

# ***Using RADARSAT-2 Polarimetric and Envisat-ASAR Dual-Pol Data for Soil Moisture***

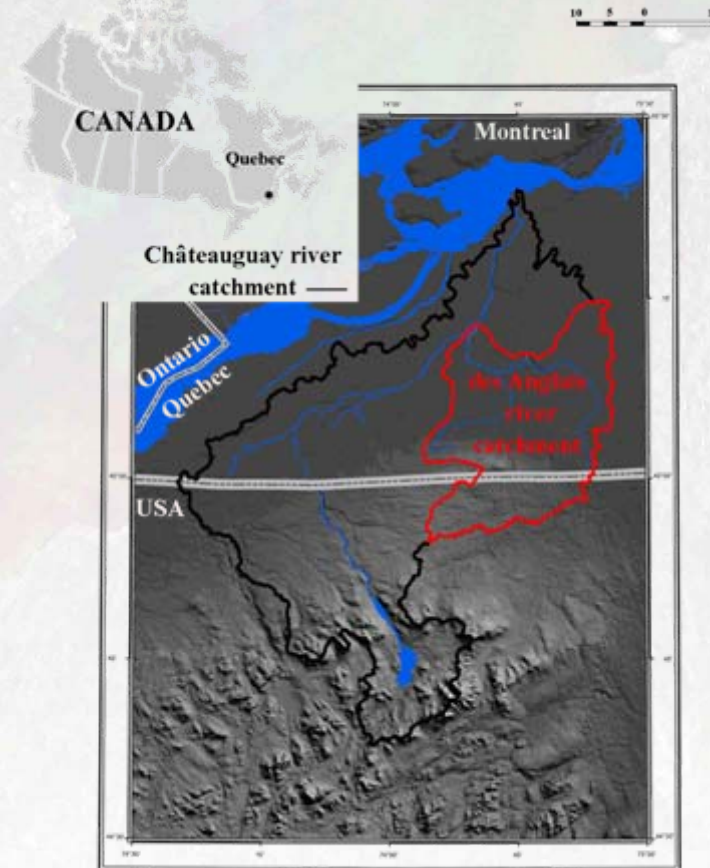
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Natural Resources Canada, Ottawa, CA

<sup>(2)</sup> École des technologies supérieures, Montréal, CA

# Context

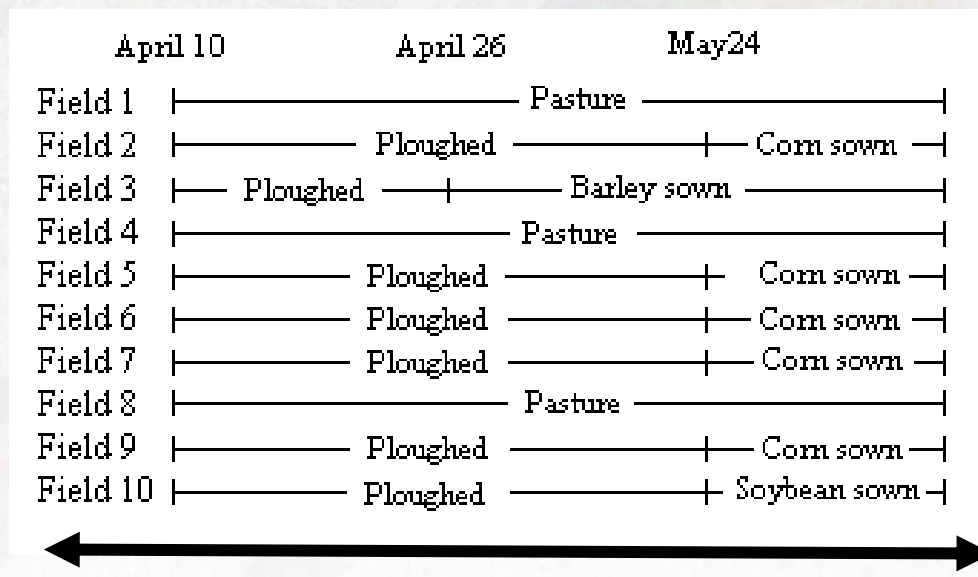
- **NRCan**
  - Groundwater mapping program, to assess our natural resources
- **ETS**
  - Data assimilation for hydrology and flood prevention
- **Agriculture**
  - des Anglais river catchment is very fertile land



# Problematic

- Agriculture is dynamic,
  - low stability on surface condition
  - Multi-temporal and/or multi-incidence techniques are limited due to man practice
  - Hope contribution from Full-Quad

