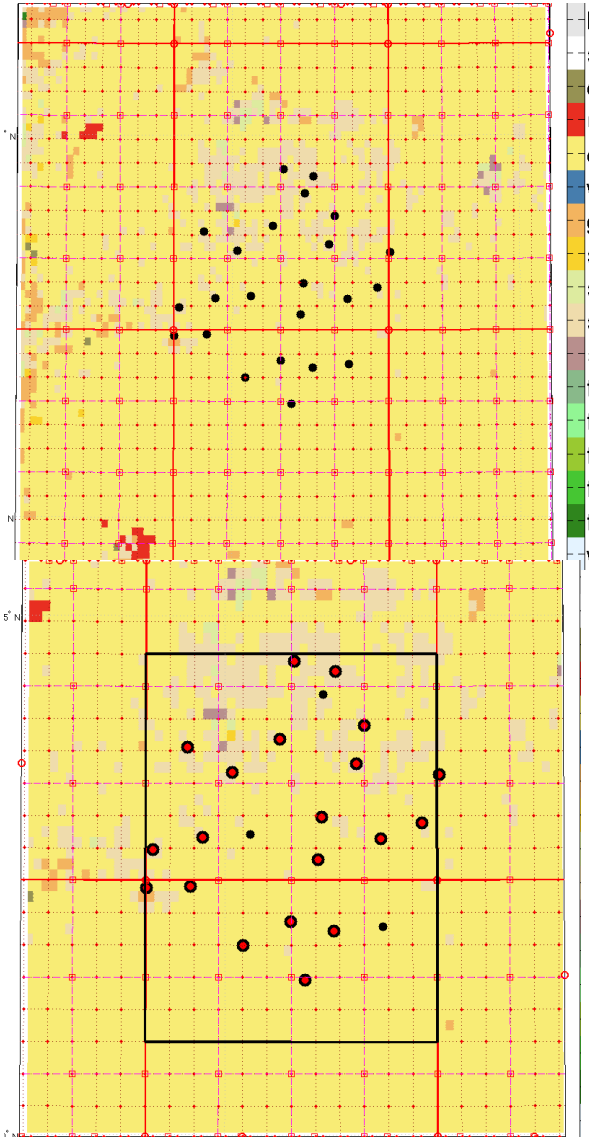
0301-36-02

Displaced ref pixel over REMEDHUS Spain; Thiessen Polygon

Spain
Lat: 41.28, Lon: -5.41
PI: Jose Martinez-Frenandez



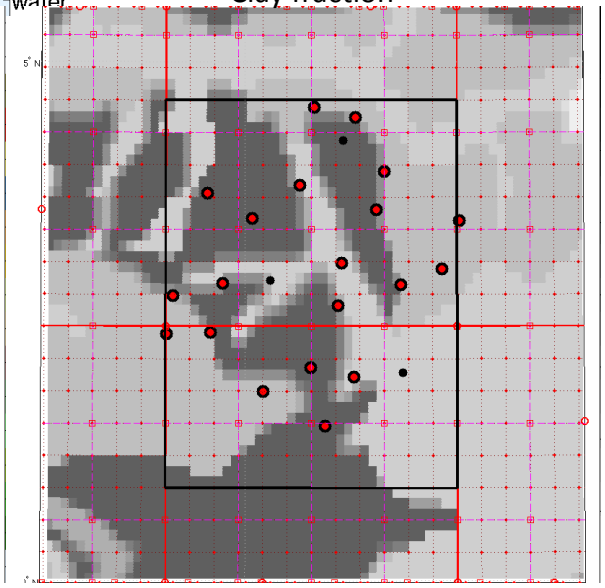




Climate class:
Temperate (Csb)
Dominant landcover:
Croplands

Soil texture:
S-%: 32
C-%: 32
BD: 1.38

Clay fraction

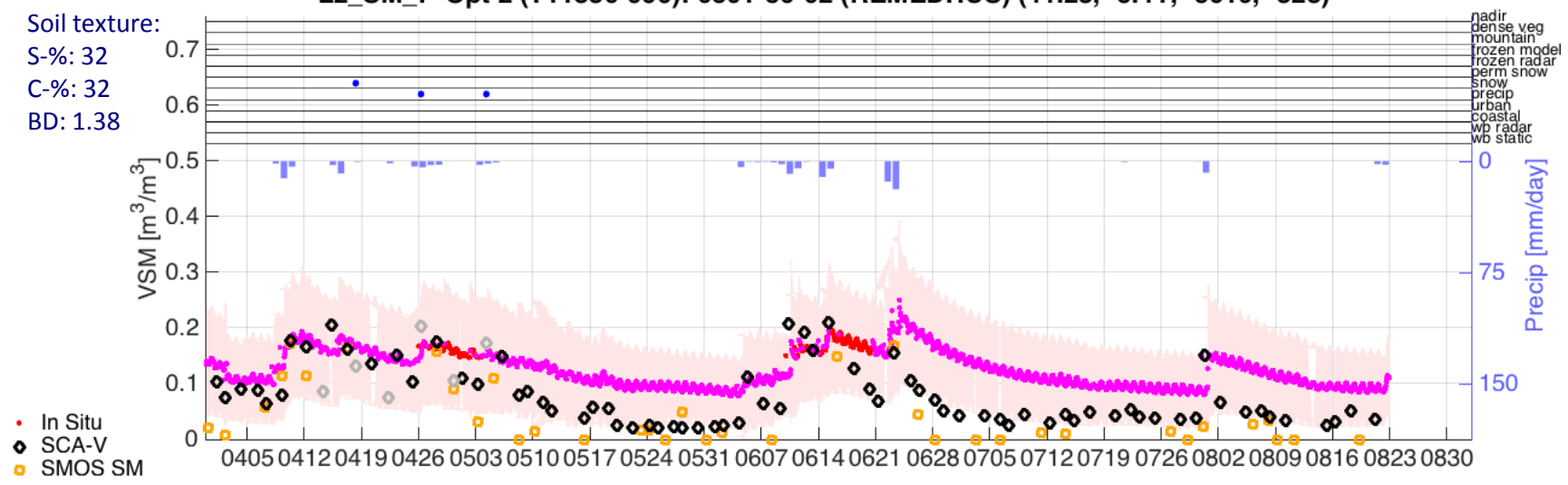


Climate class: Temperate (Csb)
Landcover: Croplands

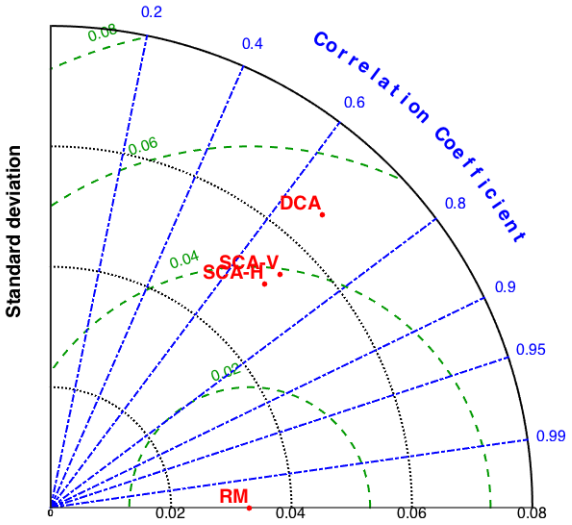
REMEDHUS (Core Pixel)

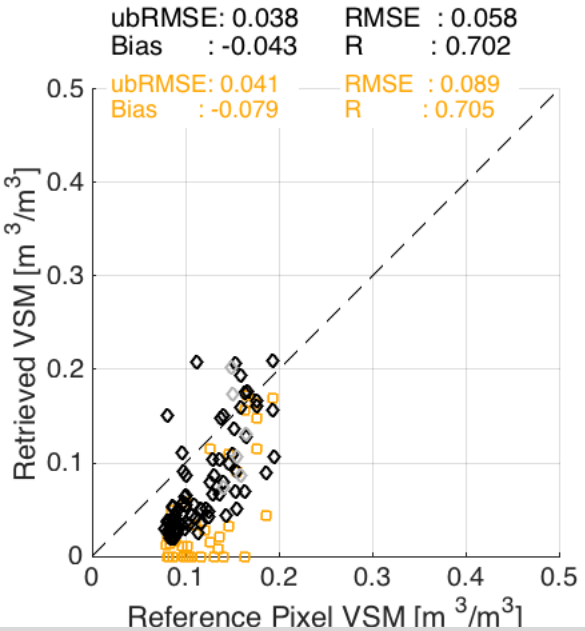
Jet Propulsion Laboratory
California Institute of Technology

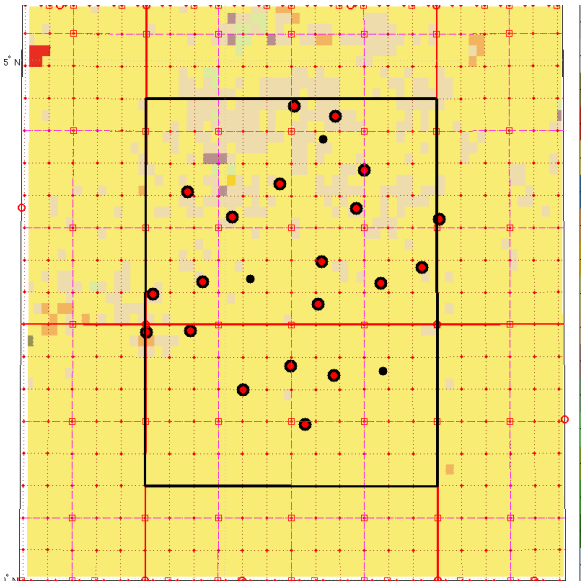
Soil texture:
S-%: 32
C-%: 32
BD: 1.38



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

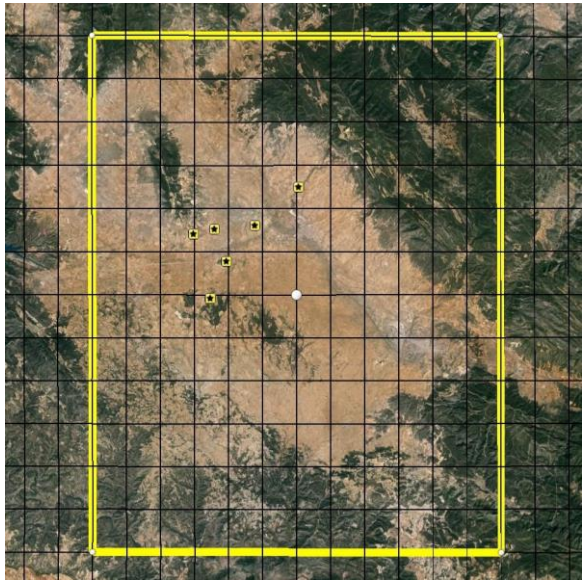
Valencia (Candidate Pixel)

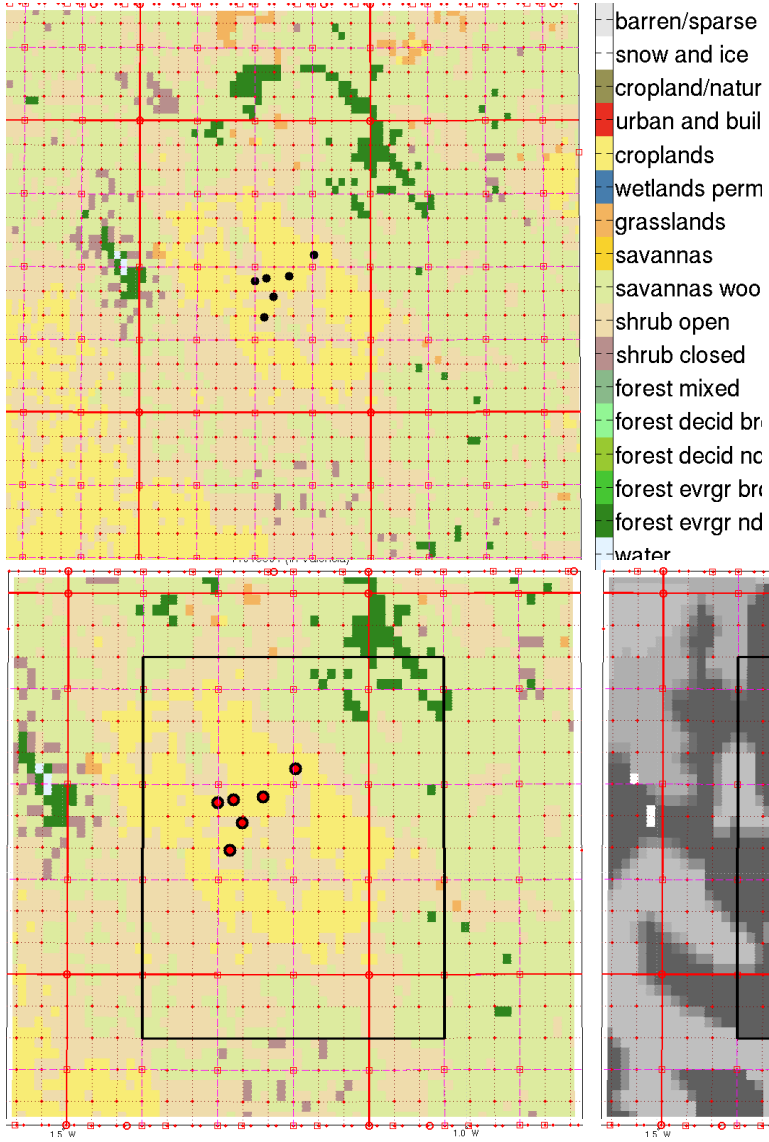
4101-36-01

Displaced ref pixel over Valencia Spain (dummy scaling)

Jet Propulsion Laboratory
California Institute of Technology

Spain
Lat: 39.52, Lon: -1.21
PI: Ernesto Lopez-Baeza

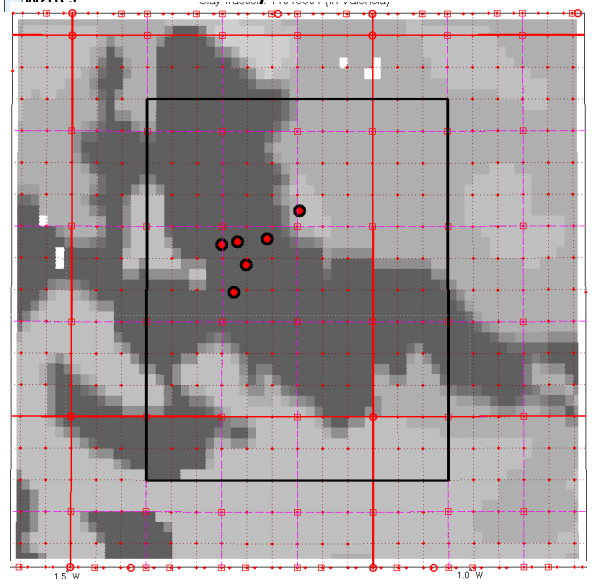




Climate class:
Arid (BSk)
Dominant landcover:
Shrub open

Soil texture:
S-%: 28
C-%: 37
BD: 1.40

Clay fraction

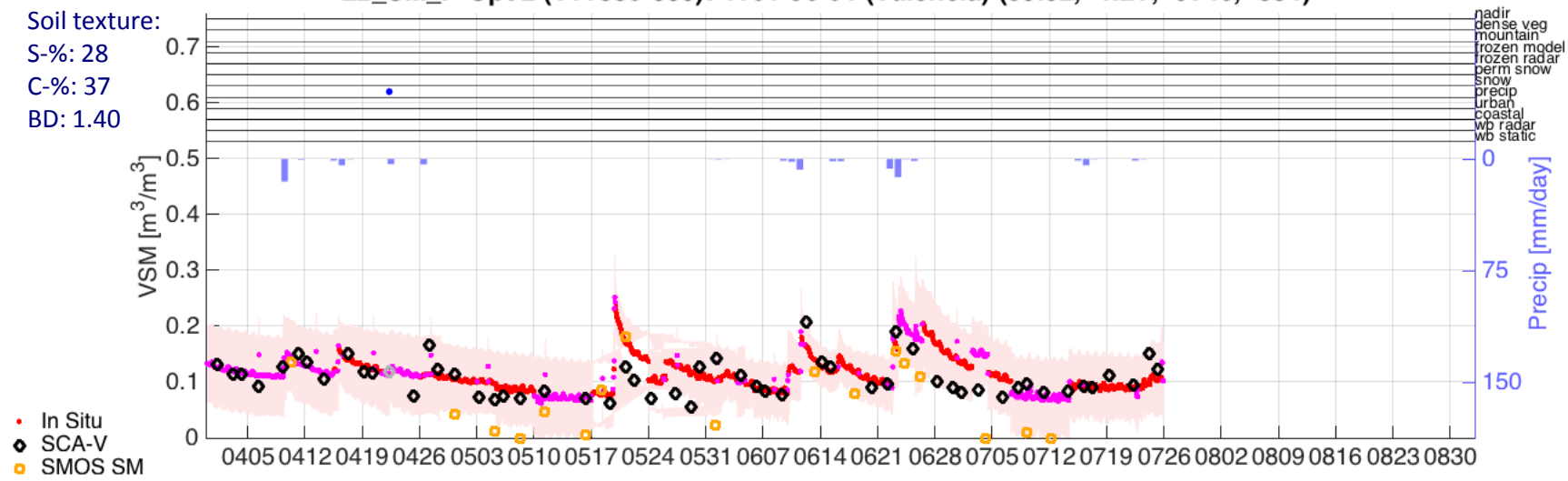


Climate class: Arid (BSk)
Landcover: Shrub open

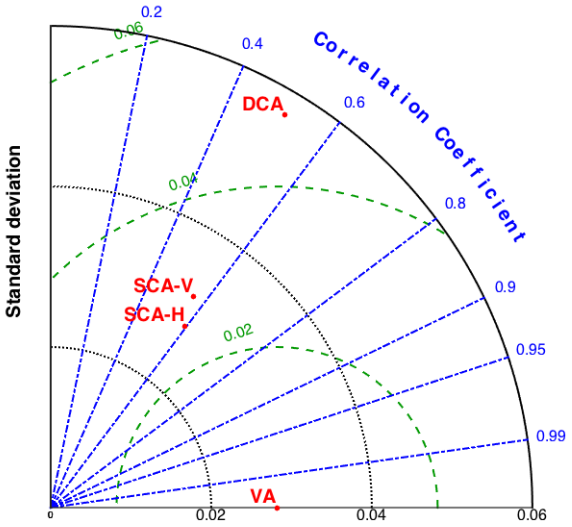
Valencia (Candidate Pixel)

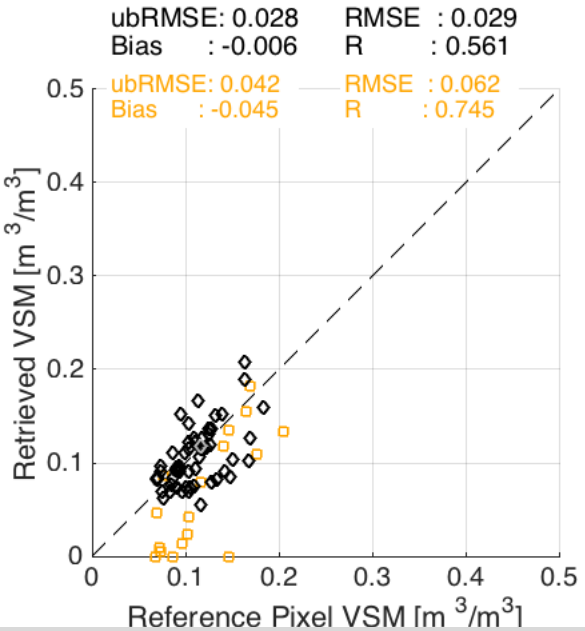
Jet Propulsion Laboratory
California Institute of Technology

