

# Preliminary evaluation of soil moisture retrievals for CanEx-SM10

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UNIVERSITÉ DE  
**SHERBROOKE**



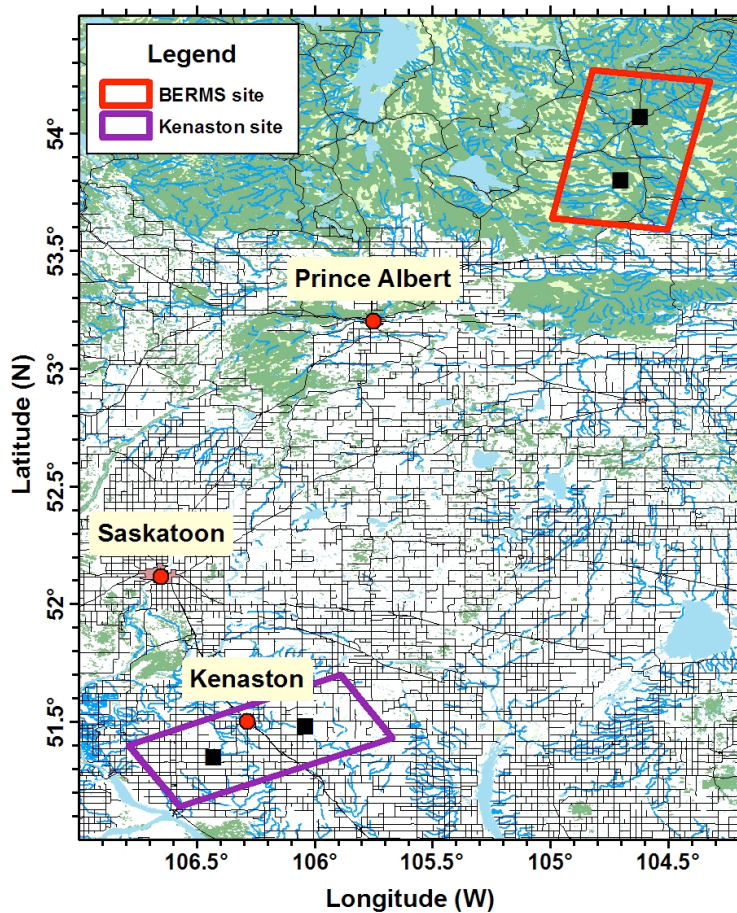
*cartel* Centre d'applications et de  
recherches en télédétection

# Objectives

- Contribute to the cal\val activities of SMOS data and the pre-launch assessment of SMAP data
- Field campaign : Canadian Experiment for Soil Moisture in 2010 (CanEx-SM10)  
(<http://www.pages.usherbrooke.ca/canexsm10/>)

