

Soil Moisture
Active Passive
Mission
SMAP

Core Validation Sites
Issues

Tom Jackson

6th Cal/Val Workshop

Sept. 1-3, 2015



6th SMAP Cal/Val Workshop Agenda-Day 3



Thursday		
	<i>Improving and Continuing Validation Resources</i>	
0800	Field Experiment Planning	T. Jackson
0815	SMAPEX-4 Report and SMAPEX-5 Plan	J. Walker
0845	SMAPVEX15 Report	T. Jackson/M. Cosh/A. Colliander
0915	Canada 2016 Planning	J. Powers
0930	SMAPVEX16 and Beyond Planning	T. Jackson
1000	<i>Break</i>	
1015	Core Validation Sites Issues	T. Jackson/A. Colliander
1030	ARS Watershed Sites	M. Cosh
1040	AARC Sites	A. Pacheco
1050	Argentina	M. Thibeault
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1120	Italy	F. Greifeneder
1130	Additional Texas Sites	B. Mohanty (C)
1135	Good Practices for Soil Moisture Validation	T. Jackson/M. Cosh/A. Berg/J. Walker
1215	<i>Lunch</i>	
0115	Sparse Networks in SMAP L2-L4 Cal/Val	W. Crow
0200	Model-based products in SMAP L2-L4 Cal/Val	D. Entekhabi
0230	<i>Break</i>	
0245	Satellite-based products in SMAP L2-L4 Cal/Val	T. Jackson/M. Burgin
0330	<i>Summary</i>	
0400	<i>End</i>	



L2-L4 Validation Methodologies



Methodology	Role
Core Validation Sites	Accurate estimates of products at matching scales for a limited set of conditions
Sparse Networks	One point in the grid cell for a wide range of conditions
Satellite Products	Estimates over a very wide range of conditions at matching scales
Model Products	Estimates over a very wide range of conditions at matching scales
Field Campaigns	Detailed estimates for a very limited set of conditions

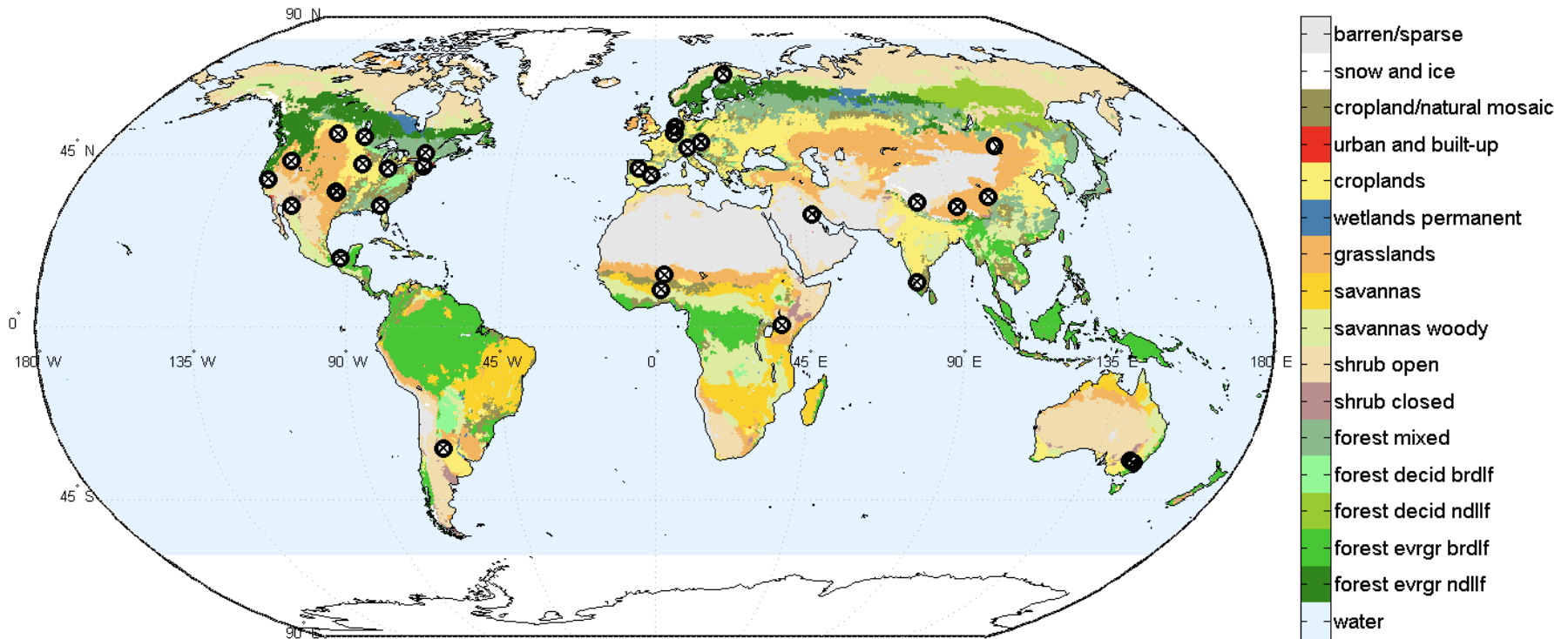
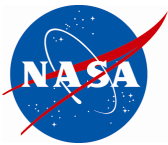