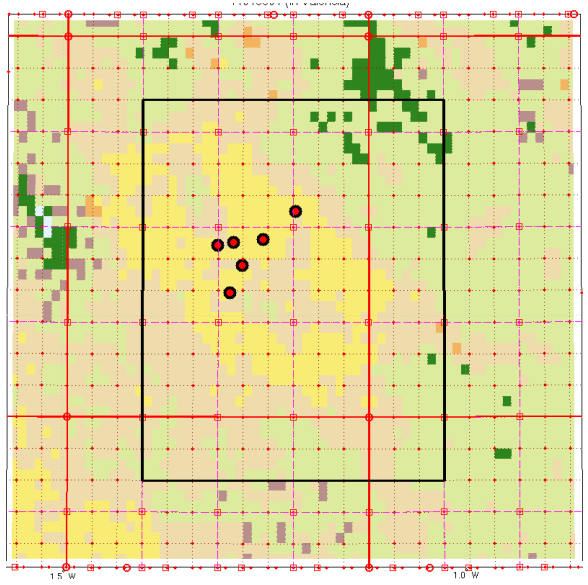
Soil texture:
S-%: 28
C-%: 37
BD: 1.40



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

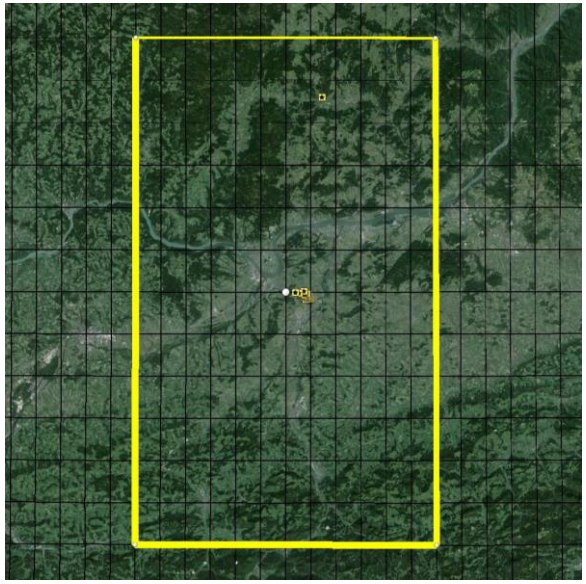
HOAL (Candidate Pixel)

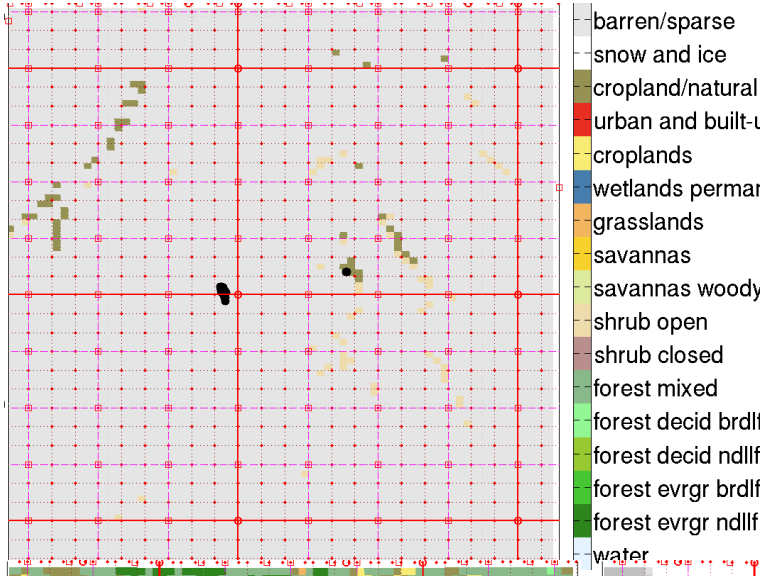
0601-36-01

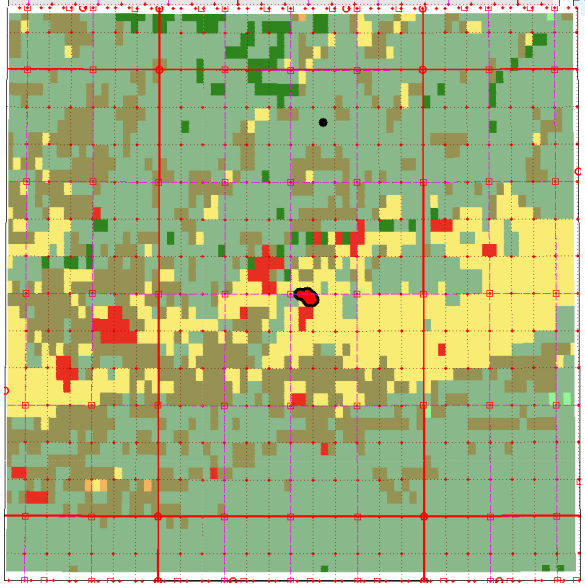
Ref pixel for HOAL site (dummy scaling)

Jet Propulsion Laboratory
California Institute of Technology

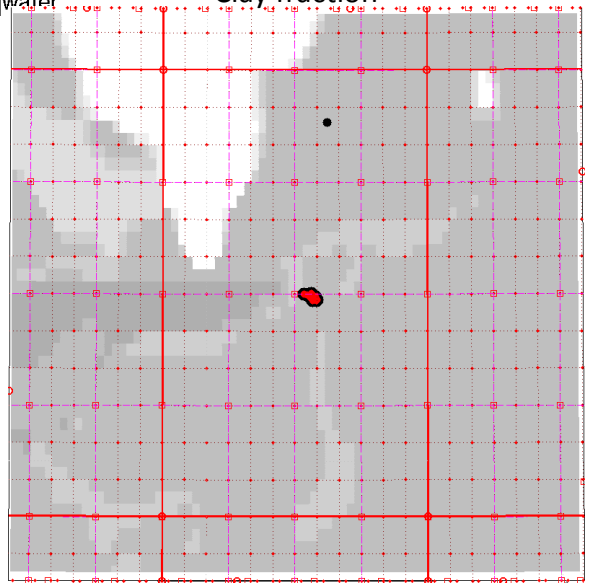
Austria
Lat: 48.16, Lon: 15.12
PI: Wouter Dorigo







Clay fraction



Climate class:
Temperate (Cfb)
Dominant landcover:
Forest mixed

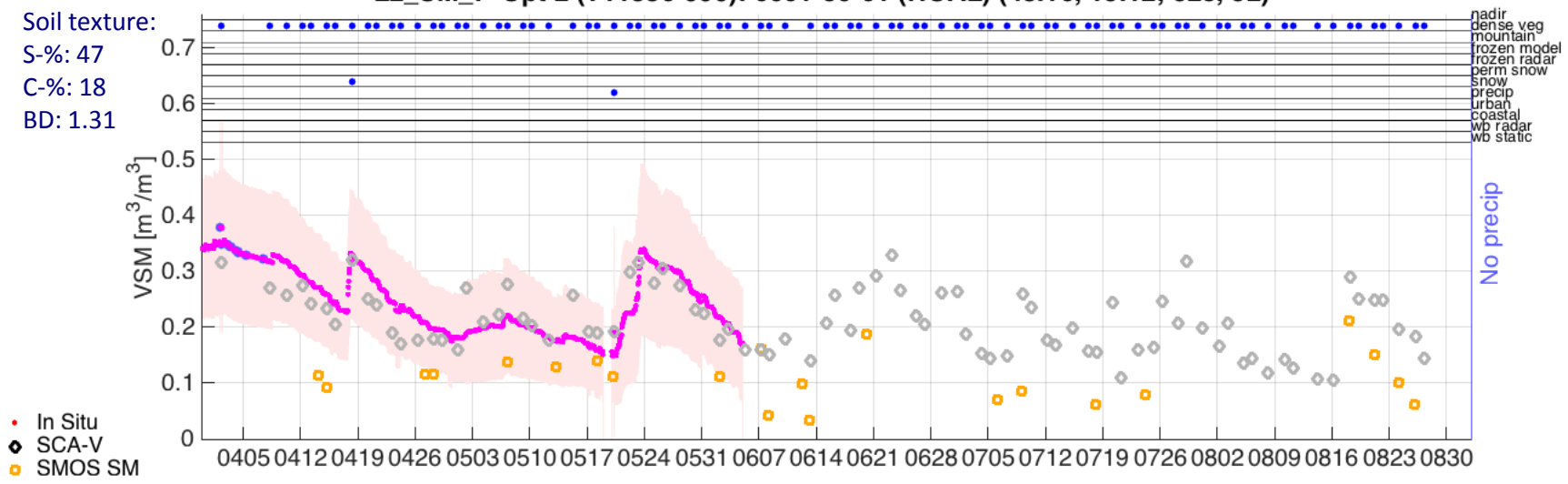
Soil texture:
S-%: 47
C-%: 18
BD: 1.31

Climate class: Temperate (Cfb)
Landcover: Forest mixed

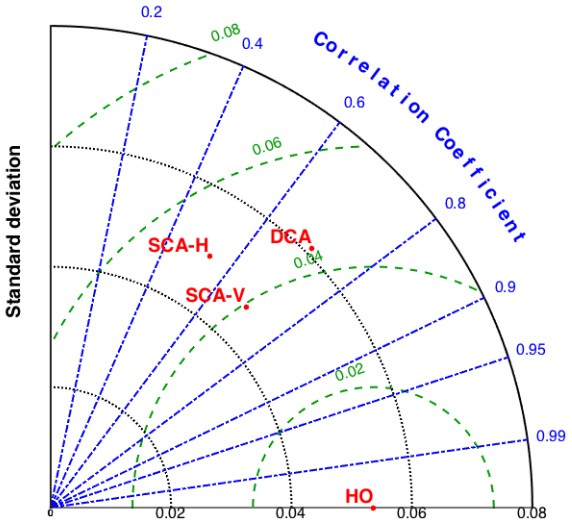
HOAL (Candidate Pixel)

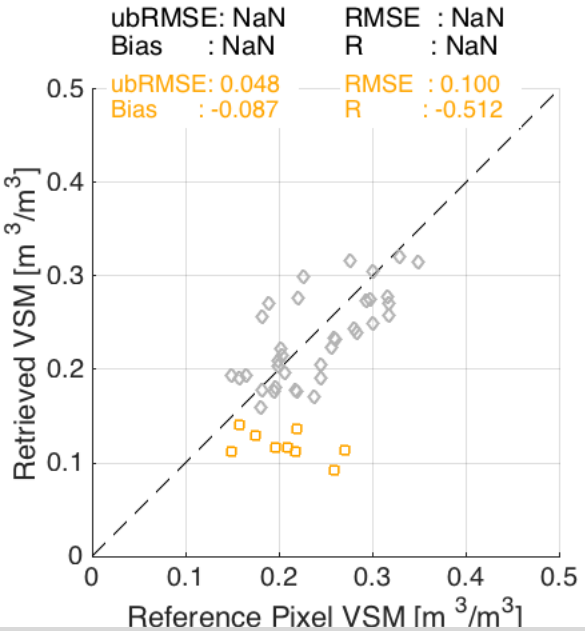
Jet Propulsion Laboratory
California Institute of Technology

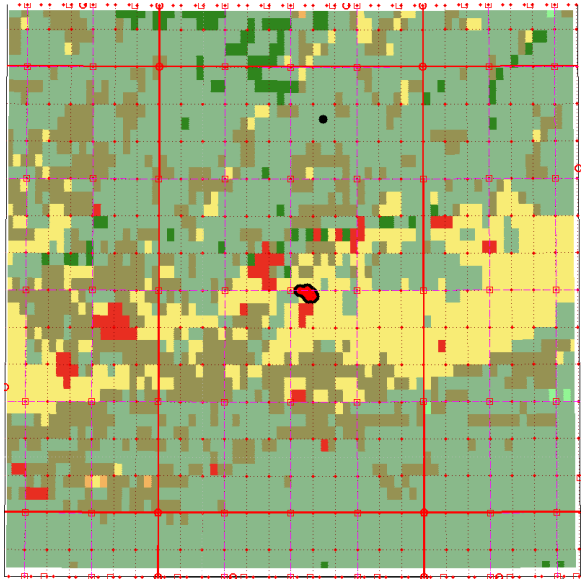
Soil texture:
S-%: 47
C-%: 18
BD: 1.31



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

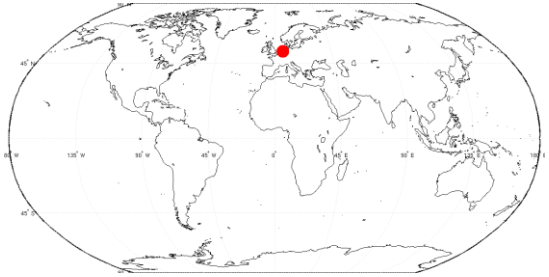
Jet Propulsion Laboratory
California Institute of Technology

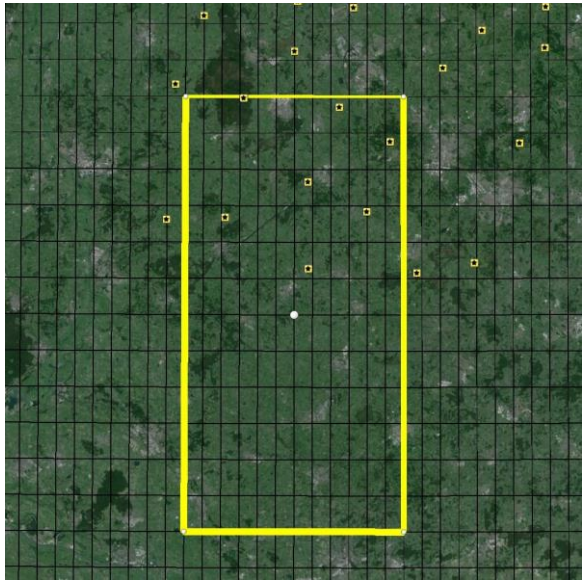
Twente (Candidate Pixel)

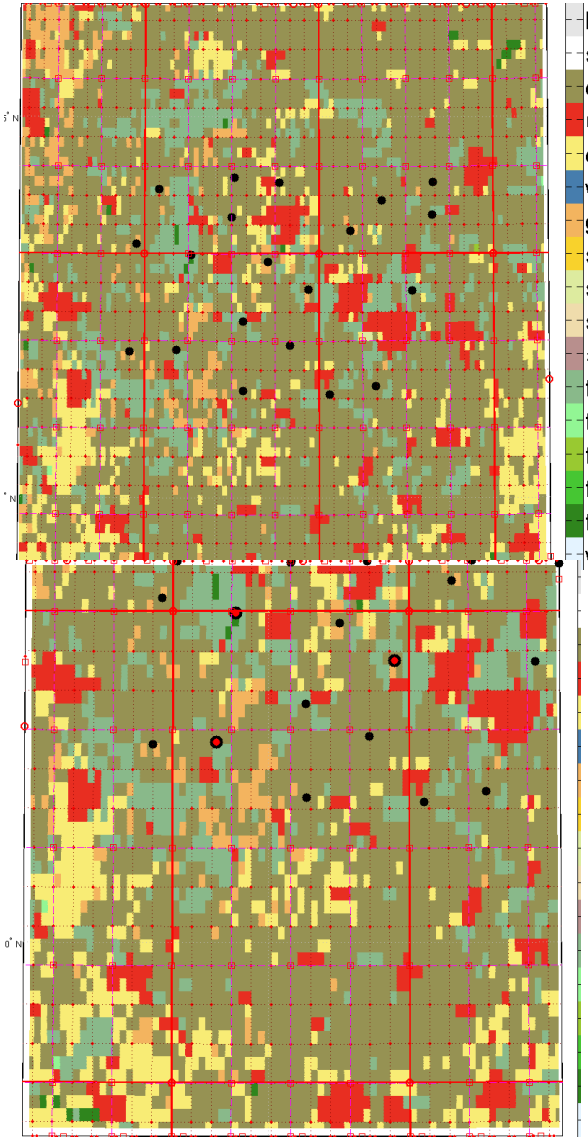
1204-36-04

Ref pixel for Twente (for telemetered stations)

Holland
Lat: 52.09, Lon: 6.54
PI: Zhongbo Su

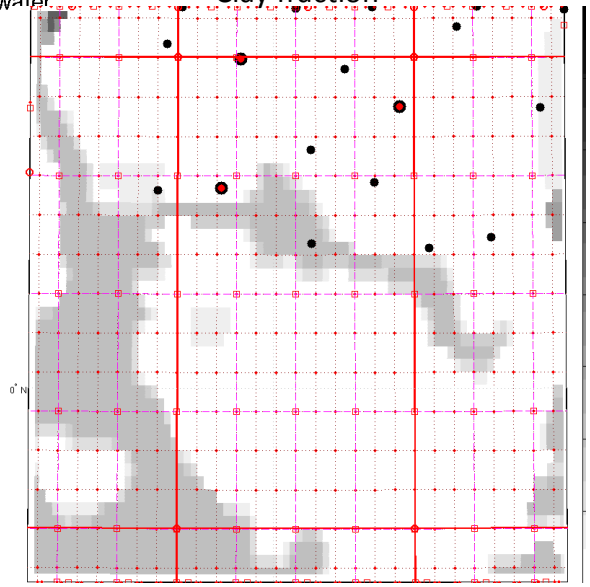






Climate class:
Temperate (Cfb)
Dominant landcover:
Cropland/natural mosaic
Soil texture:
S-%: 81
C-%: 6
BD: 1.23

Clay fraction

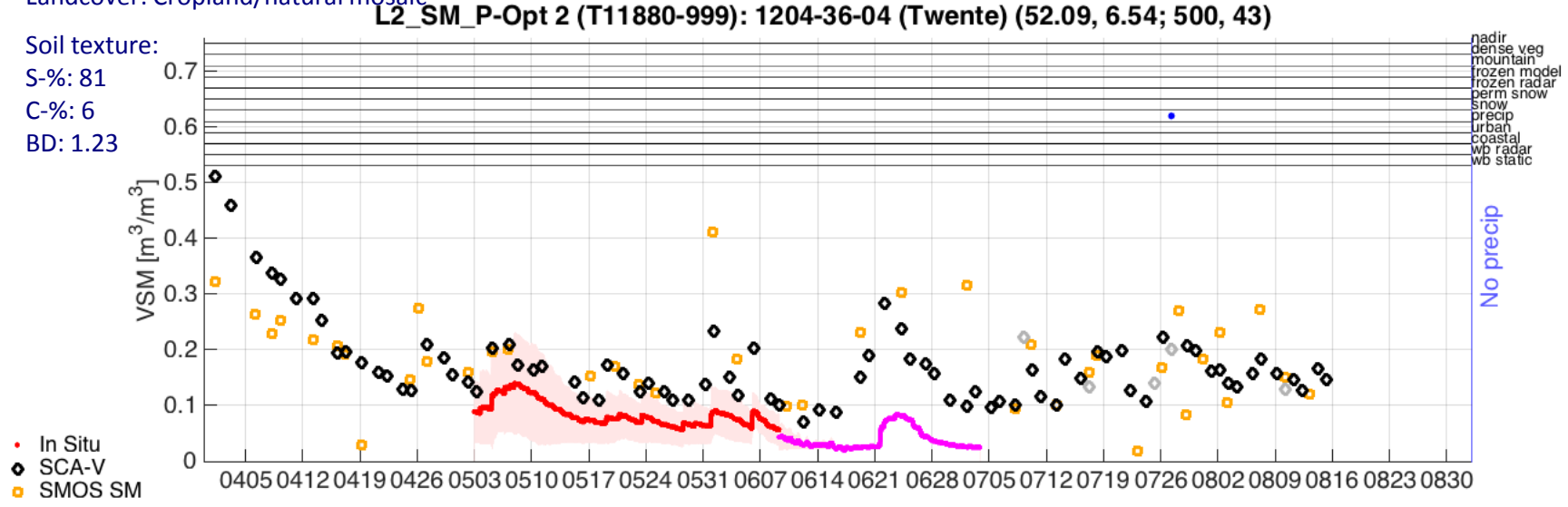


Climate class: Temperate (Cfb)
Landcover: Cropland/natural mosaic

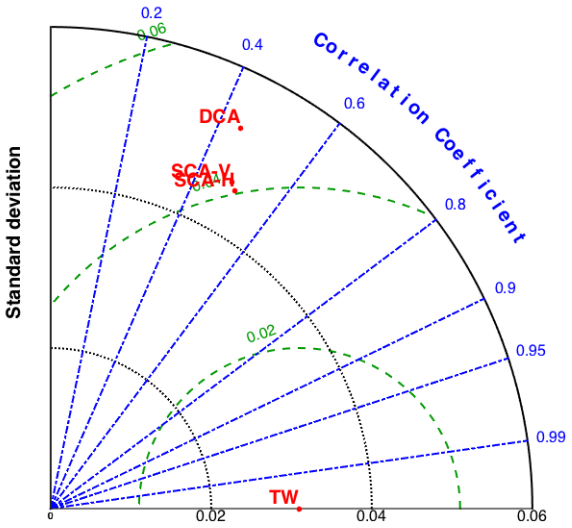
Twente (Candidate Pixel)