# Study sites

- Location of the two study sites



**Boreal Ecosystem Research  
and Monitoring Sites (BERMS)**  
~ 33 x 71 km<sup>2</sup>

**Kenaston agricultural site**  
~ 33 x 71 km<sup>2</sup>

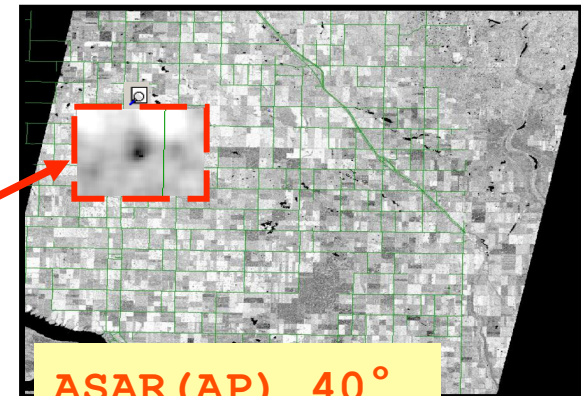


# Kenaston Site

- Standing water during CanEx-SM10



Field L5: NE 01-29-05



ASAR (AP) 40°  
JUNE 7, 2010

**➡ Issue to consider in data analysis and algorithms development**



# BERMS Study site

- Pictures



OBS



OJP



FEN



H75



H02

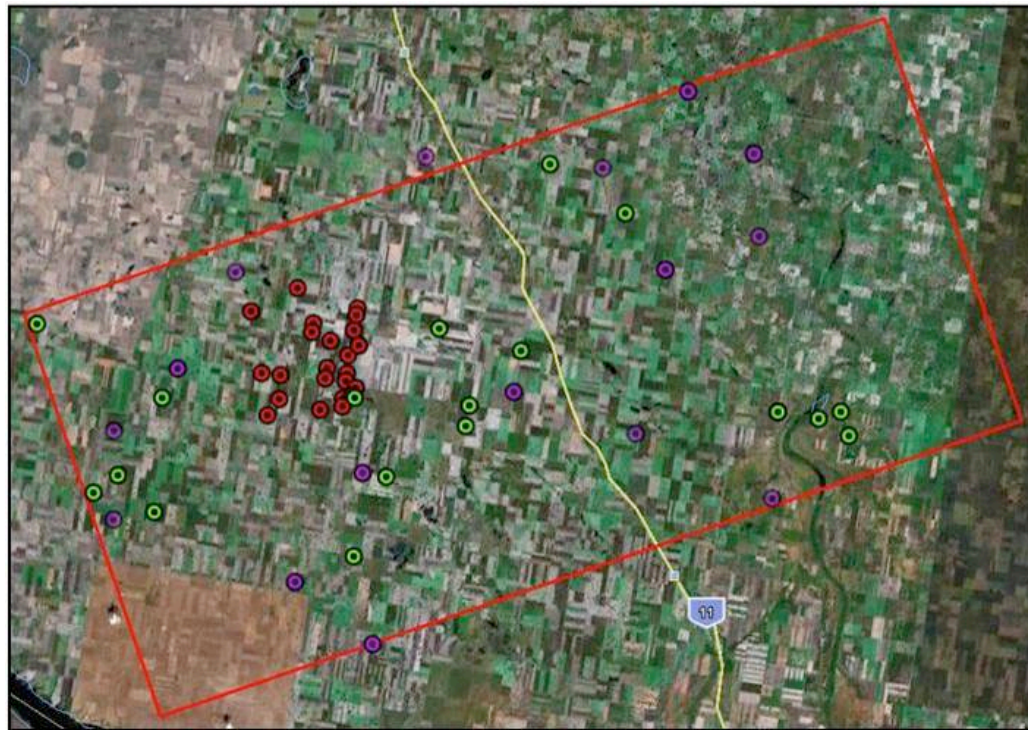


# Data

Data		Type
SMOS	Brightness temperature	Reprocessed ( <b>L1c 346</b> )
	Soil moisture	<b>L2 305-309</b> versions
Airborne Twin Otter	Brightness temperature	L-Band, 40 °
Ground	Soil moisture	<b>Networks :</b> Environment Canada University of Guelph
		<b>Manual surveys during</b> CanEx-SM10
	Vegetation	Fractional cover, LAI, height, water content, etc.
	.....	....