Core Validation Sites and SMAP Cal/Val Partners

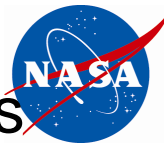


- *In situ* data are critical in the assessment of products.
- This comparison provides error estimates and a basis for modifying algorithms and/or parameters.
- Reliable and timely observations will be of the greatest value in validation.
- More sites will result in a more robust analysis.
- No 😊
- Approach: Establish a Cal/Val Partners program early on in Mission development.

Global Map of SMAP L2/L3 SM Validation Sites

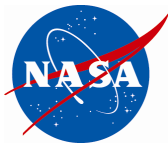


- CV Partners are at different levels of maturity (and latency).
- Implemented a process for identifying sites that were fully ready (Core-CVS) and others that were still under development (Candidate).
- Choices will be revisited prior to formal reports.



List of SMAP L2SMAP Core Validation Site Candidates

Site Name	Site PI	Area	Climate regime	IGBP Land Cover
Tonzi Ranch	M. Moghaddam	USA (California)	Temperate	Savannas woody
Walnut Gulch*	M. Cosh	USA (Arizona)	Arid	Shrub open
Reynolds Creek*	M. Cosh	USA (Idaho)	Arid	Grasslands
Fort Cobb*	M. Cosh	USA (Oklahoma)	Temperate	Grasslands
Little Washita*	M. Cosh	USA (Oklahoma)	Temperate	Grasslands
South Fork*	M. Cosh	USA (Iowa)	Cold	Croplands
St. Josephs*	M. Cosh	USA (Indiana)	Cold	Croplands
Little River*	M. Cosh	USA (Georgia)	Temperate	Cropland/natural mosaic
TxSON*	T. Caldwell	USA (Texas)	Temperate	Grasslands
Millbrook	M. Temimi	USA (New York)	Cold	Forest deciduous broadleaf
Kenaston*	A. Berg	Canada	Cold	Croplands
Carman*	H. McNairn	Canada	Cold	Croplands
Casselman*	H. McNairn	Canada	Cold	Croplands
Tabasco	J. Ramos	Mexico	Tropical	Croplands
Monte Buey*	M. Thibeault	Argentina	Arid	Croplands
Bell Ville	M. Thibeault	Argentina	Arid	Croplands
REMEDHUS*	J. Martinez	Spain	Temperate	Croplands
Valencia*	E. Lopez-Baeza	Spain	Arid	Savannas woody
EURAC	C. Notarnicola	Italy	Polar	Shrub open
Twente*	B. Su	Holland	Cold	Cropland/natural mosaic
TERENO	C. Montzka	Germany	Temperate	Forest mixed
HOAL	W. Dorigo	Austria	Temperate	Mixed forest
Sodankyla	J. Pulliainen	Finland	Cold	Savannas woody
Kuwait	H. Jassar	Kuwait	Temperate	Barren/sparse
Mpala	K. Caylor	Kenya	Temperate	Grasslands
Niger	T. Pellarin	Niger	Arid	Grasslands
Benin	T. Pellarin	Benin	Arid	Savannas
Naqu	B. Su	Tibet	Polar	Grasslands
Maqu	B. Su	Tibet	Cold	Grasslands
Ngari	B. Su	Tibet	Arid	Barren/sparse
MAHASRI	JAXA	Mongolia	Cold	Grasslands
Yanco*	J. Walker	Australia	Arid	Croplands
Kyeamba*	J. Walker	Australia	Temperate	Croplands