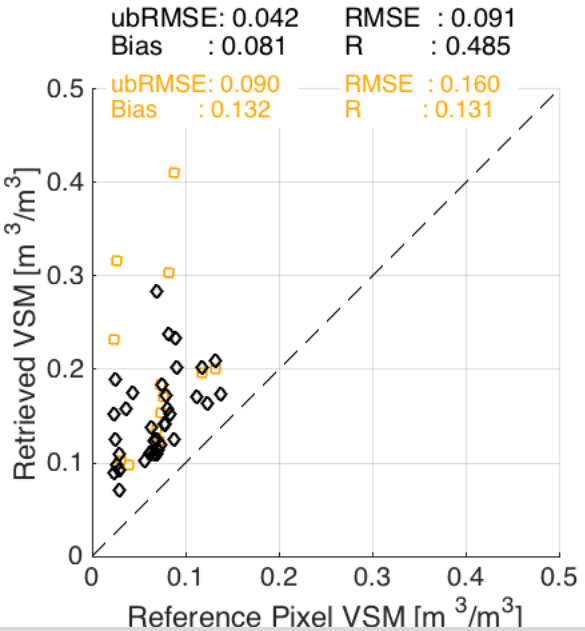
Jet Propulsion Laboratory
California Institute of Technology

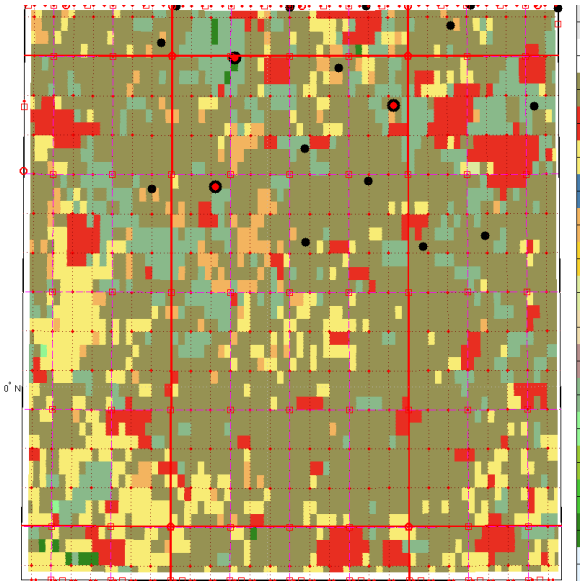
Soil texture:
S-%: 81
C-%: 6
BD: 1.23



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

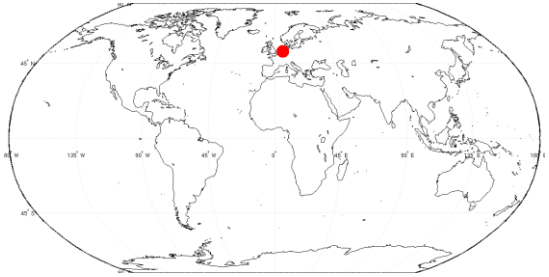
Jet Propulsion Laboratory
California Institute of Technology

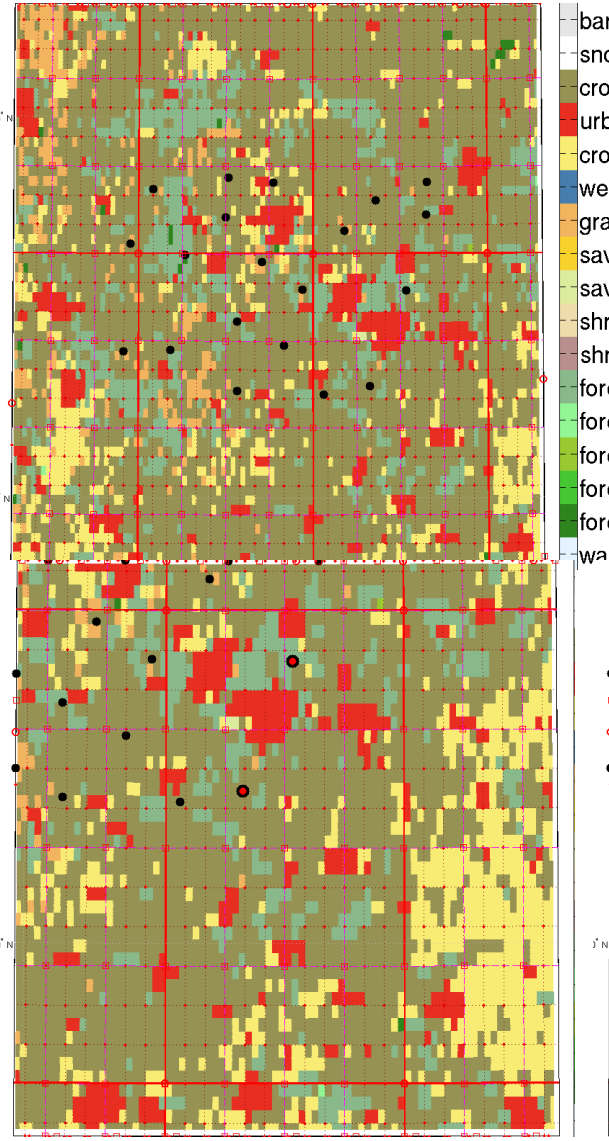
Twente (Candidate Pixel)

1204-36-05

Ref pixel for Twente (for telemetered stations)

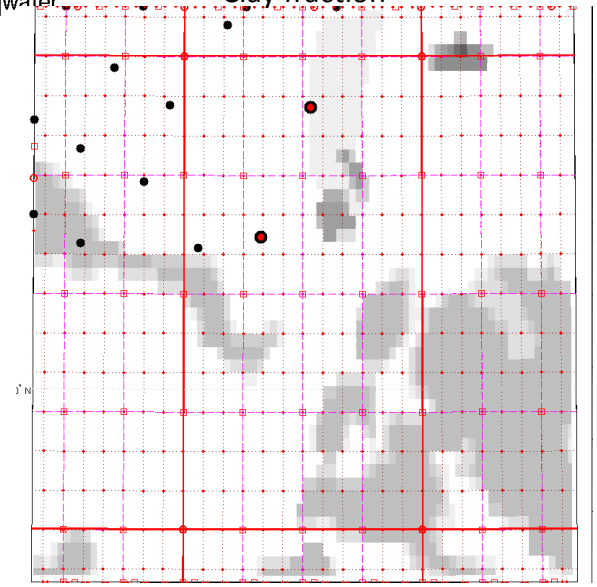
Holland
Lat: 52.09, Lon: 6.91
PI: Zhongbo Su





Climate class:
Temperate (Cfb)
Dominant landcover:
Cropland/natural mosaic
Soil texture:
S-%: 76
C-%: 8
BD: 1.21

Clay fraction

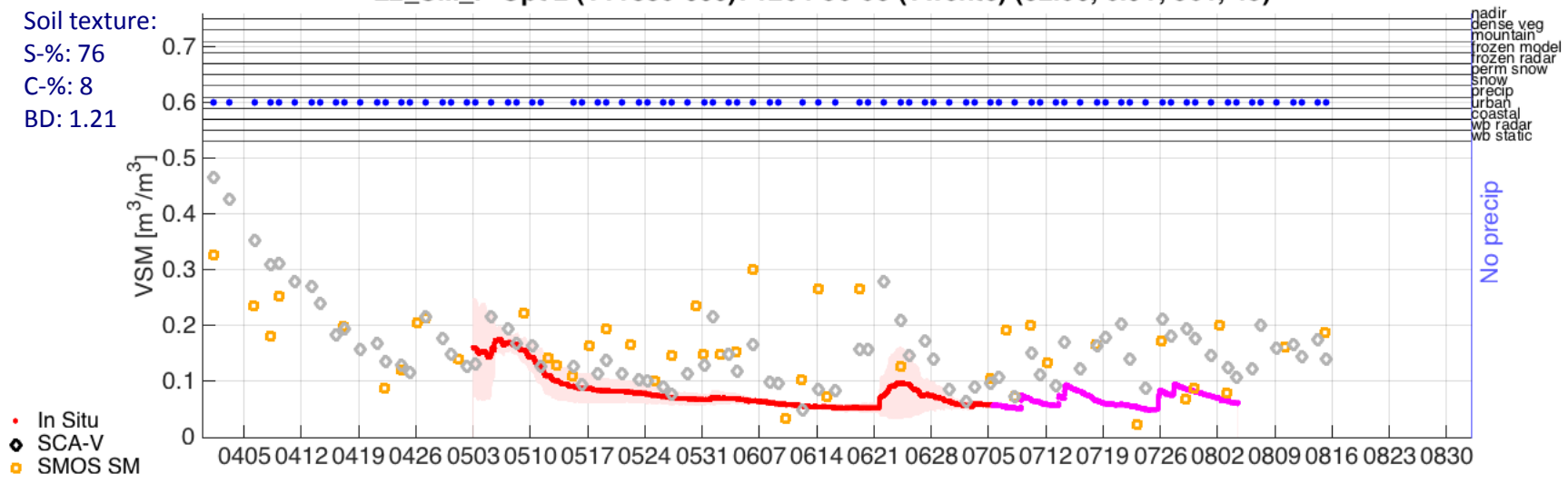


Climate class: Temperate (Cfb)
Landcover: Cropland/natural mosaic

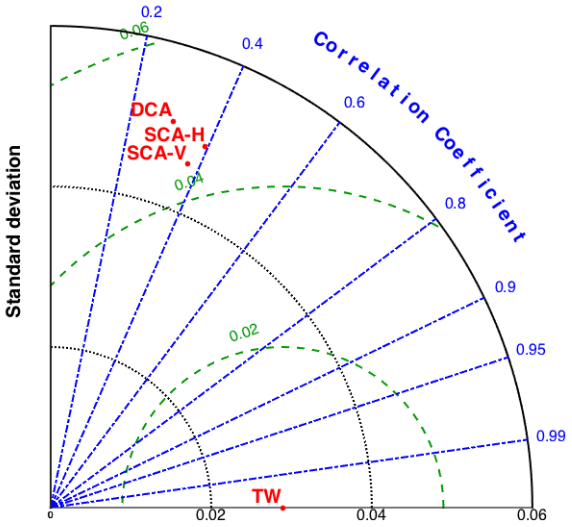
Twente (Candidate Pixel)

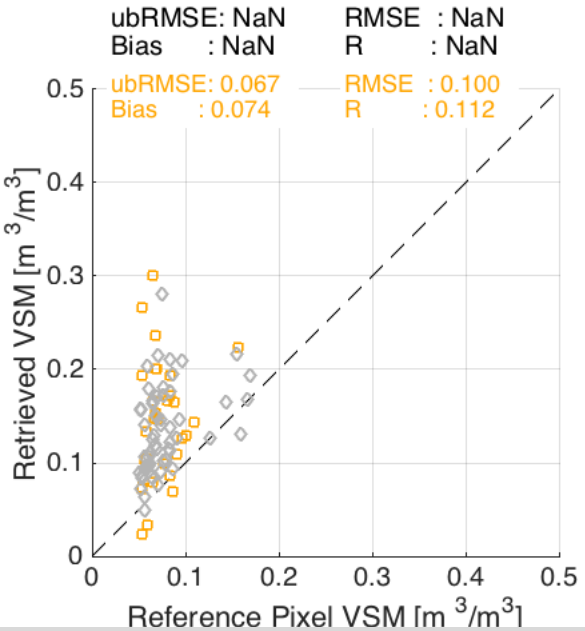
Jet Propulsion Laboratory
California Institute of Technology

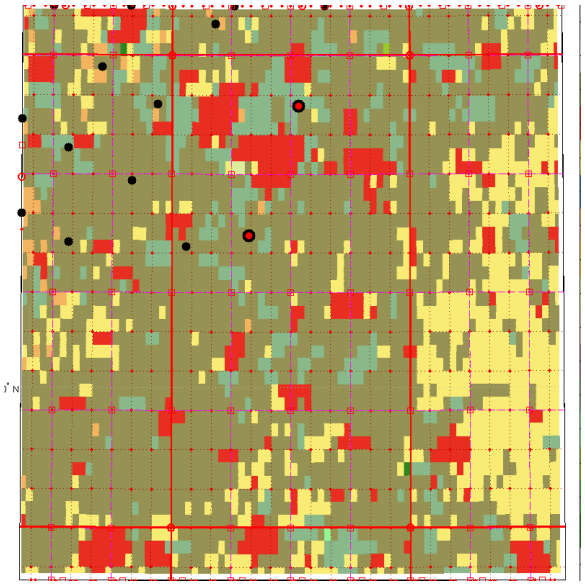
Soil texture:
S-%: 76
C-%: 8
BD: 1.21



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

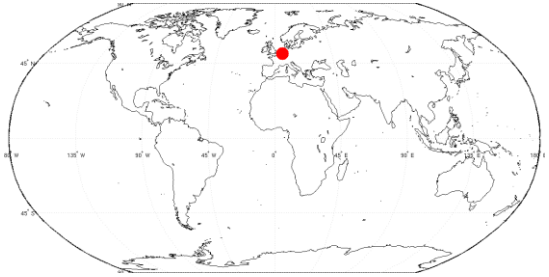
Jet Propulsion Laboratory
California Institute of Technology

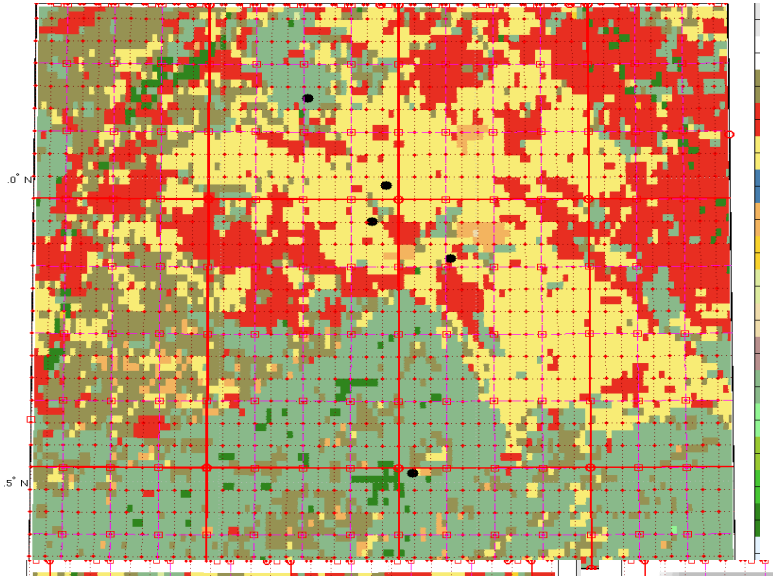
TERENO (Candidate Pixel)

0201-36-01

Displaced ref pixel over Julich site (north); Thiessen Polygon

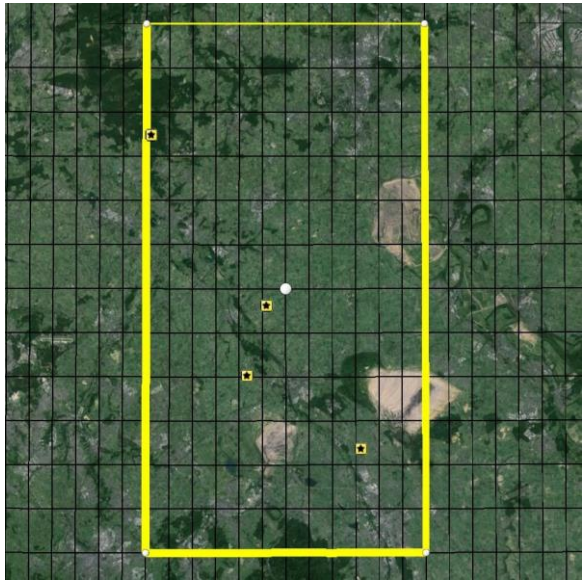
Germany
Lat: 51.00, Lon: 6.35
PI: Carsten Montzka

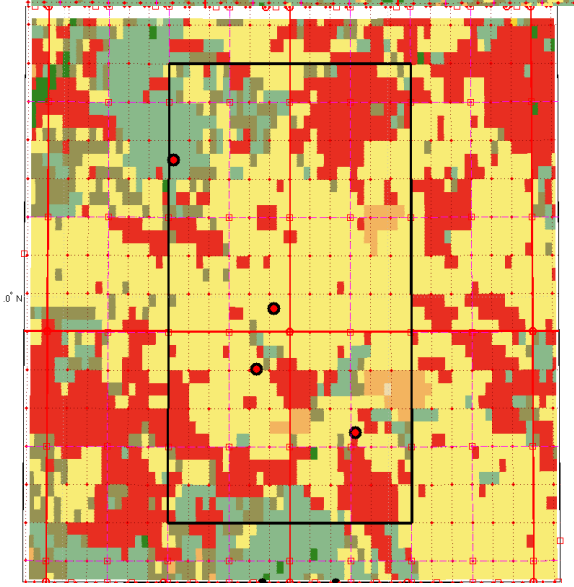




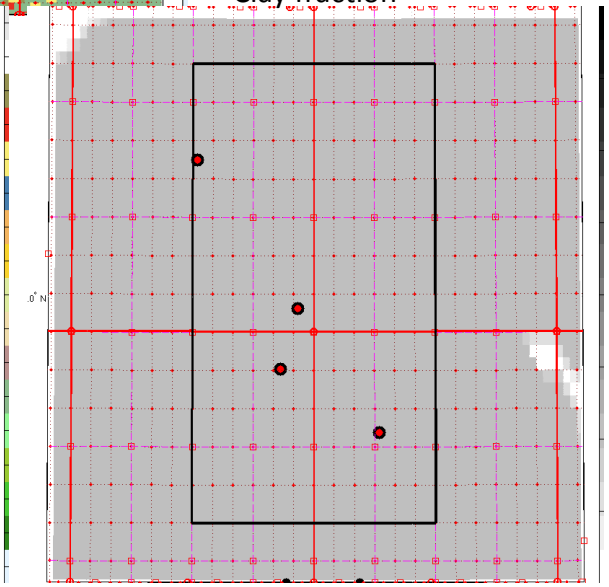
Climate class:
Temperate (Cfb)
Dominant landcover:
Croplands