# Soil moisture sampling fields over kenaston site



## ▣ Networks

**24 EC fields**

**16 U of Guelph fields**

▣ **20 manual survey fields**

### Legend

- Study area
- U of G Sites
- EC Sites
- Manual Survey Sites

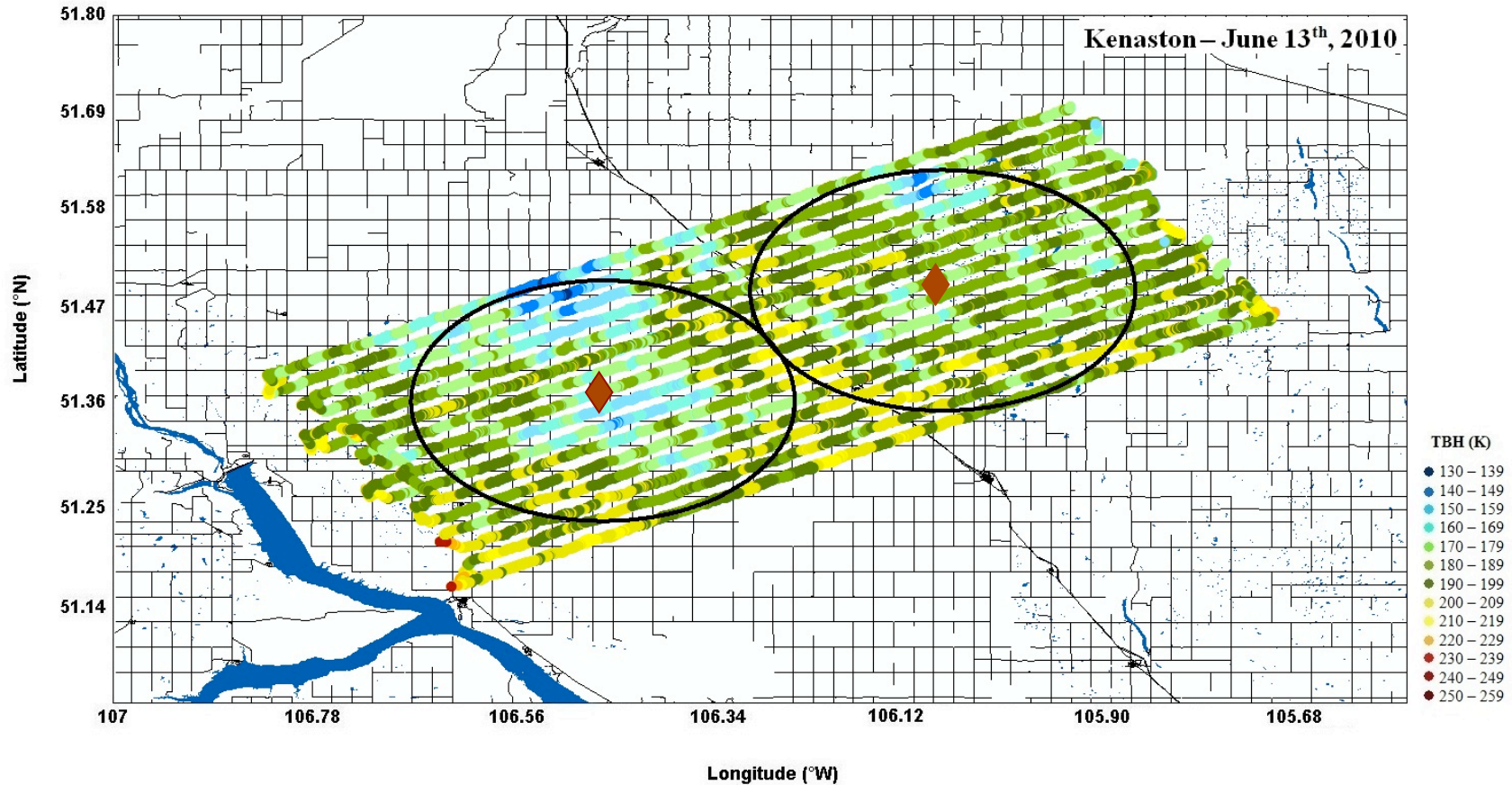


# L-Band airborne data

- TBH (L-band, 40°)

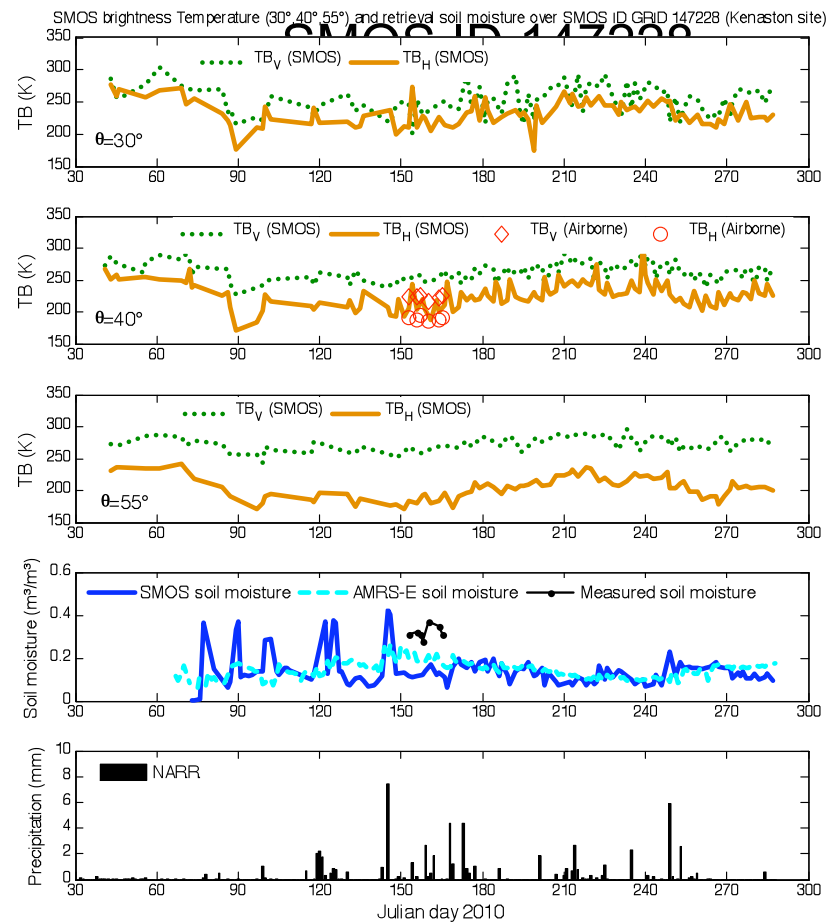
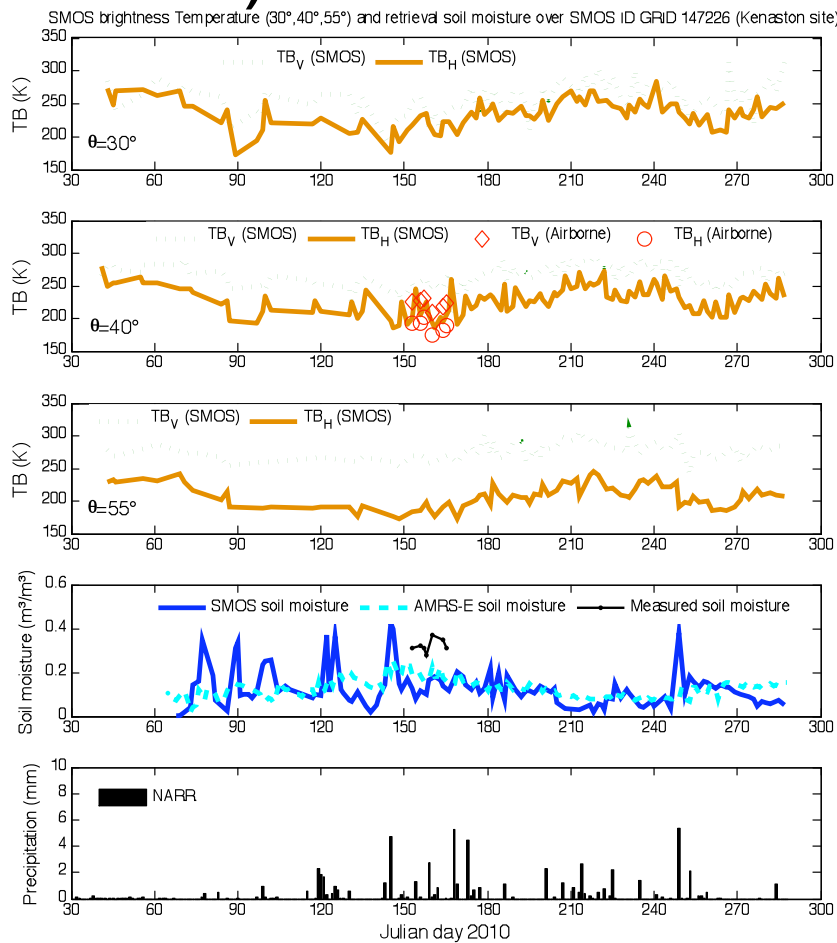
SMOS ID 147226