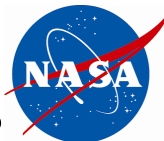
Protocol for Selecting a Core Validation Site

Step	Task
1	Develop and implement the validation grid
2	Assessment of site for conditions that would introduce uncertainty
3	Is the number of points large enough?
4	Are the <i>in situ</i> points geographically distributed?
5	Has the instrumentation been either 1) widely used and known to be well-calibrated or 2) site calibrated?
6	Quality assessment of each point in the network using temporal stability
7	Established scaling function (default average)
8	Conduct pre-launch assessment using surrogate data appropriate for the grid product (i.e. SMOS and GCOM-W soil moisture for 36 km, ..)
9	Has a supplemental study been performed to verify that the network represents the SMAP product over the grid domain?

Core Validation Sites and SMAP Cal/Val Partners



- Moving Candidate sites to Core Site status by January 1, 2016
 - *Based on closing the validated product assessment on March 1, 2016 for release on May 1, 2016*
 - *Identify the roadblocks to accomplishing this for each Candidate site*
- What do we do about the 3- and 9-km validation sites?
- Can we integrate new sites if they become available in 3 months, 1 year,?
- Do we decrease the frequency of L2-L4 meetings?
- Do we need to establish new sites for important/under-represented conditions?
- How long will our CVPs support us?



List of SMAP L2SMP Core Validation Site Candidates

Site Name	Site PI	Area	Climate regime	IGBP Land Cover
Walnut Gulch*	M. Cosh	USA (Arizona)	Arid	Shrub open
Reynolds Creek*	M. Cosh	USA (Idaho)	Arid	Grasslands
Fort Cobb*	M. Cosh	USA (Oklahoma)	Temperate	Grasslands
Little Washita*	M. Cosh	USA (Oklahoma)	Temperate	Grasslands
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Benin	T. Pellarin	Benin	Arid	Savannas
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Ngari	Z. Su	Tibet	Arid	Barren/sparse
MAHASRI	JAXA	Mongolia	Cold	Grasslands
Yanco*	J. Walker	Australia	Arid	Croplands
Kyeamba*	J. Walker	Australia	Temperate	Croplands

Climate class: Temperate (Cfa)

Landcover: Grasslands

Little Washita (Core Pixel)

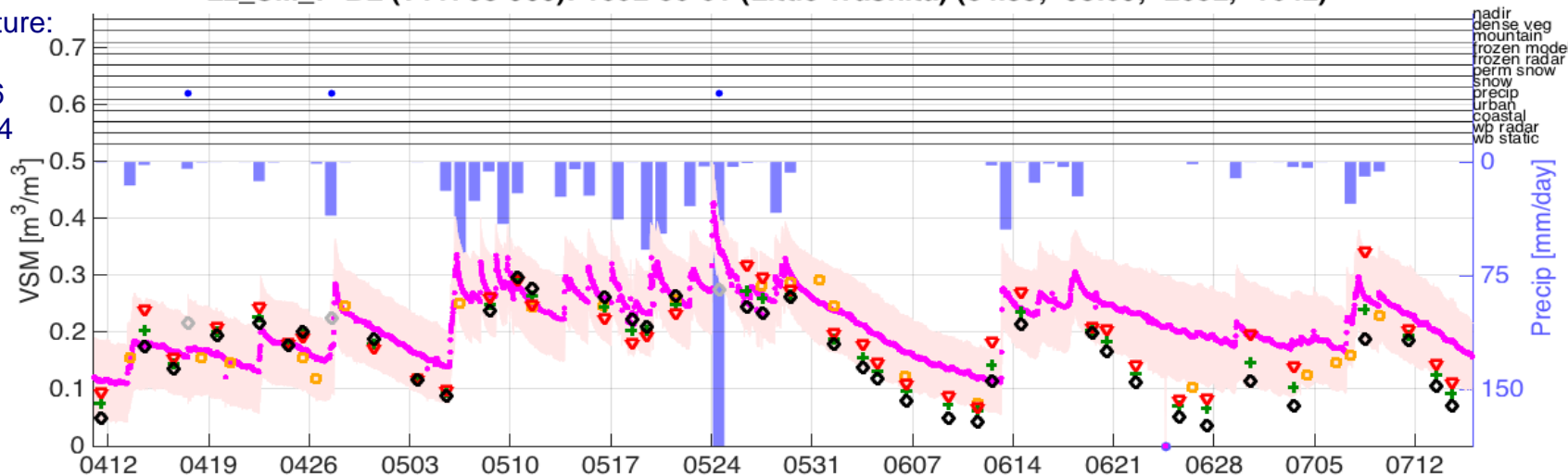
L2_SM_P-BL (T11758-999): 1602-36-01 (Little Washita) (34.88, -98.09; -2632, -1042)