Soil texture:
S-%: 41
C-%: 22
BD: 1.40





Clay fraction

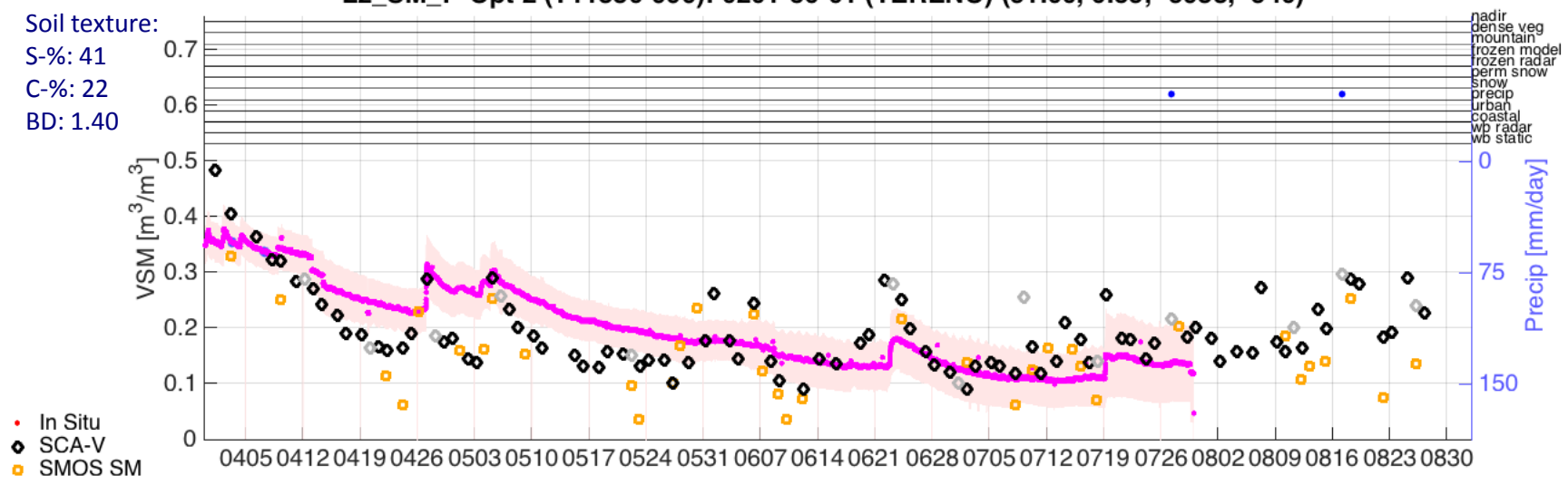


Climate class: Temperate (Cfb)
Landcover: Croplands

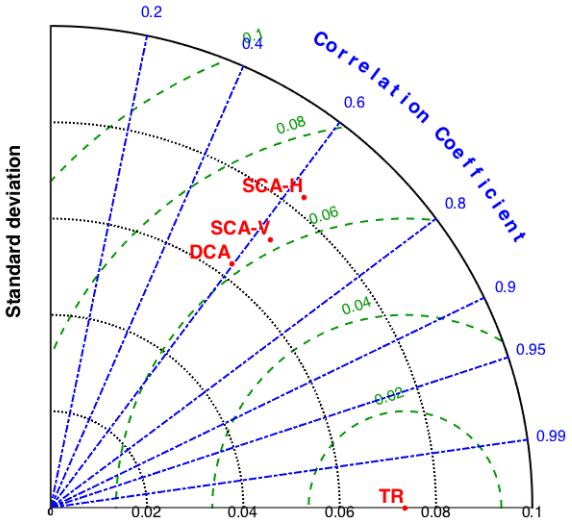
TERENO (Candidate Pixel)

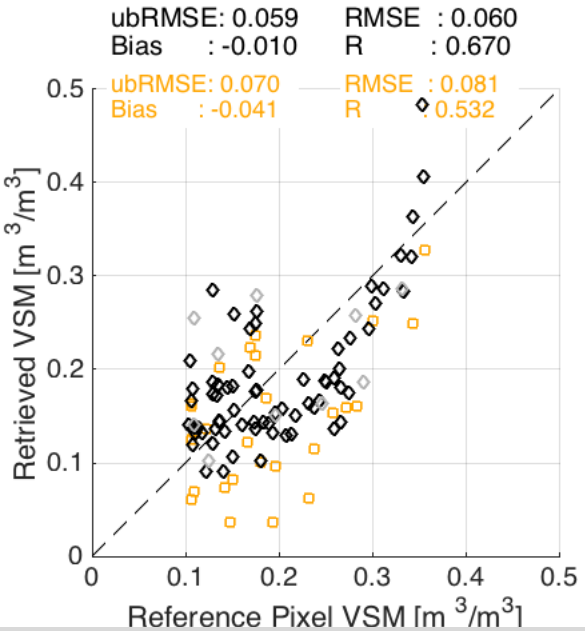
Jet Propulsion Laboratory
California Institute of Technology

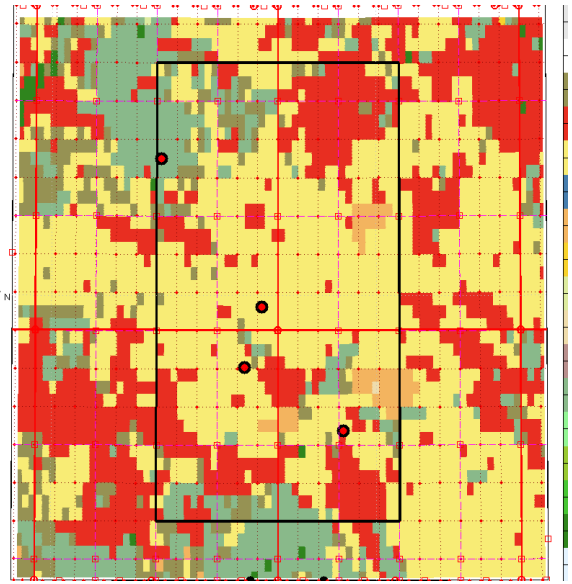
Soil texture:
S-%: 41
C-%: 22
BD: 1.40



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

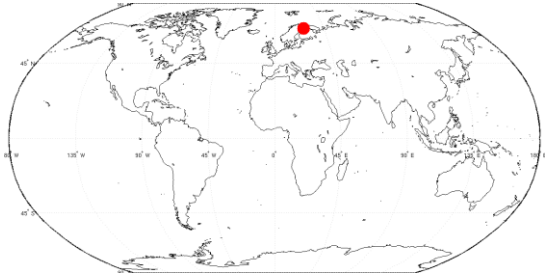
Sodankyla (Candidate Pixel)

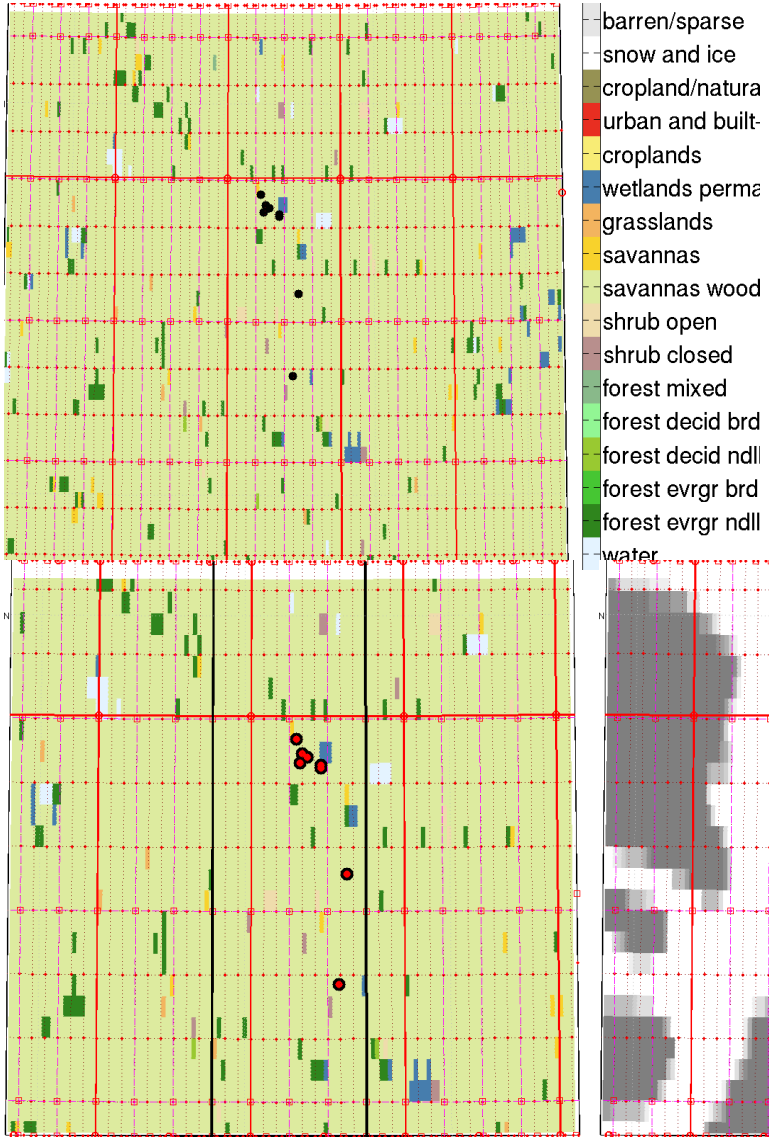
1701-36-01

Displaced ref pixel over Sodankyla Finland

Jet Propulsion Laboratory
California Institute of Technology

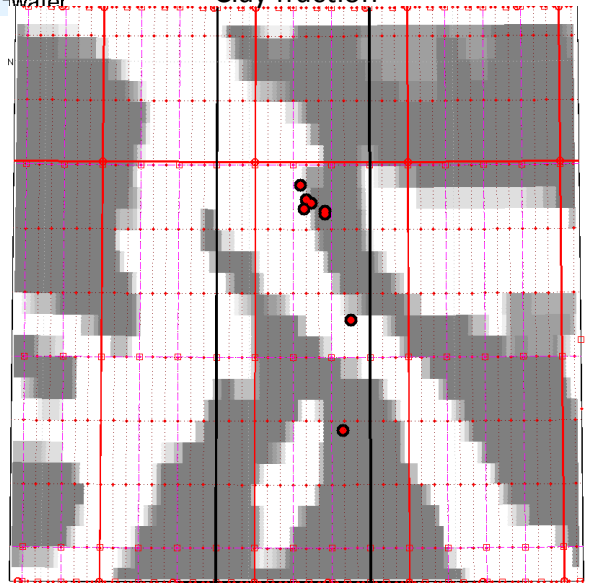
Finland
Lat: 67.28, Lon: 26.61
PI: Jouni Pulliainen





Climate class:
Cold (Dfc)
Dominant landcover:
Savannas woody
Soil texture:
S-%: 46
C-%: 26
BD: 1.03

Clay fraction

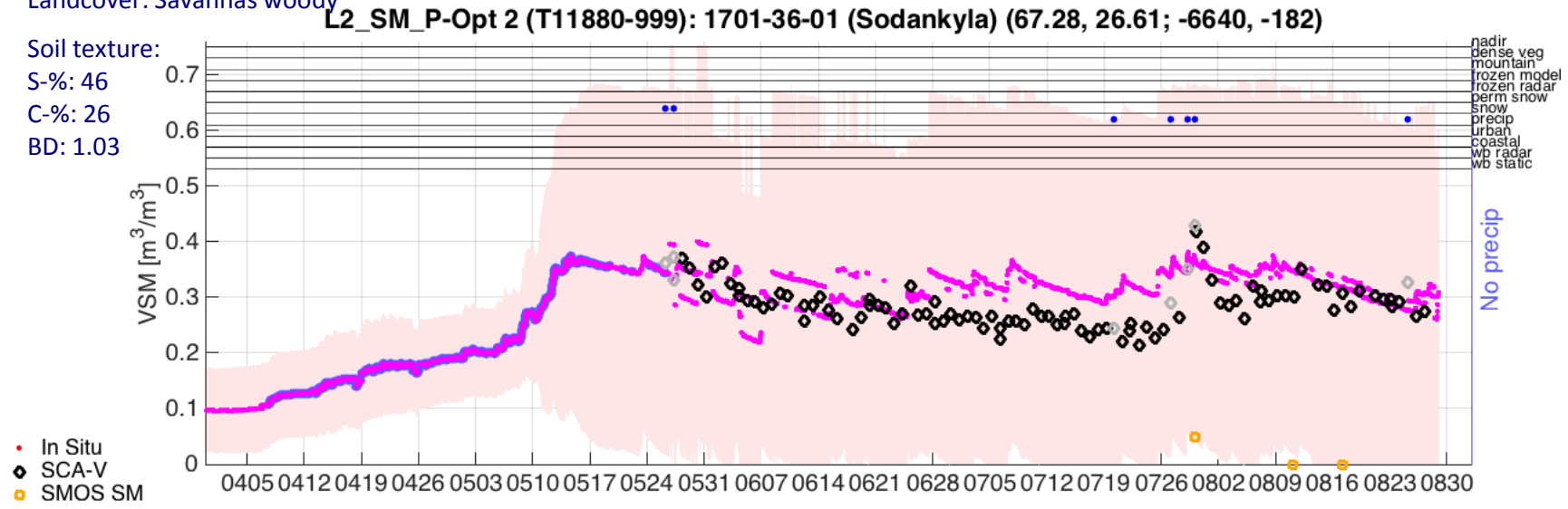


Climate class: Cold (Dfc)
Landcover: Savannas woody

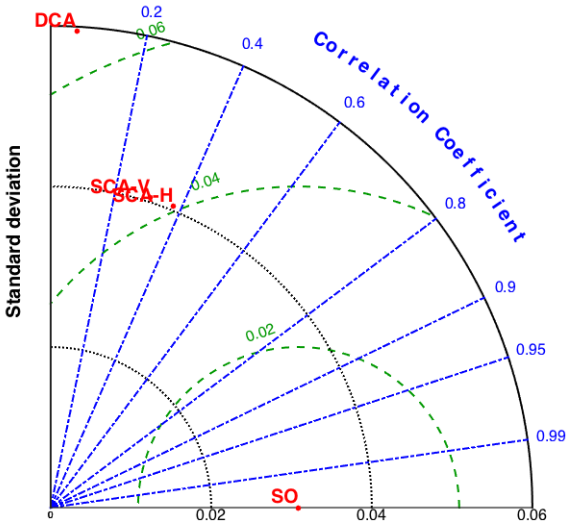
Soil texture:
S-%: 46
C-%: 26
BD: 1.03

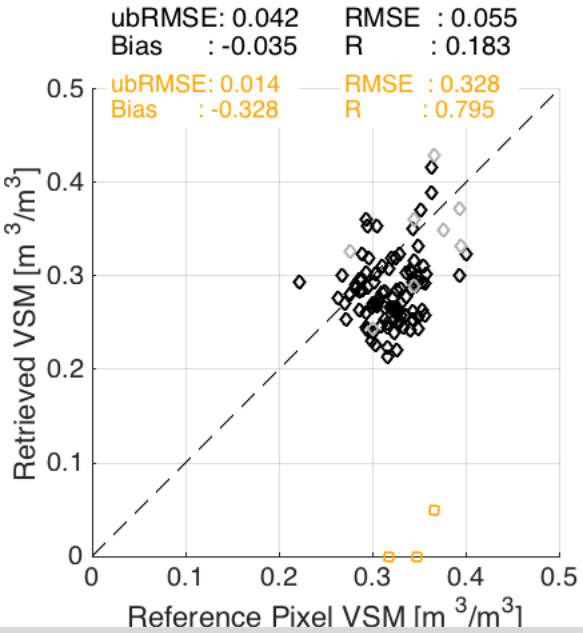
Sodankyla (Candidate Pixel)

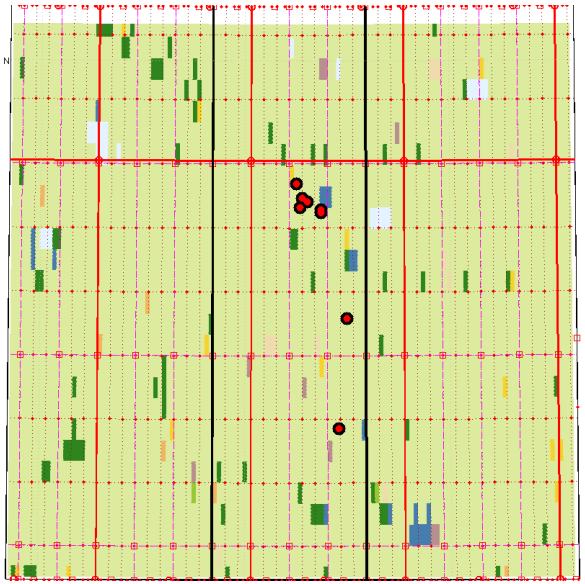
Jet Propulsion Laboratory
California Institute of Technology



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

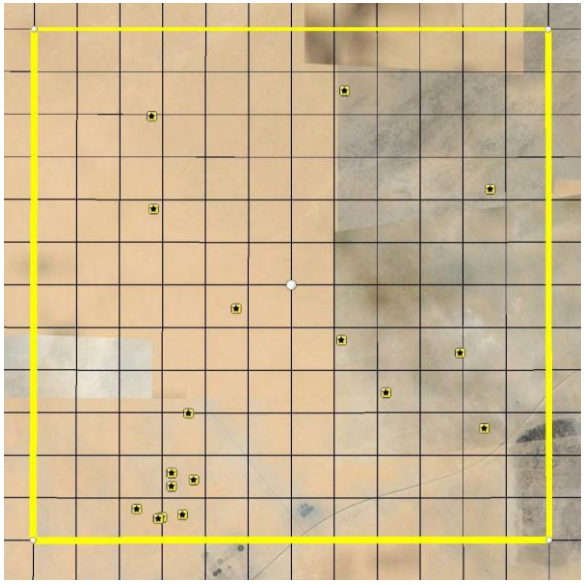
Jet Propulsion Laboratory
California Institute of Technology

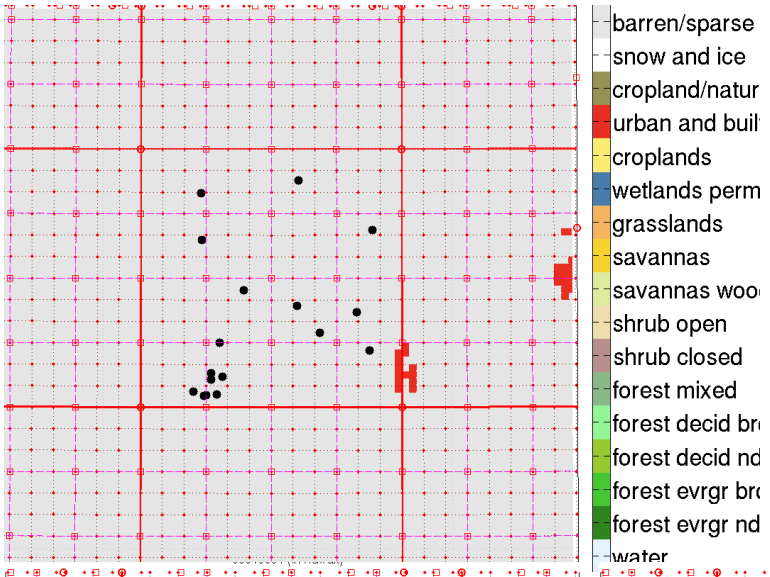
Kuwait (Candidate Pixel)

0501-36-01

Ref pixel over Kuwait (dummy scaling)