SMOS ID 147228



# Temporal profiles

- Kenaston agricultural area (Feb. to Oct. 2010)



30°

40°

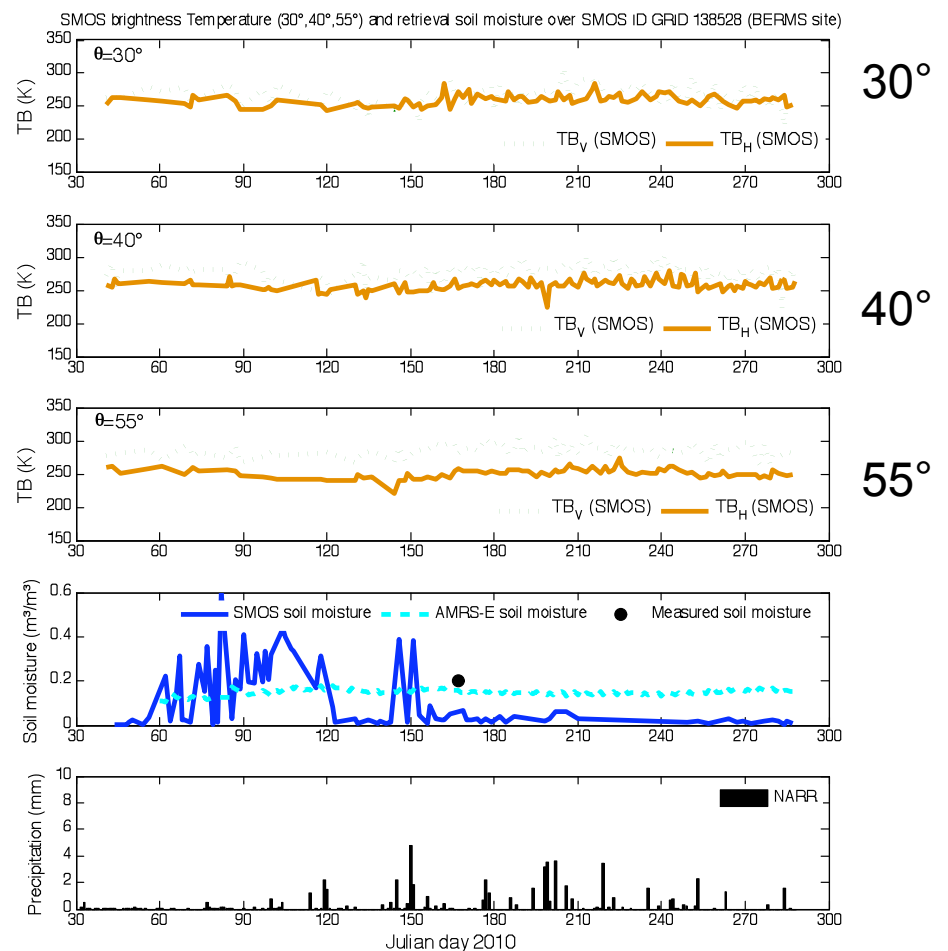
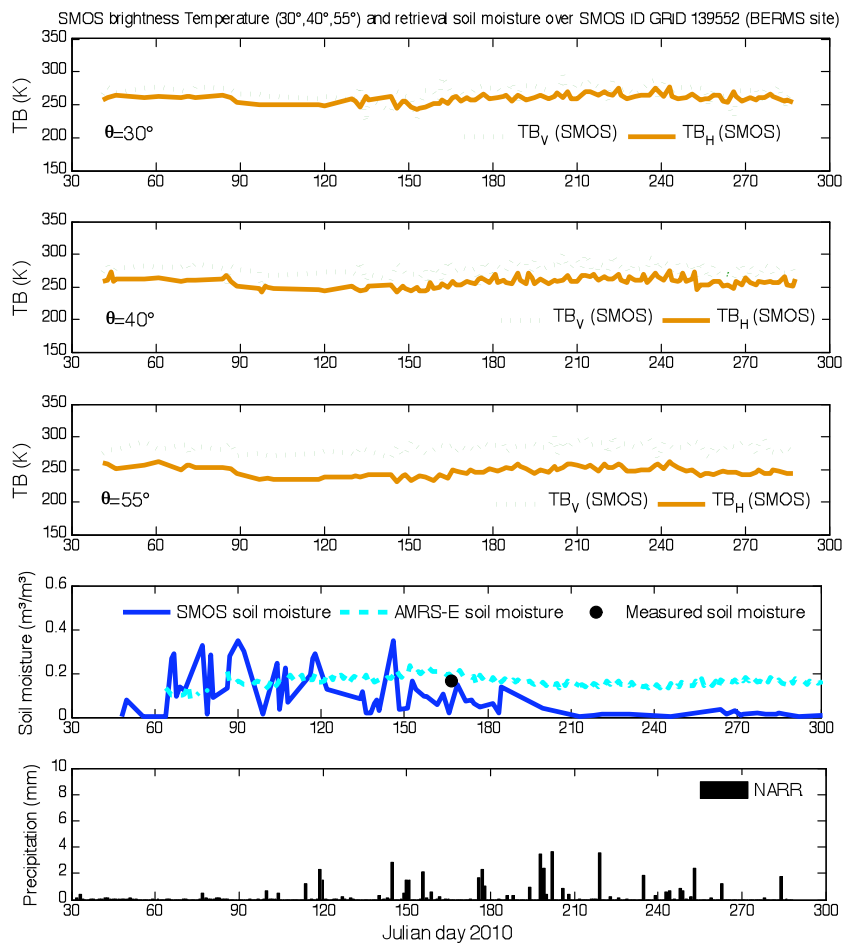
55°

# Temporal profiles

- BERMS forested area (Feb. to Oct. 2010)