Soil texture:

S-%: 51

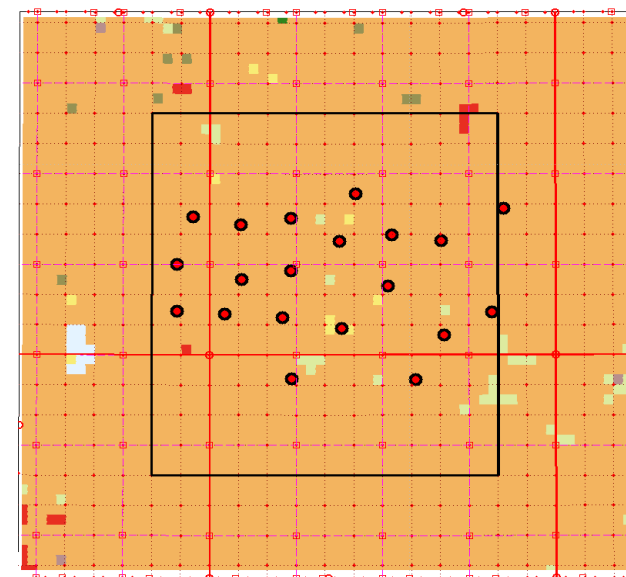
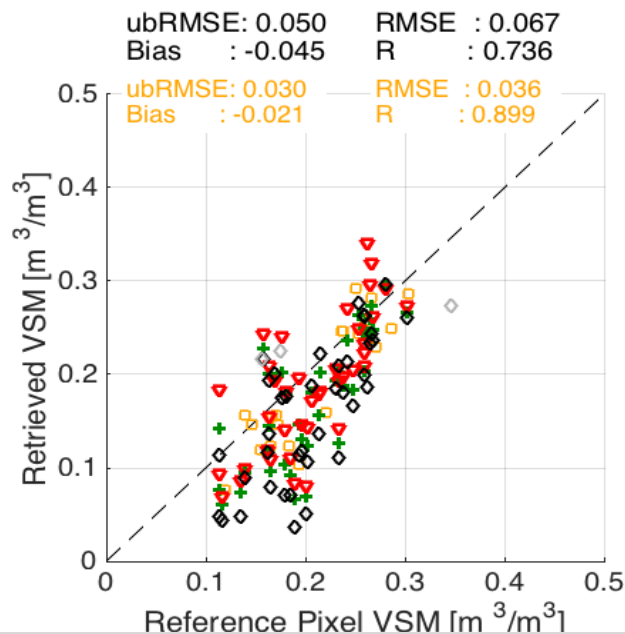
C-%: 16

BD: 1.44



- In Situ
- ◊ L2SMP
- ◻ SMOS SM
- + SCA-V
- ◻ DCA

Alg	ubRMSE	Bias	RMSE	R
SCA-H	0.050	-0.045	0.067	0.736
SCA-V	0.043	-0.033	0.054	0.758
DCA	0.048	-0.018	0.051	0.721



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]



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