Kuwait
Lat: 29.34, Lon: 47.24
PI: Kota Rao

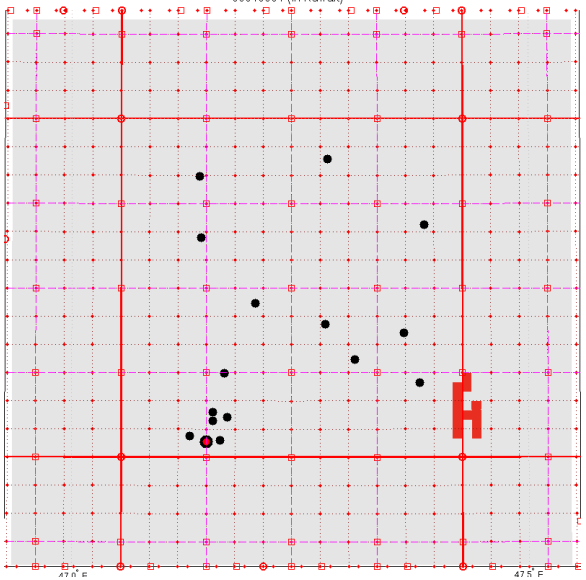


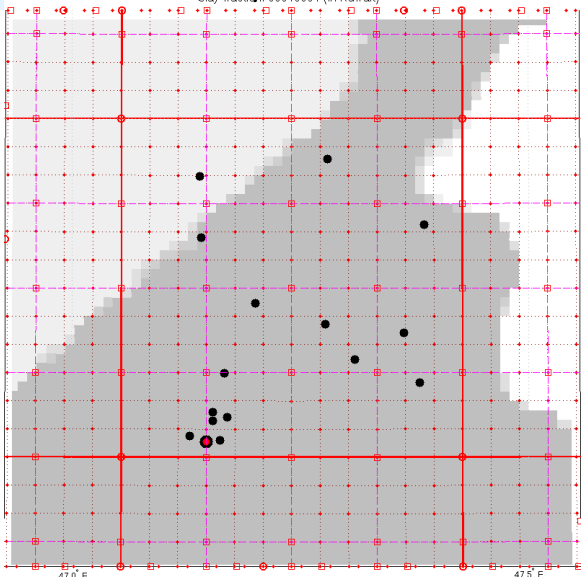


Climate class:
Arid (BWh)
Dominant landcover:
Barren/sparse

Soil texture:
S-%: 44
C-%: 17
BD: 1.54

Clay fraction



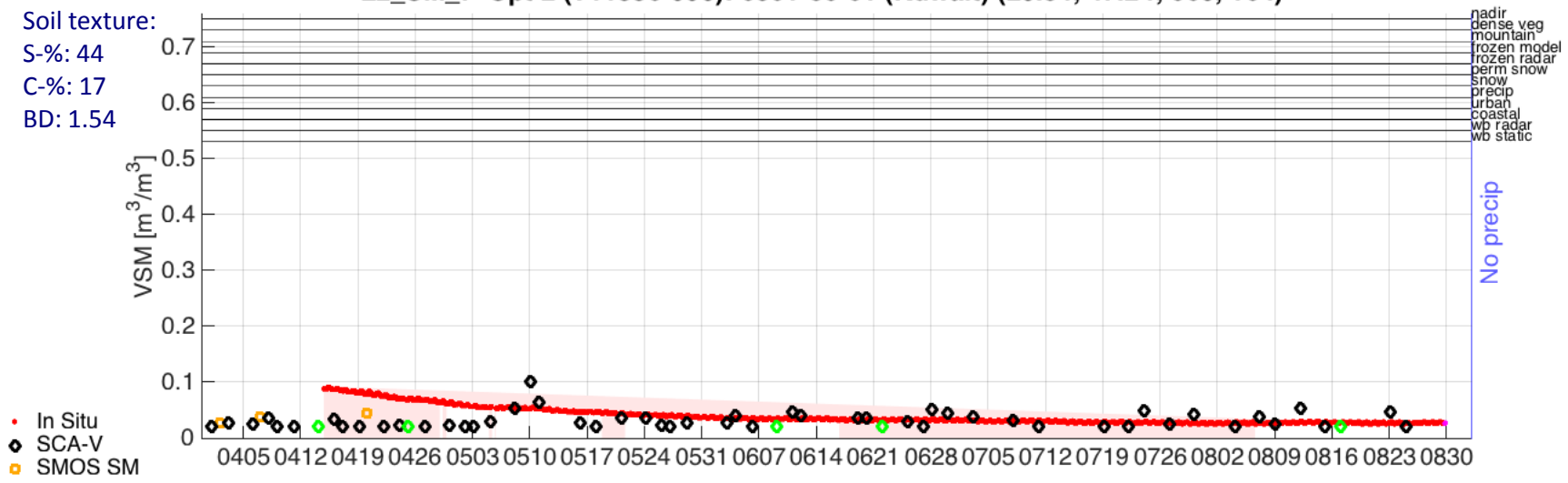


Climate class: Arid (BWh)
Landcover: Barren/sparse

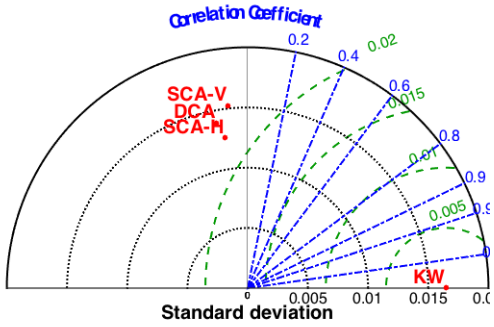
Kuwait (Candidate Pixel)

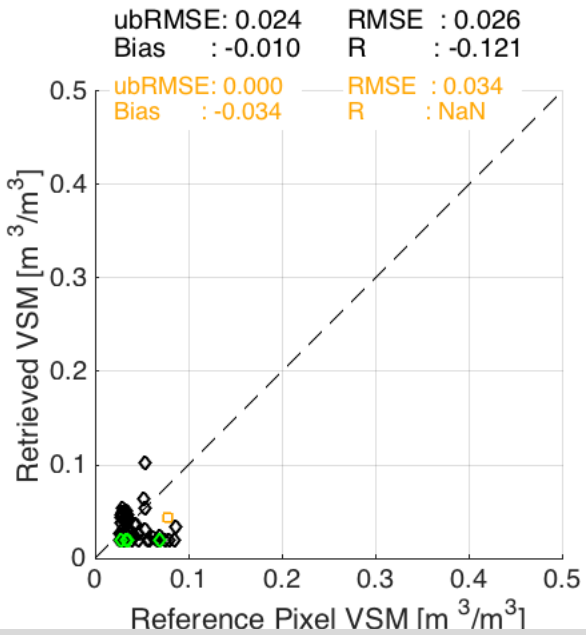
Jet Propulsion Laboratory
California Institute of Technology

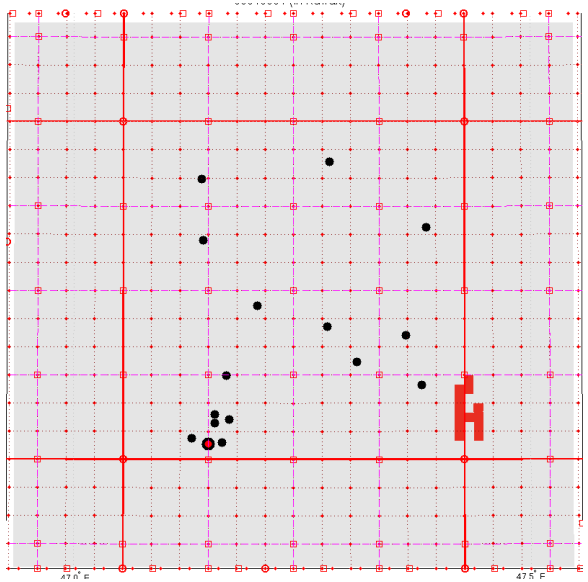
Soil texture:
S-%: 44
C-%: 17
BD: 1.54



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

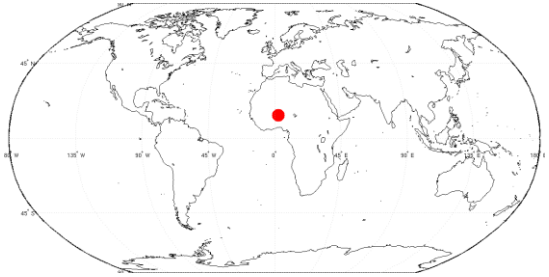
Niger (Candidate Pixel)

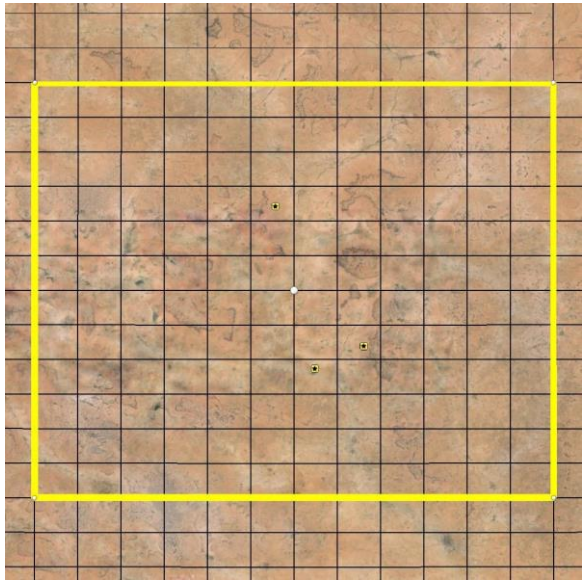
4501-36-01

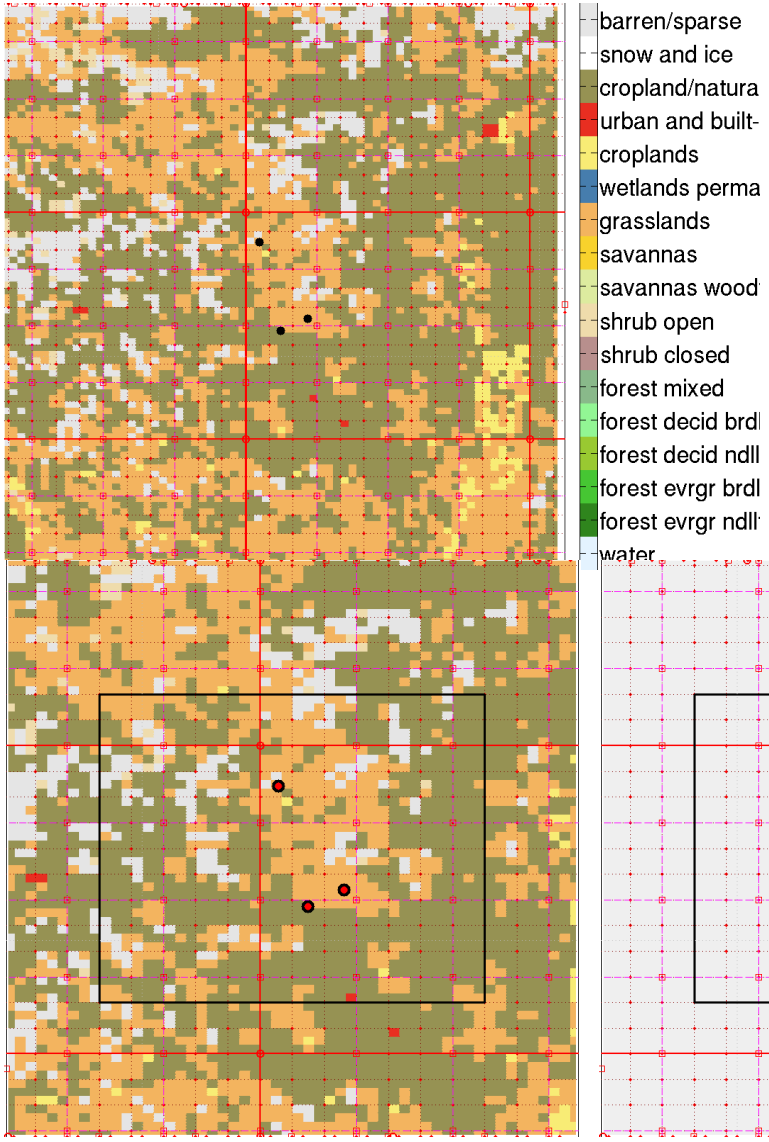
Displaced ref pixel over Niger AMMA site

Jet Propulsion Laboratory
California Institute of Technology

Niger
Lat: 13.59, Lon: 2.65
PI: Thierry Pellarin

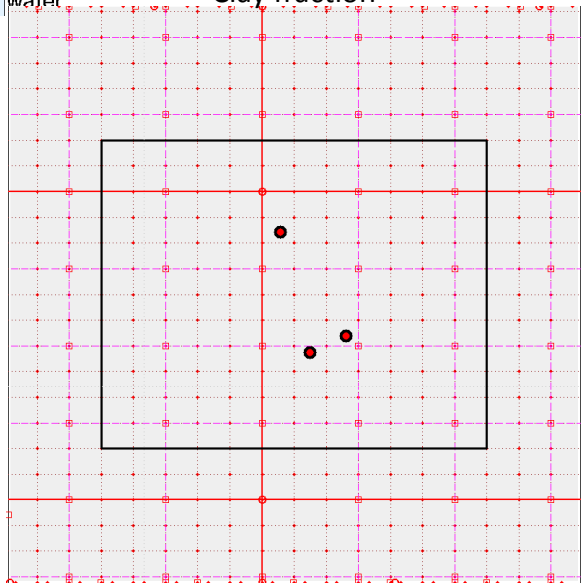






Climate class:
Arid (BSh)
Dominant landcover:
Cropland/natural mosaic
Soil texture:
S-%: 90
C-%: 5
BD: 1.50

Clay fraction

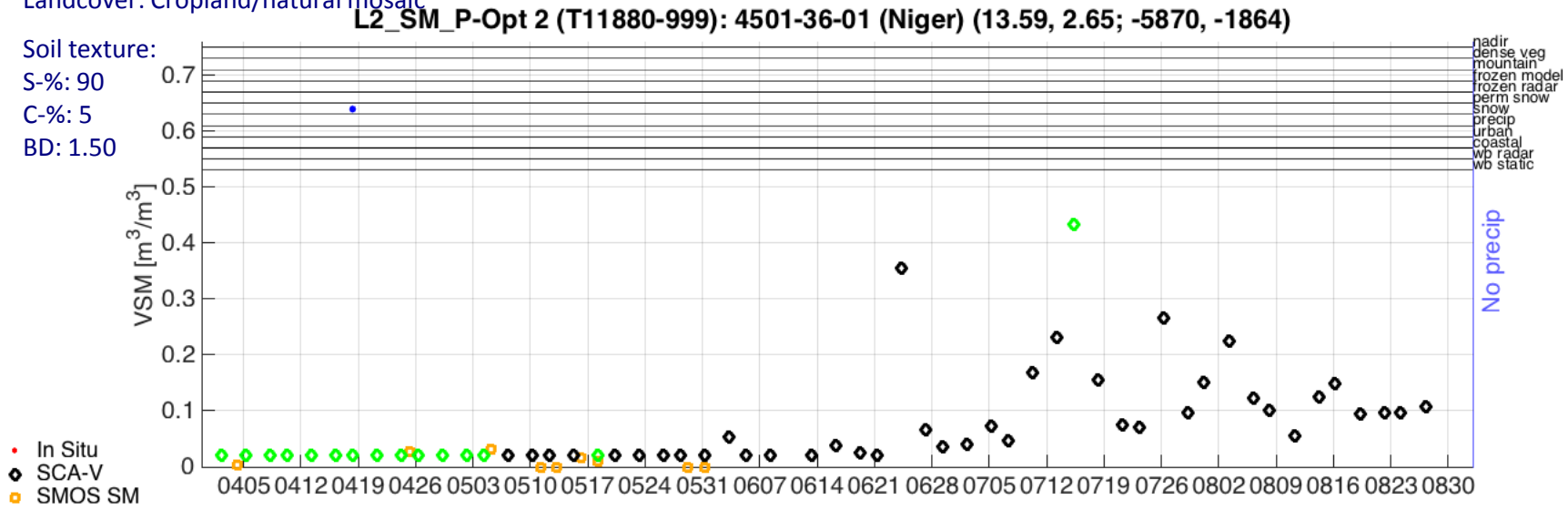


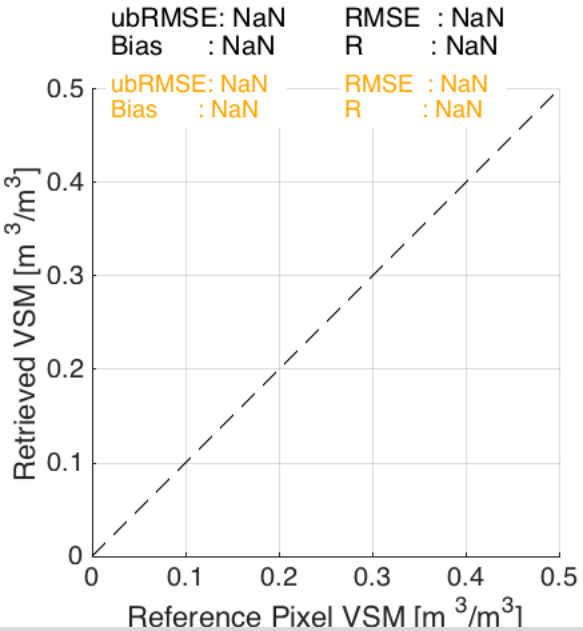
Climate class: Arid (BSh)
Landcover: Cropland/natural mosaic

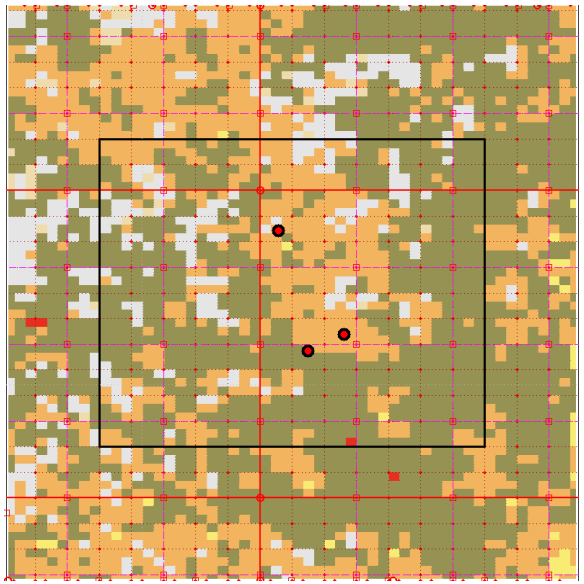
Niger (Candidate Pixel)

Jet Propulsion Laboratory
California Institute of Technology

Soil texture:
S-%: 90
C-%: 5
BD: 1.50







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

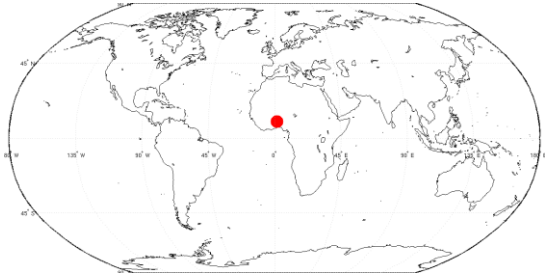
Jet Propulsion Laboratory
California Institute of Technology

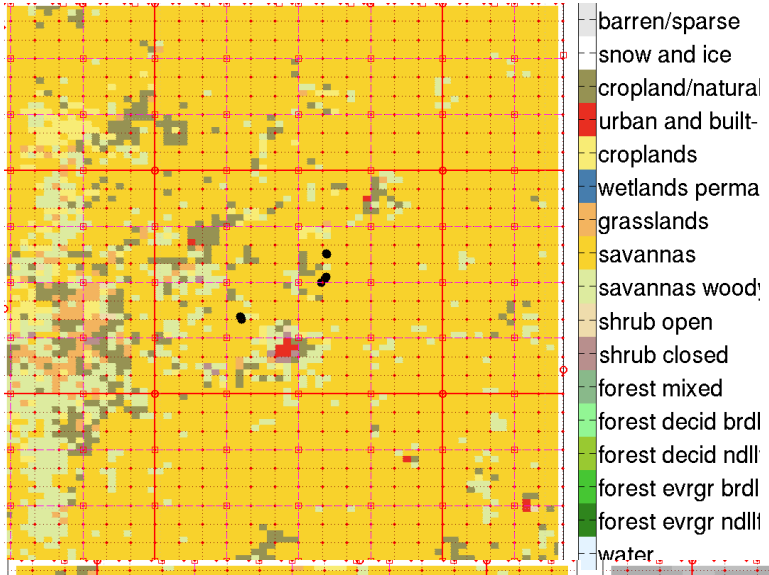
Benin (Candidate Pixel)