SMOS ID 139552

SMOS ID 138528

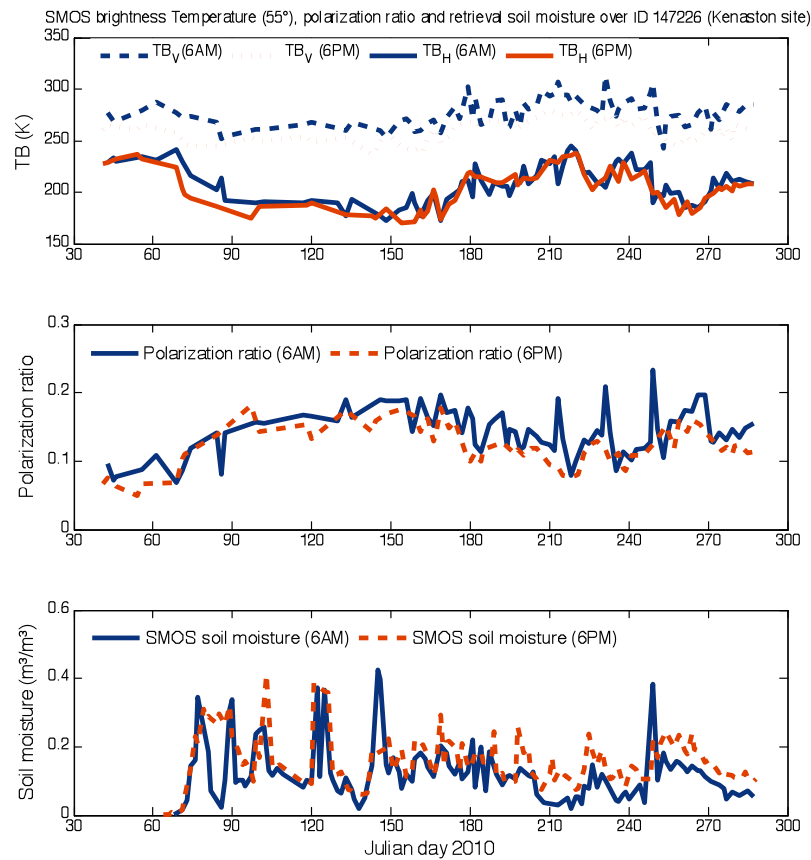




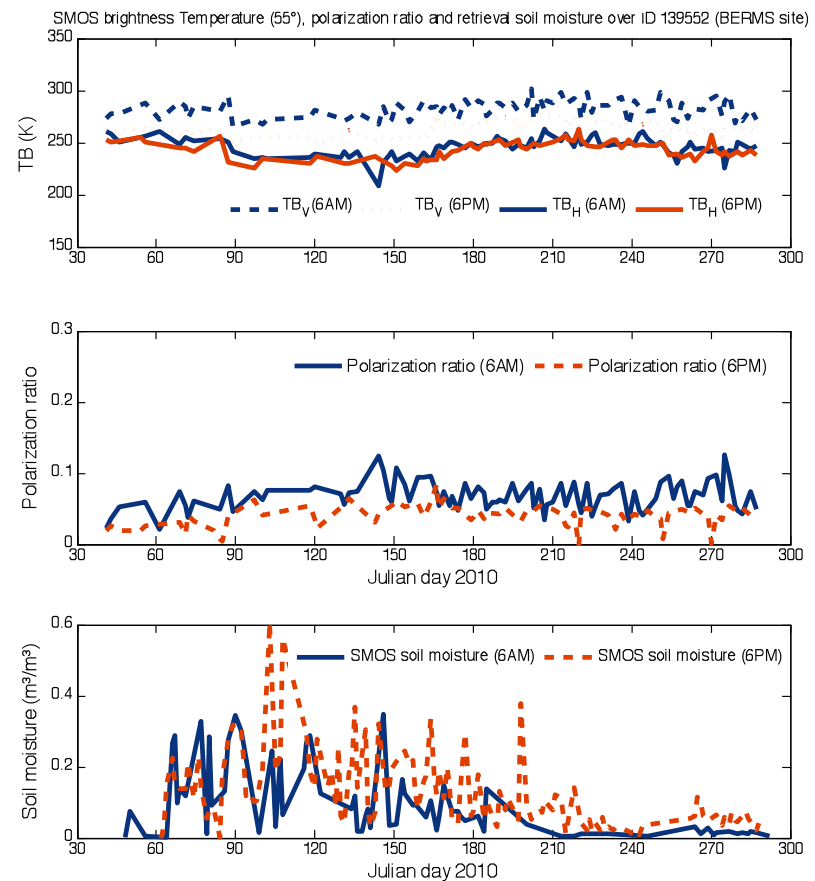
# Temporal profiles

- AM and PM overpasses

## Kenaston

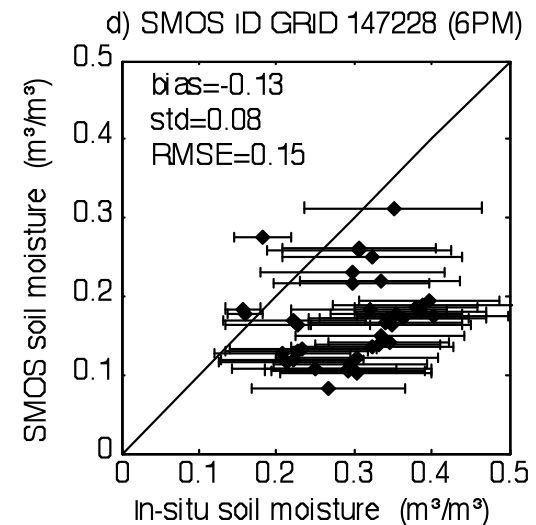