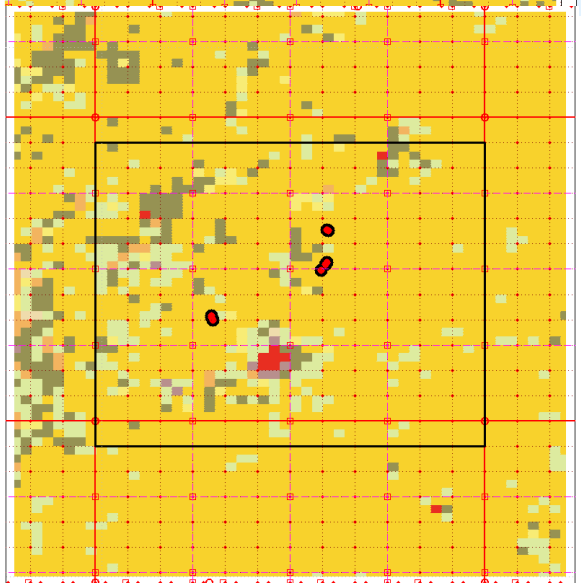
4502-36-01

Displace ref pixel over Benin AMMA site

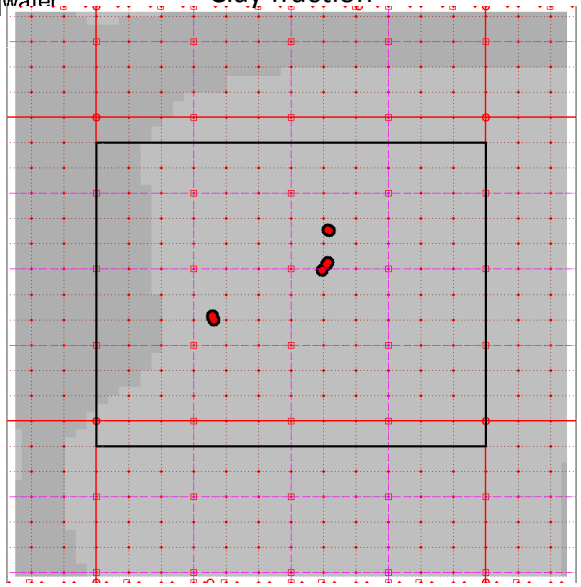
Benin
Lat: 9.77, Lon: 1.68
PI: Thierry Pellarin







Clay fraction



Climate class:
Tropical (Aw)
Dominant landcover:
Savannas

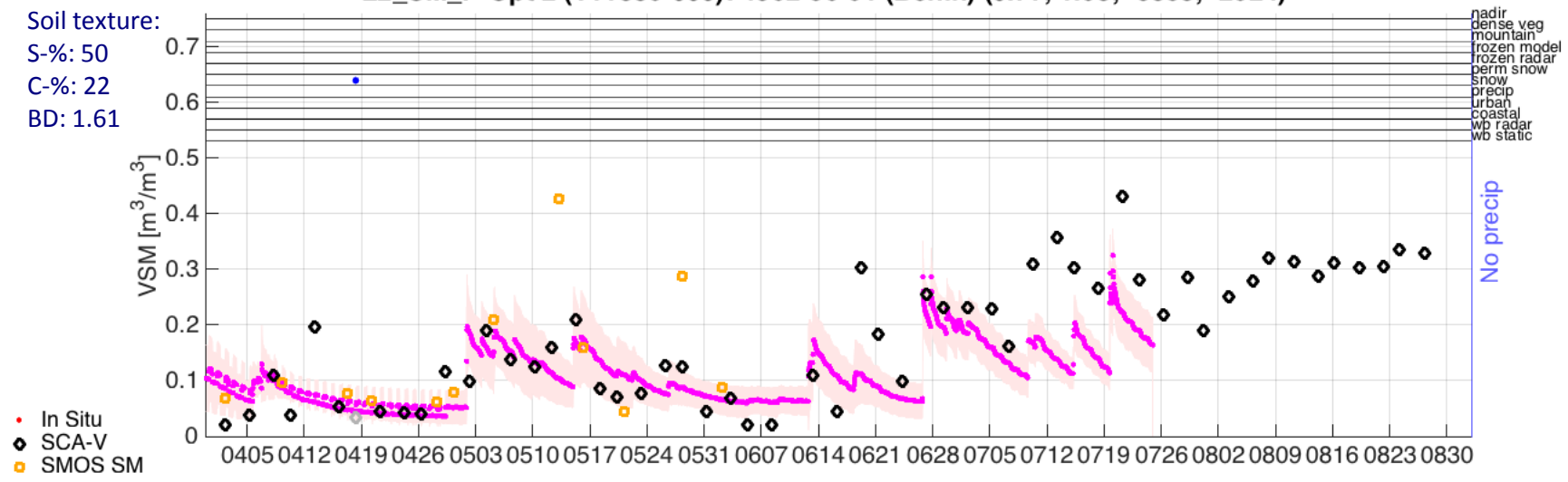
Soil texture:
S-%: 50
C-%: 22
BD: 1.61

Climate class: Tropical (Aw)
Landcover: Savannas

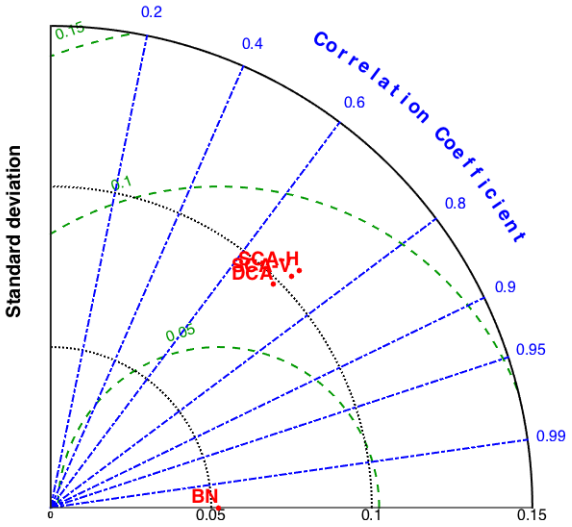
Benin (Candidate Pixel)

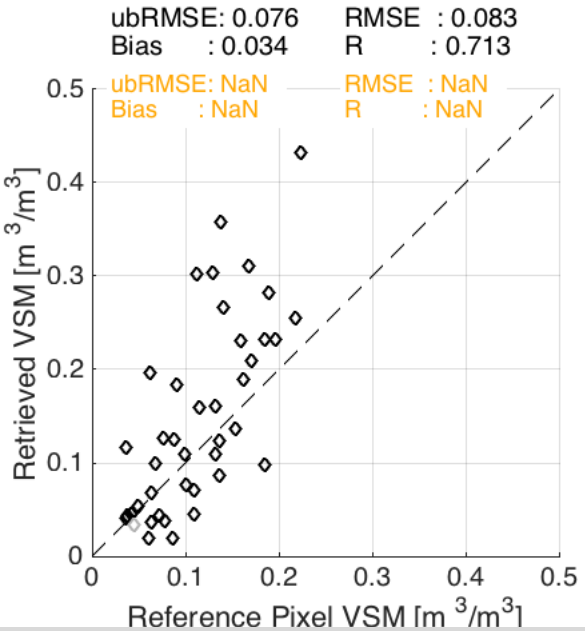
Jet Propulsion Laboratory
California Institute of Technology

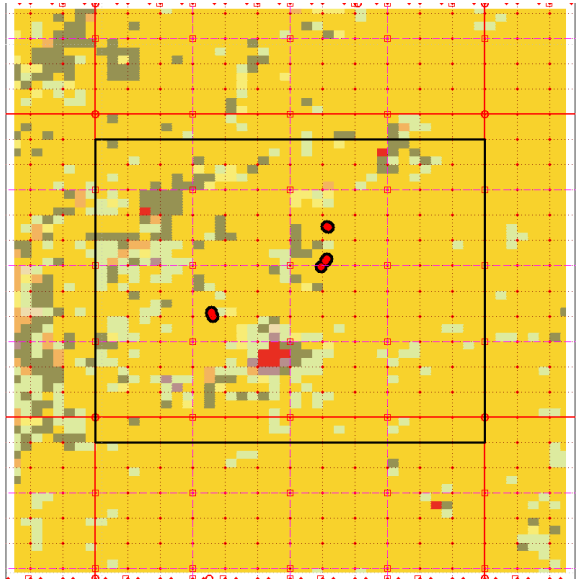
Soil texture:
S-%: 50
C-%: 22
BD: 1.61



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

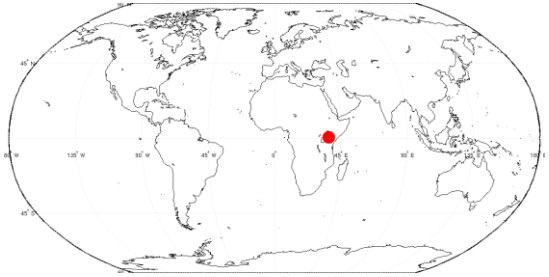
Mpala (Candidate Pixel)

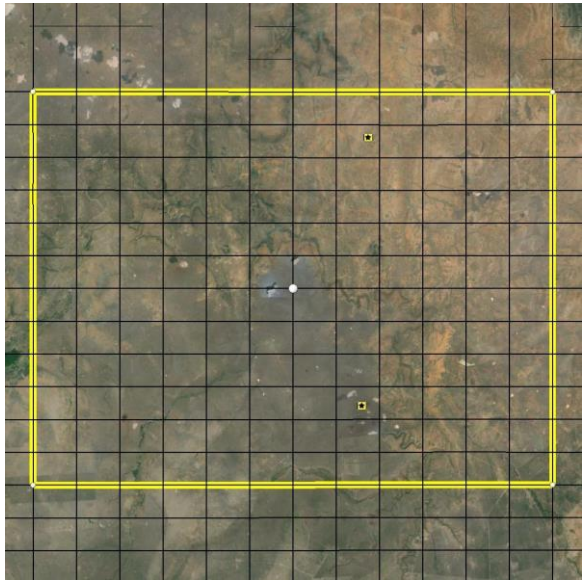
2401-36-01

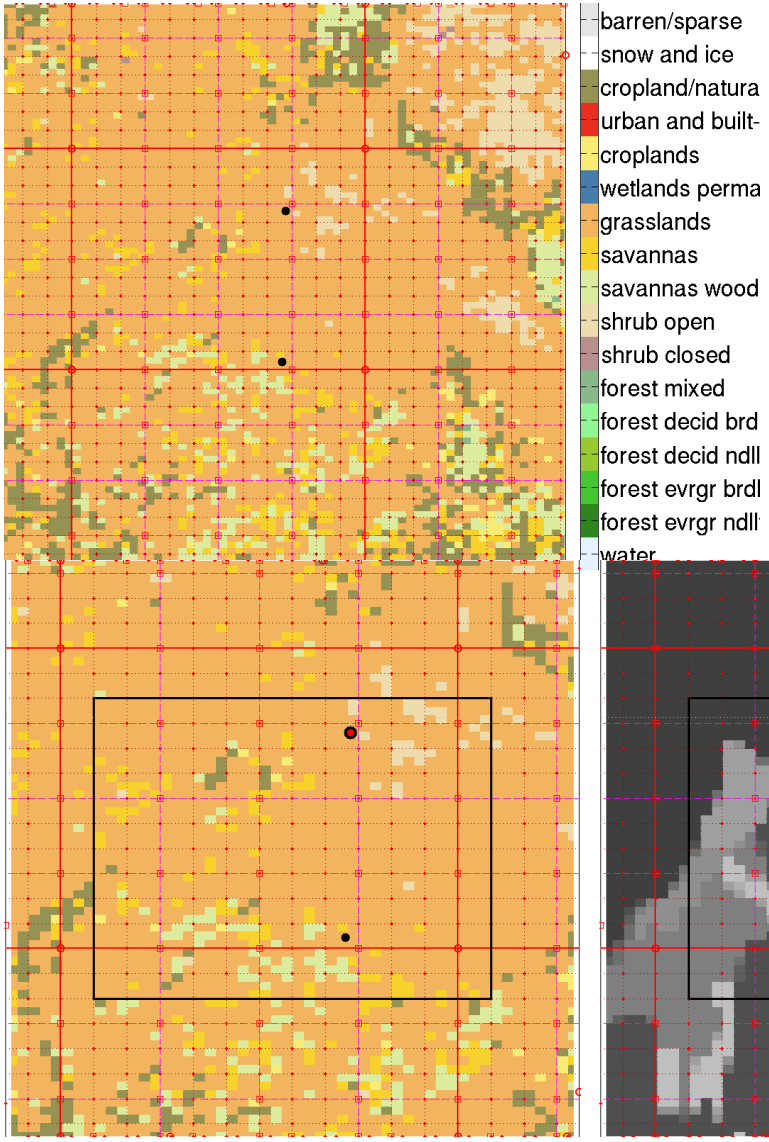
Displaced ref pixel over Mpala (dummy scaling)

Jet Propulsion Laboratory
California Institute of Technology

Kenya
Lat: 0.38, Lon: 36.82
PI: Kelly Caylor



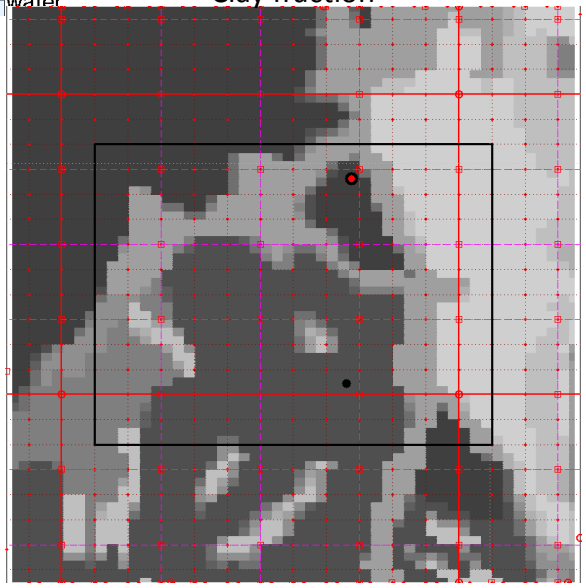




Climate class:
Temperate (Cfb)
Dominant landcover:
Grasslands

Soil texture:
S-%: 41
C-%: 42
BD: 1.36

Clay fraction

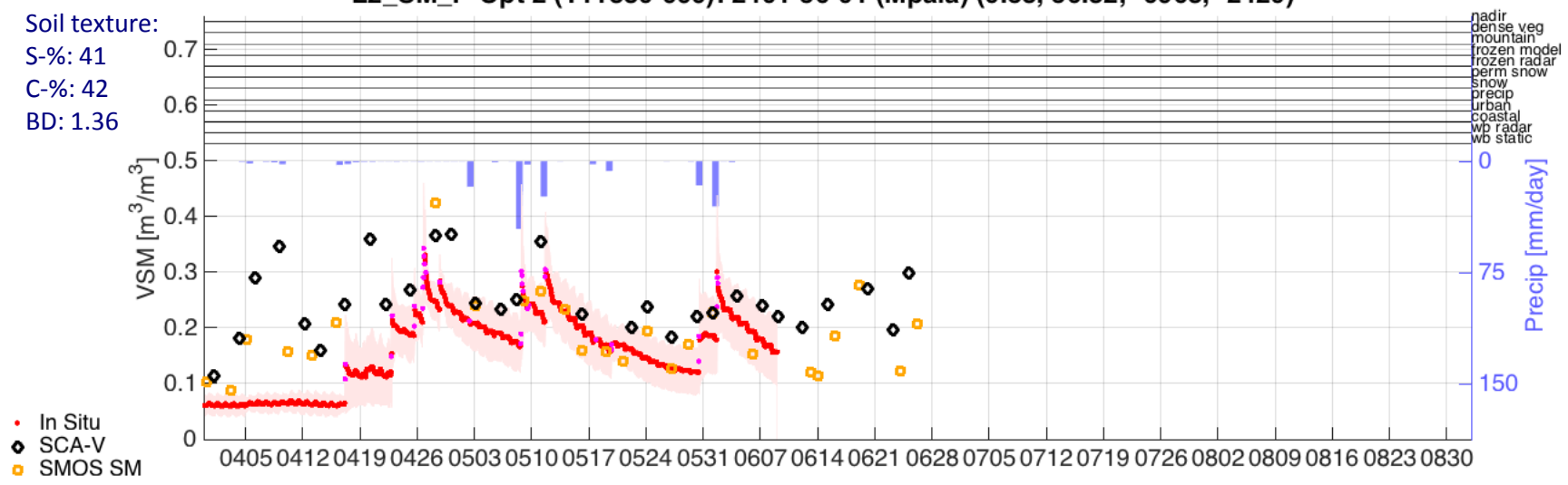


Climate class: Temperate (Cfb)
Landcover: Grasslands

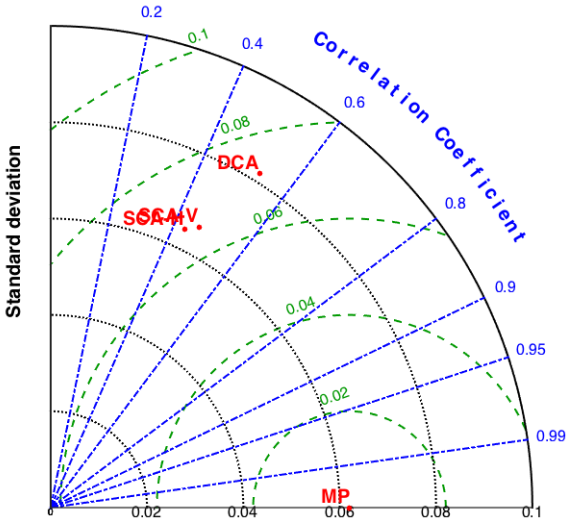
Mpala (Candidate Pixel)

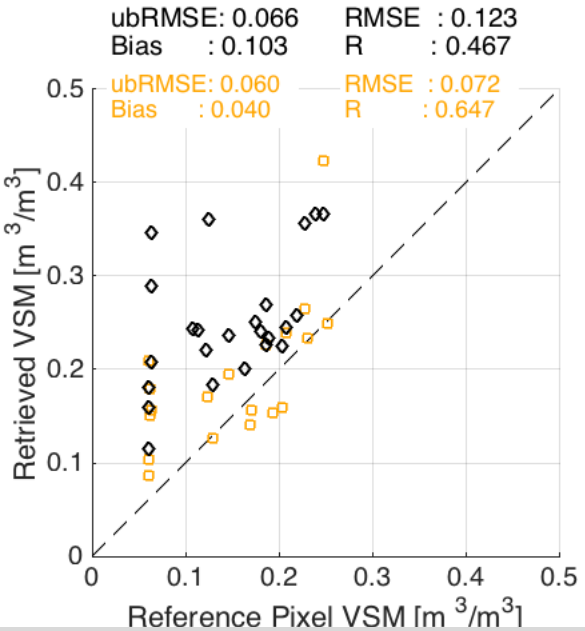
Jet Propulsion Laboratory
California Institute of Technology

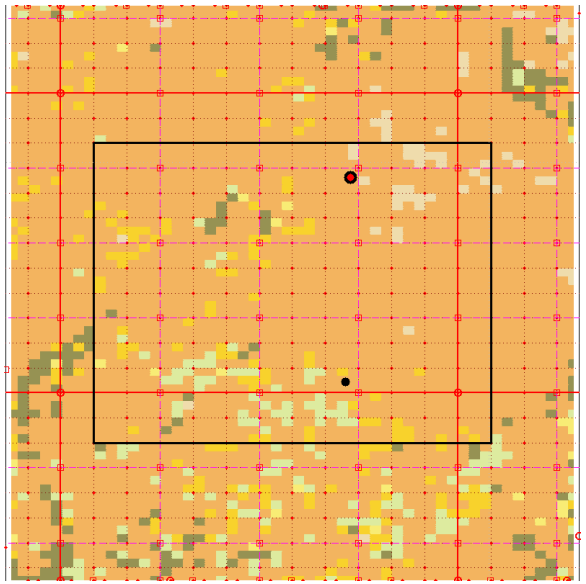
Soil texture:
S-%: 41
C-%: 42
BD: 1.36



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

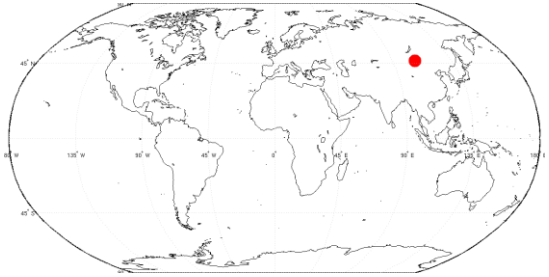
MAHASRI (Candidate Pixel)

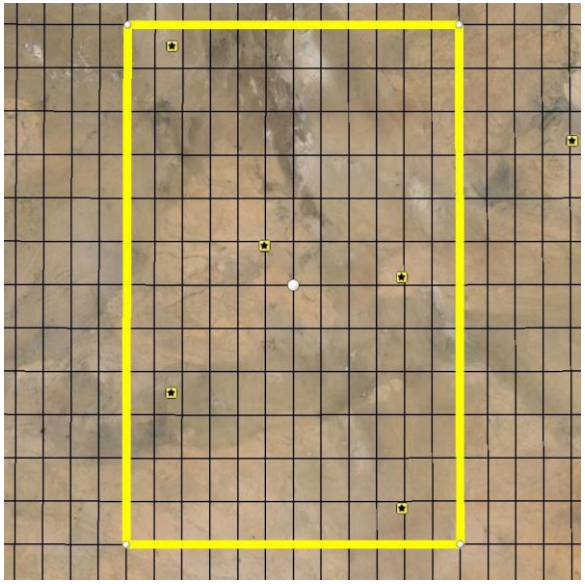
5301-36-01

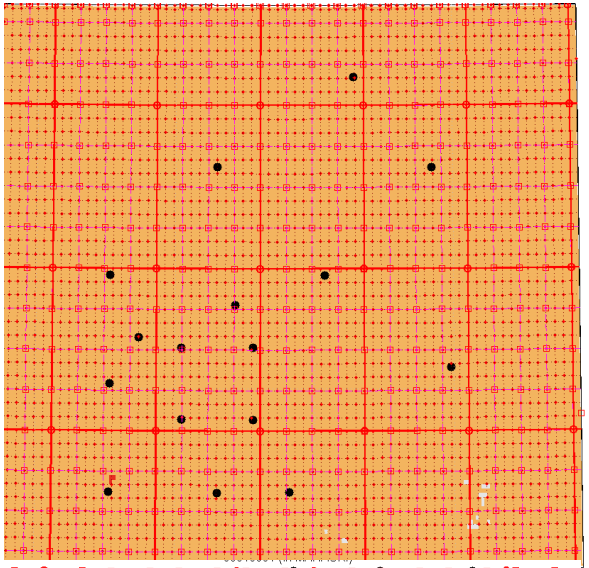
Displaced ref pixel in Mongolia (western)

Jet Propulsion Laboratory
California Institute of Technology

Mongolia
Lat: 46.10, Lon: 106.40
PI: JAXA

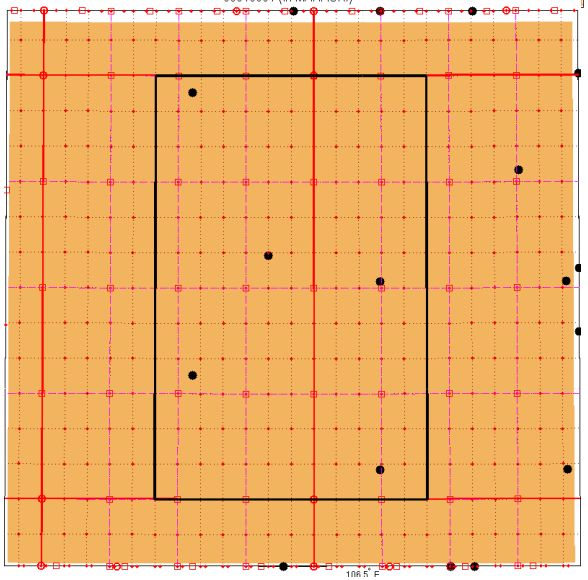




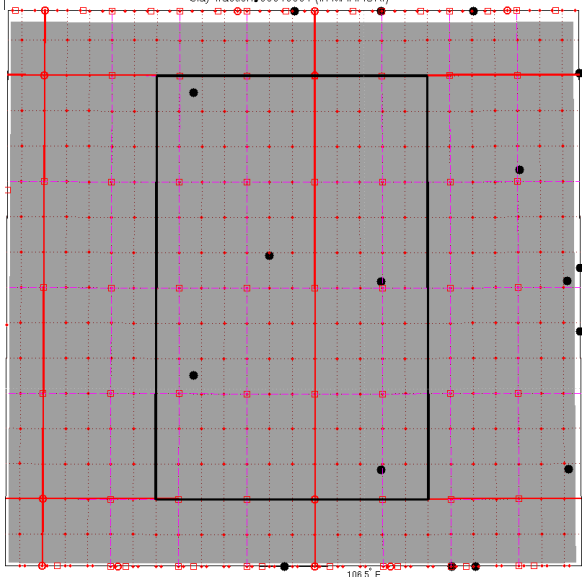


Climate class:
Cold (Dwc)
Dominant landcover:
Grasslands

Soil texture:
S-%: 30
C-%: 32
BD: 1.36



Clay fraction

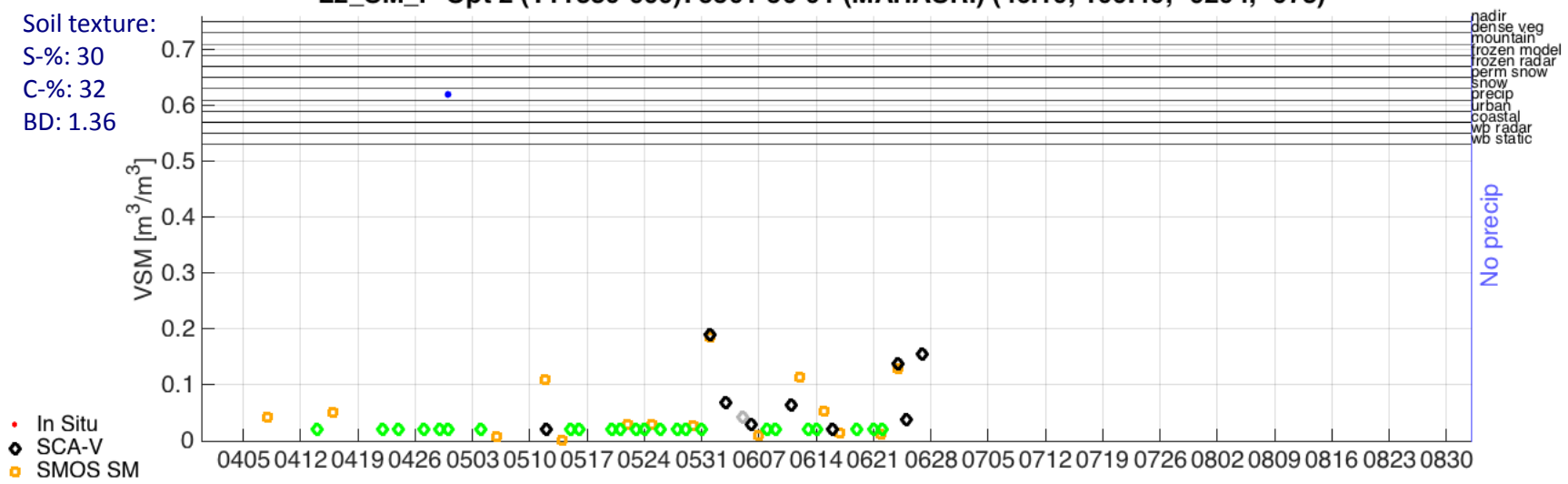


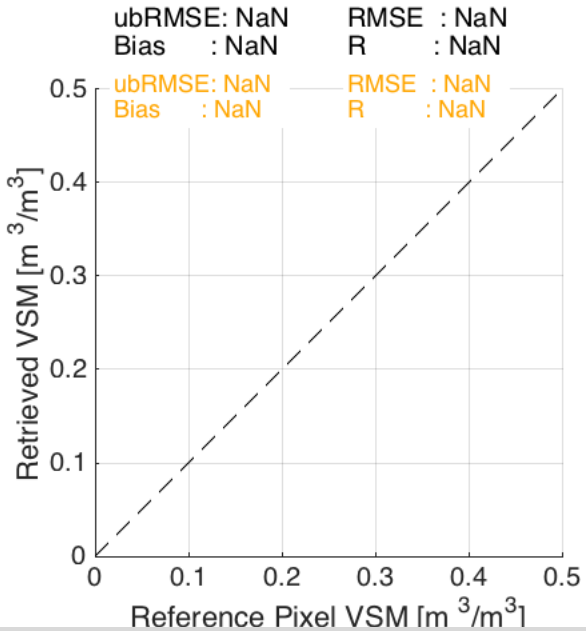
Climate class: Cold (Dwc)
Landcover: Grasslands

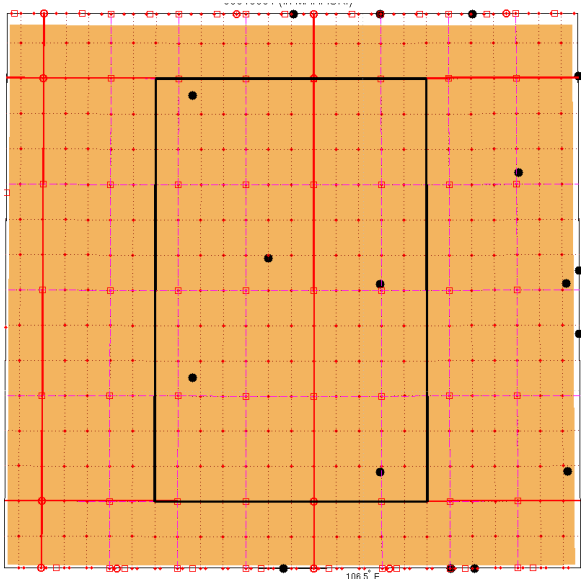
MAHASRI (Candidate Pixel)

Jet Propulsion Laboratory
California Institute of Technology

Soil texture:
S-%: 30
C-%: 32
BD: 1.36







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

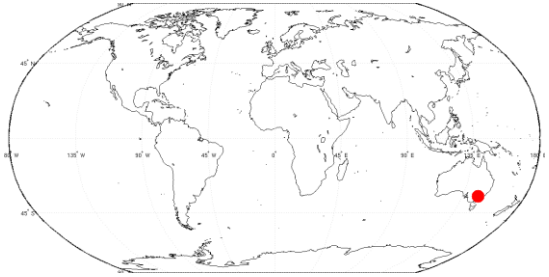
Jet Propulsion Laboratory
California Institute of Technology

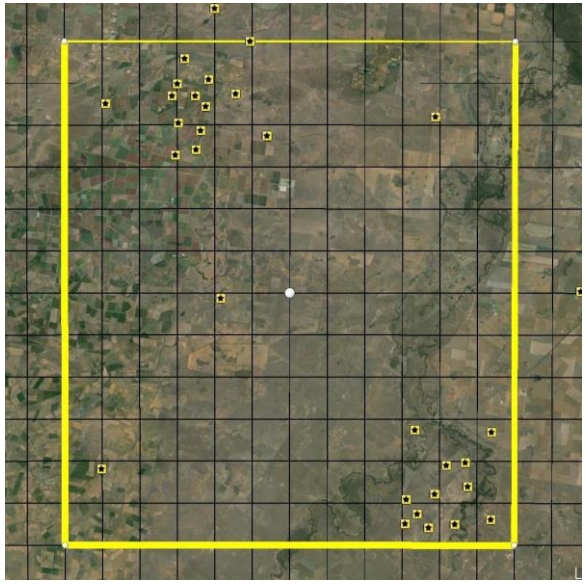
Yanco (Core Pixel)

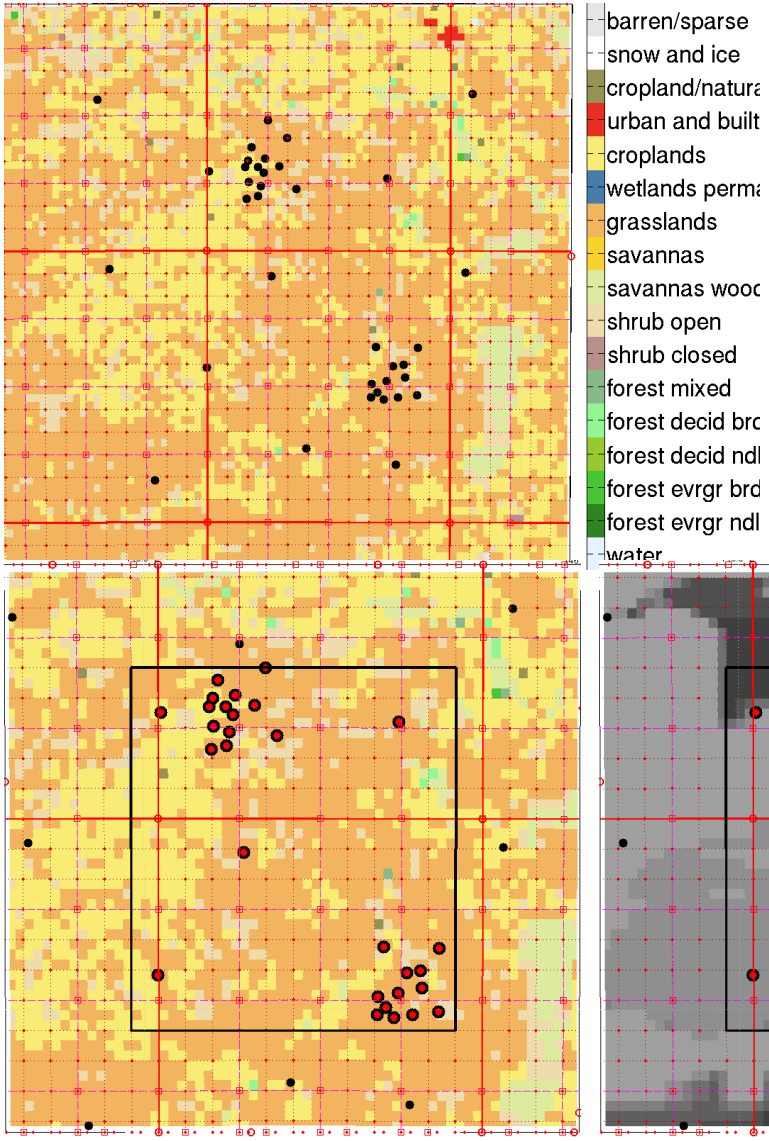
0701-36-01

Displaced ref pixel over Yanco

Australia
Lat: -34.85, Lon: 146.17
PI: Jeffrey Walker



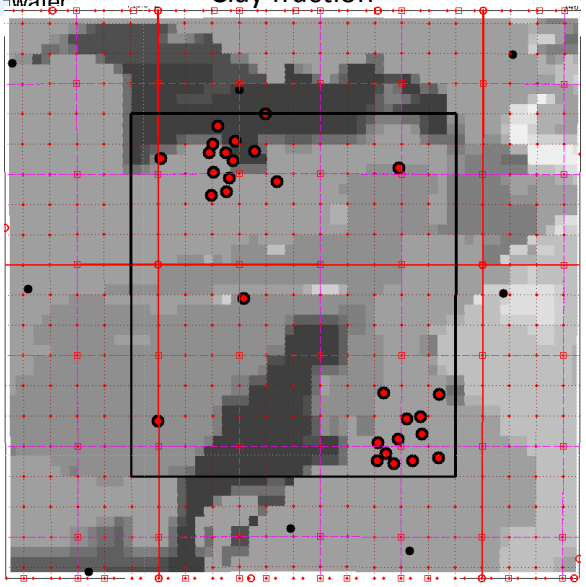




Climate class:
Arid (BSk)
Dominant landcover:
Grasslands

Soil texture:
S-%: 43
C-%: 38
BD: 1.33

Clay fraction

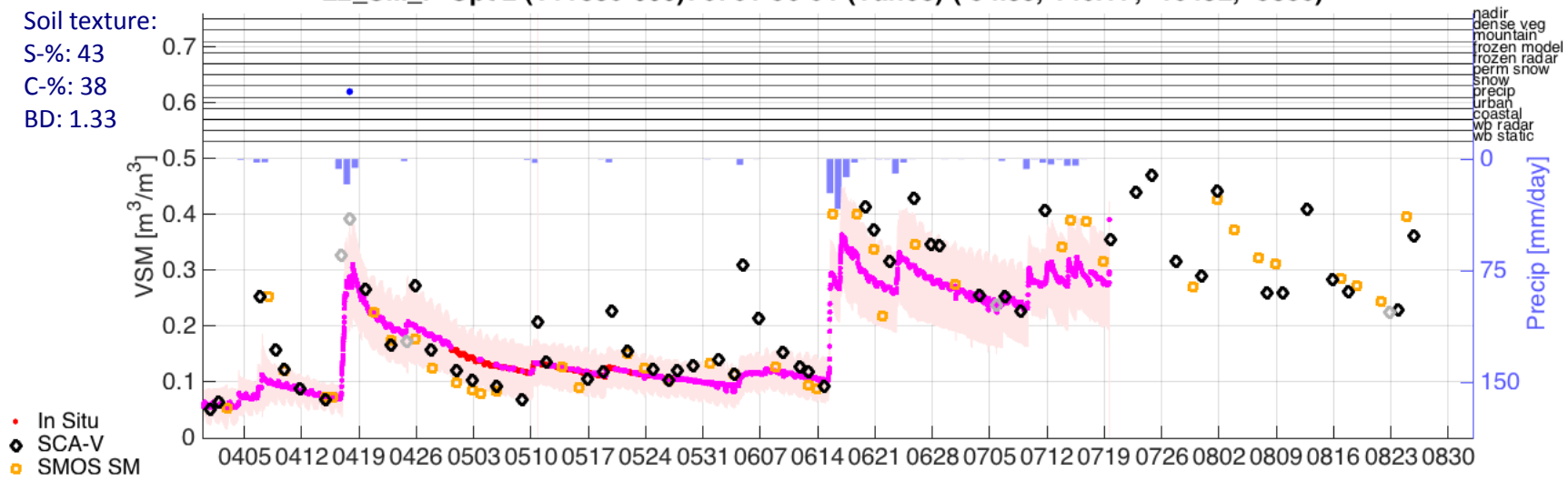


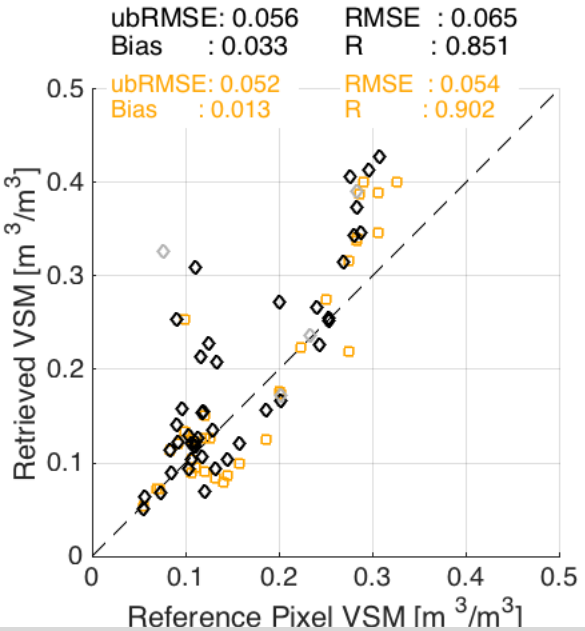
Climate class: Arid (BSk)
Landcover: Grasslands