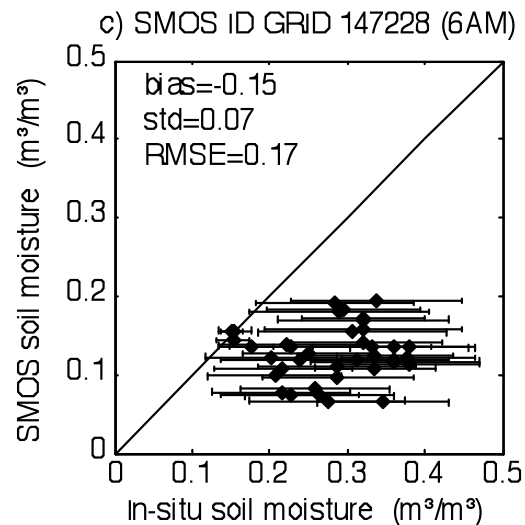
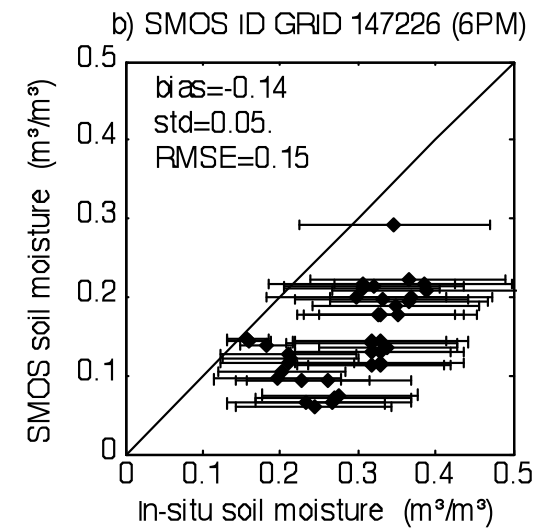
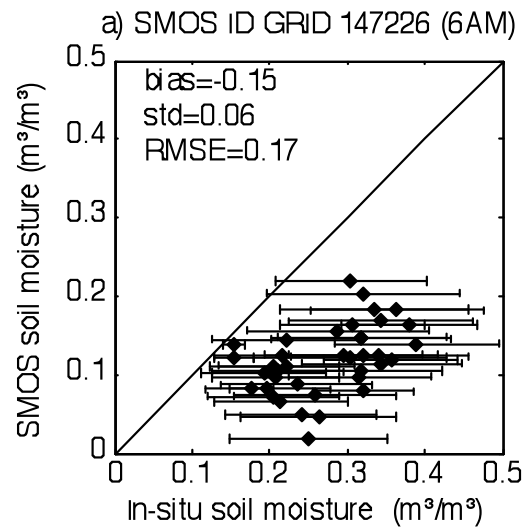


## BERMS



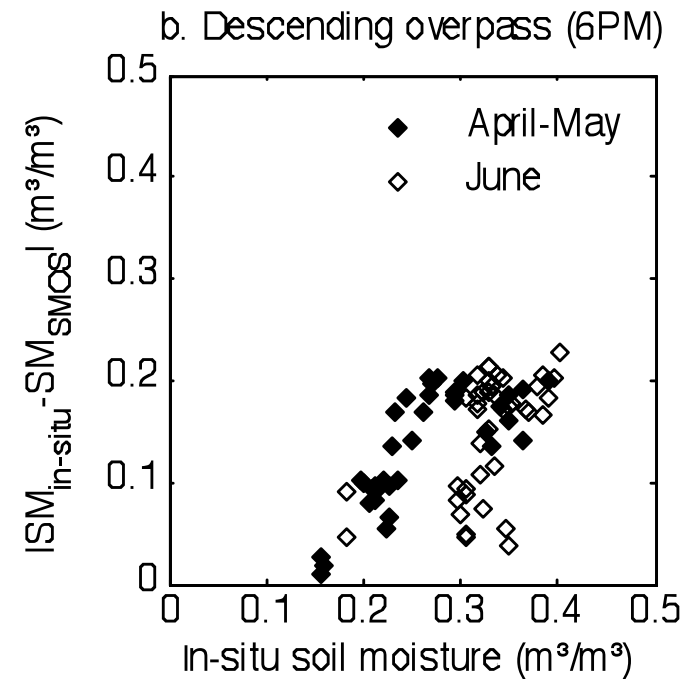
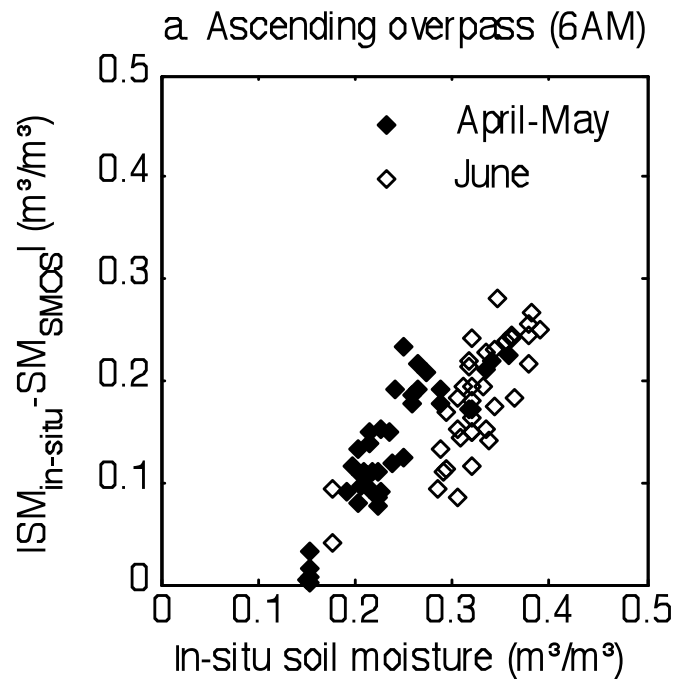
# SMOS vs In-situ soil moisture