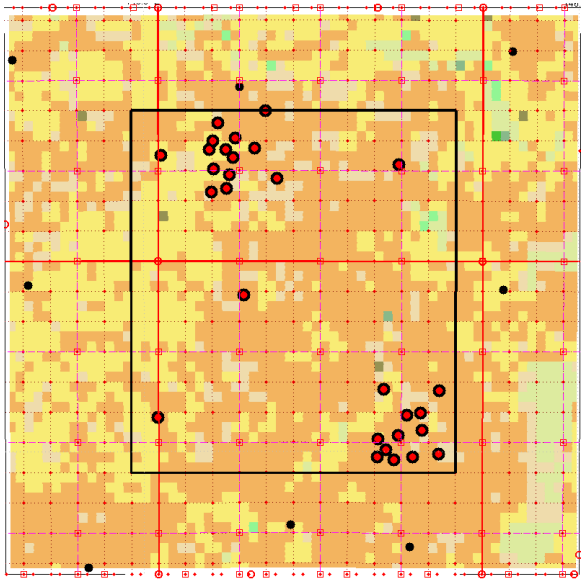
Yanco (Core Pixel)

Jet Propulsion Laboratory
California Institute of Technology

Soil texture:
S-%: 43
C-%: 38
BD: 1.33







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
Gray: Retrieval attempted and succeeded but use not recommended [bit(0)=1, bit(1)=0, bit(2)=0]
Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

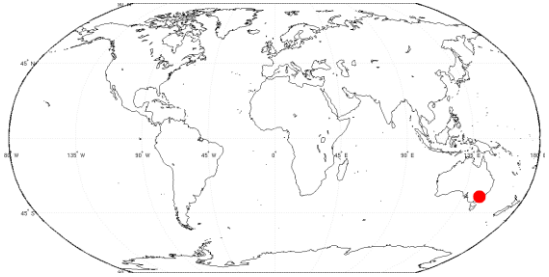
Jet Propulsion Laboratory
California Institute of Technology

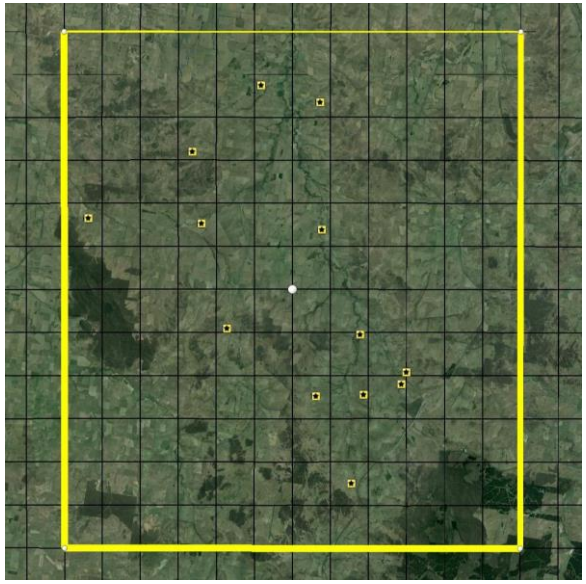
Kyeamba (Core Pixel)

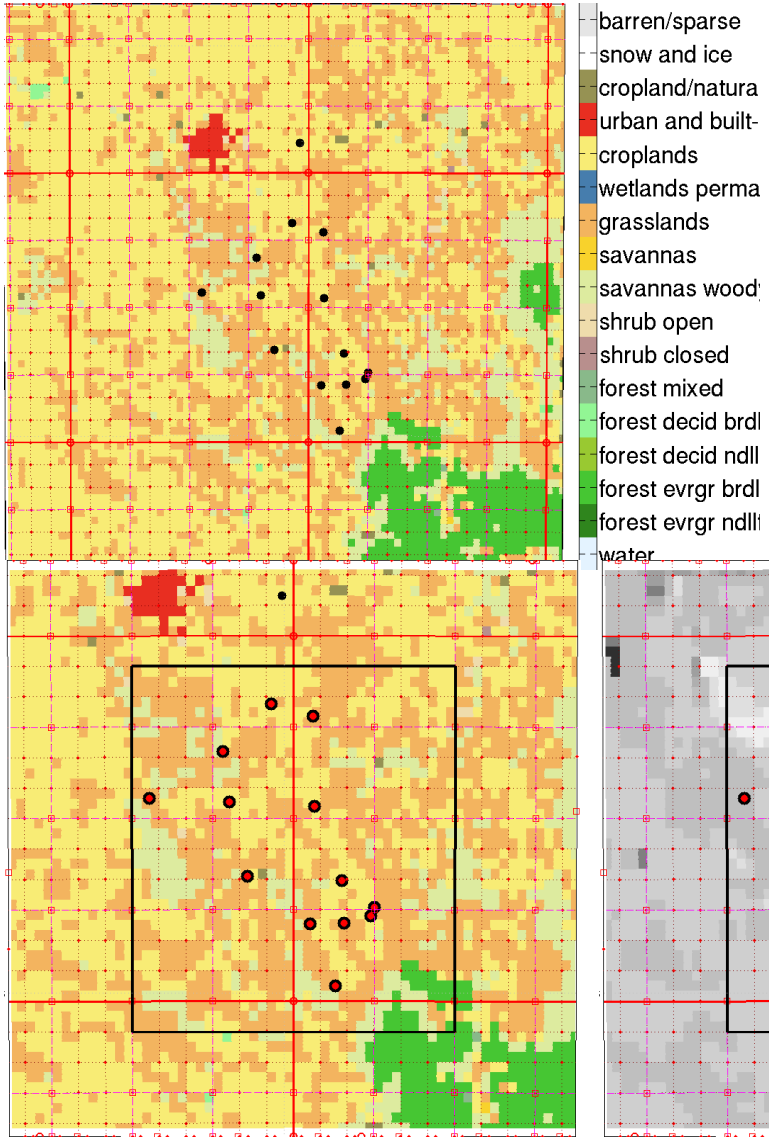
0702-36-01

Displaced ref pixel over Kyeamba

Australia
Lat: -35.36, Lon: 147.51
PI: Jeffrey Walker



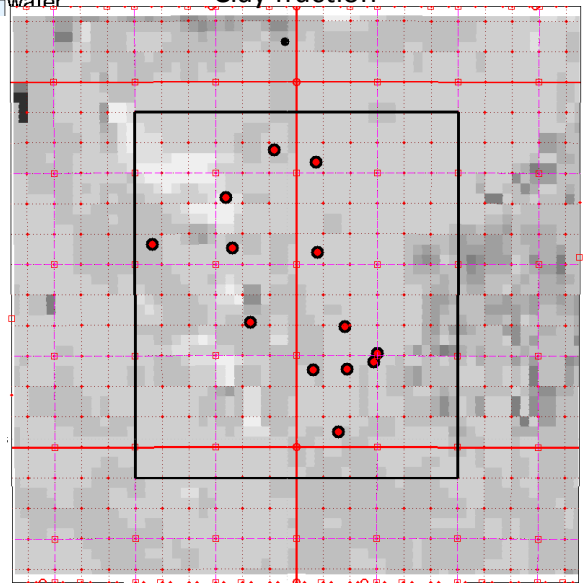




Climate class:
Temperate (Cfa)
Dominant landcover:
Grasslands

Soil texture:
S-%: 65
C-%: 18
BD: 1.43

Clay fraction

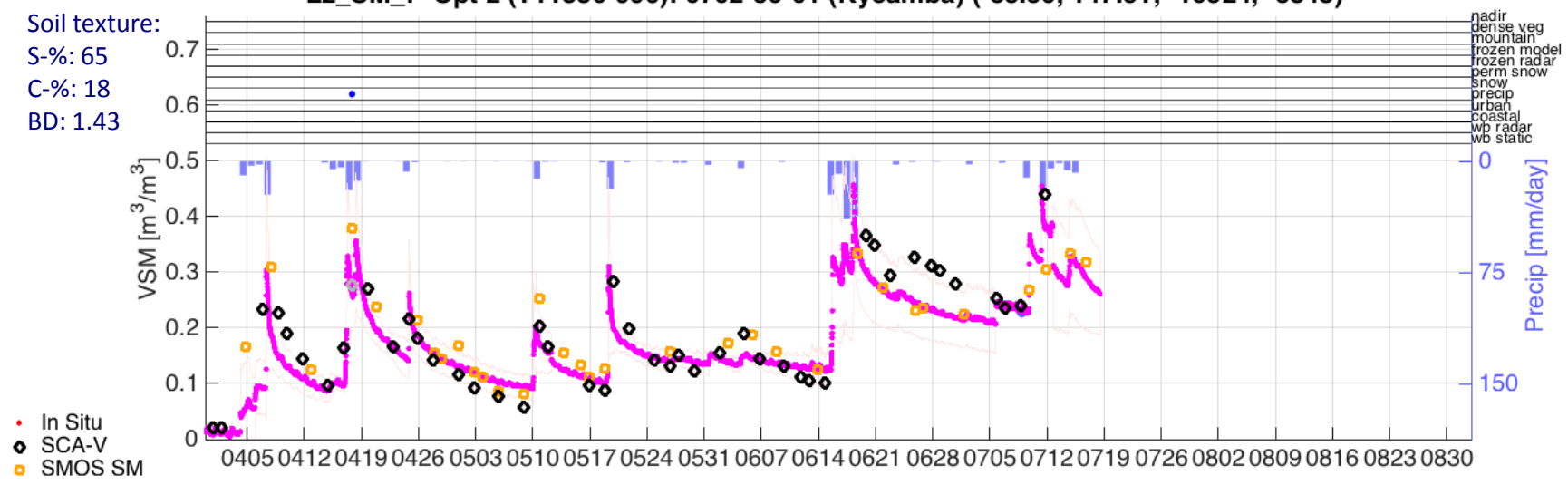


Climate class: Temperate (Cfa)
Landcover: Grasslands

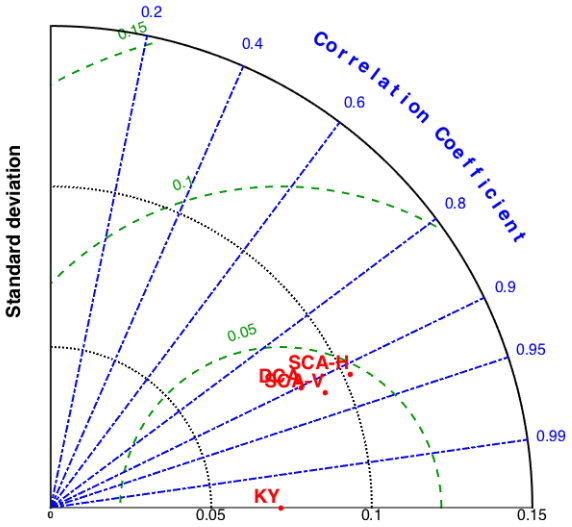
Kyeamba (Core Pixel)

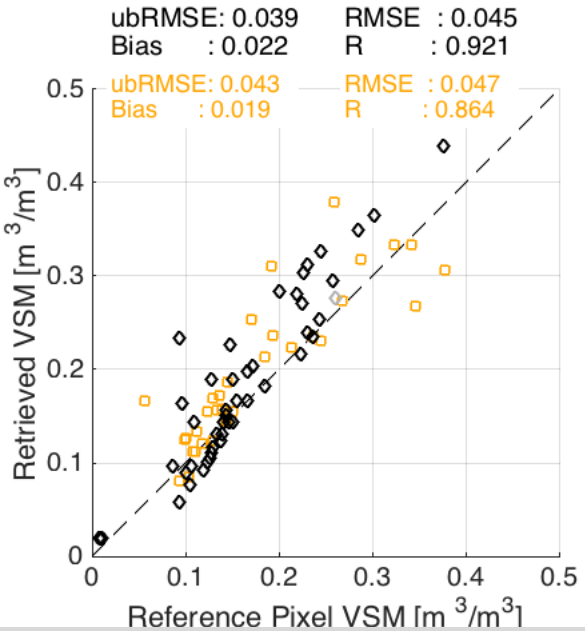
Jet Propulsion Laboratory
California Institute of Technology

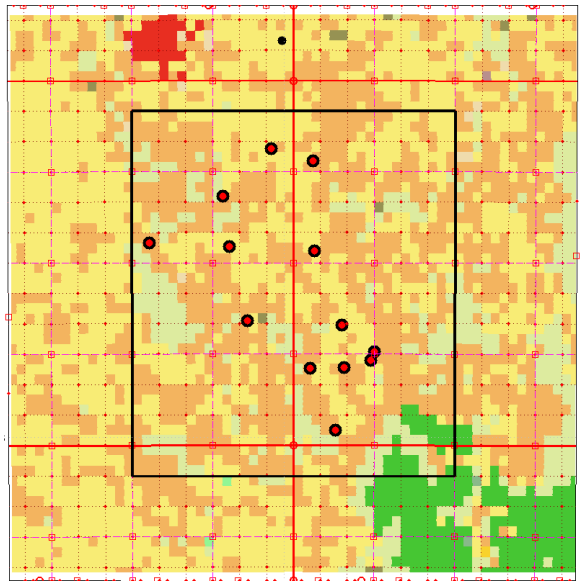
Soil texture:
S-%: 65
C-%: 18
BD: 1.43



Optional Algorithms







Black: Use recommended [Retrieval Quality Flag bit(0)=0]
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Green: Retrieval attempted but failed [bit(0)=1, bit(1)=0, bit(2)=1]
Cyan: Retrieval not attempted [bit(0)=1, bit(1)=1]

L2_SM_P-Opt 2 (T11880-999)

2015/03/31 - 2015/09/02

Metrics Summary: All Pixels

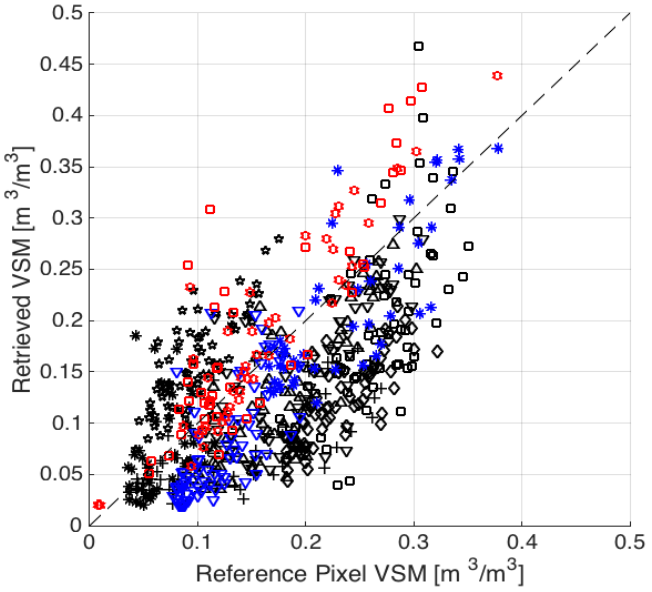
Ref Pixel	ubRMSE	Bias	RMSE	R
Tonzi Ranch (2501-36-01)	NaN	NaN	NaN	NaN
Reynolds Creek (0401-36-01)	0.050	-0.058	0.077	0.628
Walnut Gulch (1601-36-01)	0.040	0.005	0.041	0.471
TxSON (4801-36-01)	0.031	-0.010	0.032	0.962
Fort Cobb (1603-36-01)	0.044	-0.049	0.066	0.758
Little Washita (1602-36-01)	0.037	-0.050	0.062	0.833
South Fork (1607-36-01)	0.066	-0.072	0.098	0.643
St Josephs (1606-36-01)	0.043	-0.065	0.078	0.647
Little River (1604-36-01)	0.027	0.062	0.068	0.800
Kenaston (2701-36-01)	0.023	-0.111	0.113	0.828
Carman (0901-36-01)	NaN	NaN	NaN	NaN
Tabasco (3201-36-01)	NaN	NaN	NaN	NaN
Monte Buey (1902-36-01)	0.045	-0.024	0.051	0.813
Bell Ville (1901-36-01)	0.052	-0.044	0.069	0.857
REMEDHUS (0301-36-02)	0.038	-0.043	0.058	0.702
Valencia (4101-36-01)	0.028	-0.006	0.029	0.561
HOAL (0601-36-01)	NaN	NaN	NaN	NaN
Twente (1204-36-04)	0.042	0.081	0.091	0.485
Twente (1204-36-05)	NaN	NaN	NaN	NaN
TERENO (0201-36-01)	0.059	-0.010	0.060	0.670
Sodankyla (1701-36-01)	0.042	-0.035	0.055	0.183
Kuwait (0501-36-01)	0.024	-0.010	0.026	-0.121
Niger (4501-36-01)	NaN	NaN	NaN	NaN
Benin (4502-36-01)	0.076	0.034	0.083	0.713
Mpala (2401-36-01)	0.066	0.103	0.123	0.467
MAHASRI (5301-36-01)	NaN	NaN	NaN	NaN
Yanco (0701-36-01)	0.056	0.033	0.065	0.851
Kyeamba (0702-36-01)	0.039	0.022	0.045	0.921

L2_SM_P-Opt 2 (T11880-999)

2015/03/31 - 2015/09/02

Performance Metrics

Ref Pixel	ubRMSE	Bias	RMSE	R
Reynolds Creek (0401-36-01)	0.050	-0.058	0.077	0.628
Walnut Gulch (1601-36-01)	0.040	0.005	0.041	0.471
Fort Cobb (1603-36-01)	0.044	-0.049	0.066	0.758
Little Washita (1602-36-01)	0.037	-0.050	0.062	0.833
South Fork (1607-36-01)	0.066	-0.072	0.098	0.643
Little River (1604-36-01)	0.027	0.062	0.068	0.800
Kenaston (2701-36-01)	0.023	-0.111	0.113	0.828
Carman (0901-36-01)	NaN	NaN	NaN	NaN
Monte Buey (1902-36-01)	0.045	-0.024	0.051	0.813
REMEDHUS (0301-36-02)	0.038	-0.043	0.058	0.702
Yanco (0701-36-01)	0.056	0.033	0.065	0.851
Kyeamba (0702-36-01)	0.039	0.022	0.045	0.921
MEAN:	**0.042**	**-0.026**	**0.068**	**0.750**



L2_SM_P-Opt 2 (T11880-999)

2015/03/31 - 2015/09/02

Performance Metrics by Land Cover Class (IGBP)

Land Cover	Ref Pixel	ubRMSE	Bias	RMSE	R
Cropland/natural mosaic	Little River (1604-36-01)	0.027	0.062	0.068	0.800
	MEAN:	**0.027**	**0.062**	**0.068**	**0.800**
Croplands	South Fork (1607-36-01)	0.066	-0.072	0.098	0.643
	Kenaston (2701-36-01)	0.023	-0.111	0.113	0.828
	Carman (0901-36-01)	NaN	NaN	NaN	NaN
	Monte Buey (1902-36-01)	0.045	-0.024	0.051	0.813
	REMEDHUS (0301-36-02)	0.038	-0.043	0.058	0.702
	MEAN:	**0.043**	**-0.063**	**0.080**	**0.746**
Grasslands	Reynolds Creek (0401-36-01)	0.050	-0.058	0.077	0.628
	Fort Cobb (1603-36-01)	0.044	-0.049	0.066	0.758
	Little Washita (1602-36-01)	0.037	-0.050	0.062	0.833
	Yanco (0701-36-01)	0.056	0.033	0.065	0.851
	Kyeamba (0702-36-01)	0.039	0.022	0.045	0.921
	MEAN:	**0.045**	**-0.021**	**0.063**	**0.798**
Shrub open	Walnut Gulch (1601-36-01)	0.040	0.005	0.041	0.471
	MEAN:	**0.040**	**0.005**	**0.041**	**0.471**