April to June, 2010



# Difference between SMOS and in-situ soil moisture

- April to June, 2010



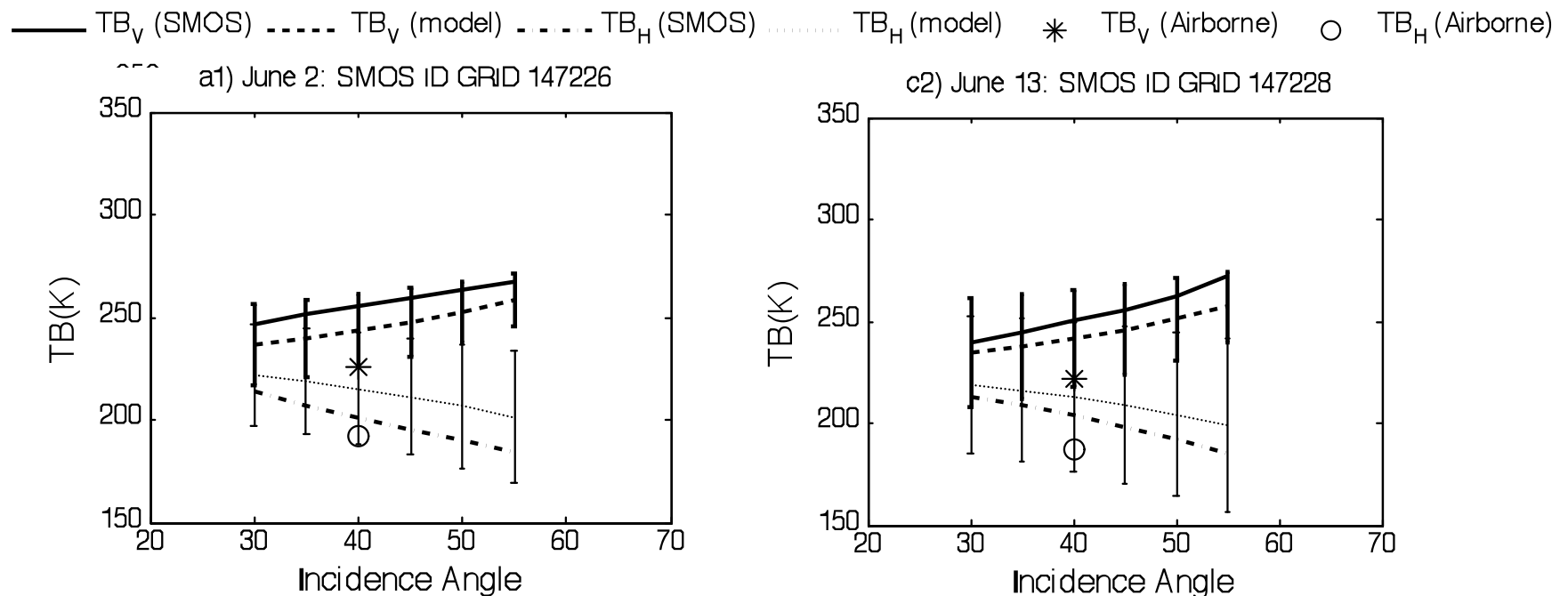


# Conclusion

- V pol more sensitive to the acquisition time than H pol ?
- SMOS underestimates soil moisture measurements
- SMOS soil moisture more sensitive to rain events than AMSR-E soil moisture
- Soil moisture estimation errors increase with the absolute value of the soil moisture


# Next steps

- Improve forward simulations



- Retrieve soil moisture from the airborne and satellite data
- Reevaluate L2 reprocessed products

# Thanks!

- **Financial partners**
- **All the participants to CanEx-SM10**
- **ESA for providing us SMOS data**
- **Yann Kerr and his team (CESBIO)**  
 **help in understanding SMOS data**