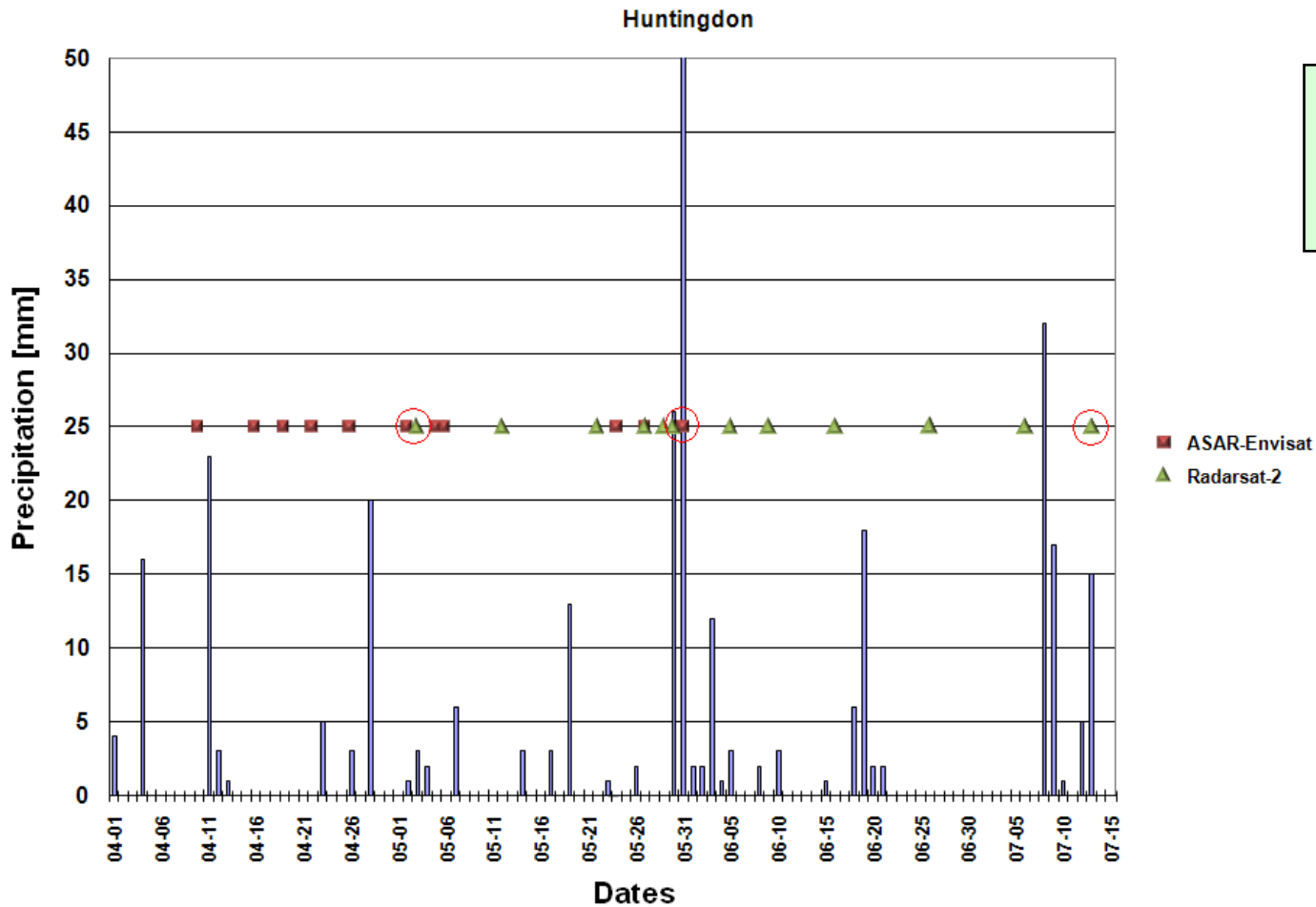
Snow



Vegetation

3 different surface conditions in less than 2 months

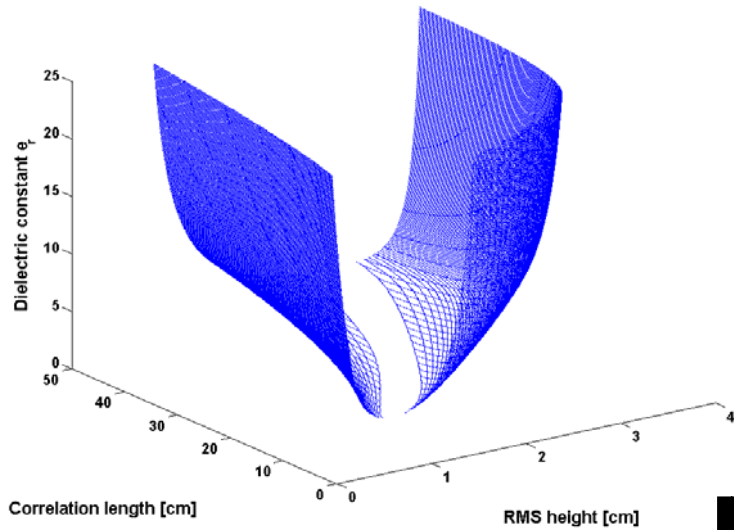
# SAR Data acquired & Precipitation



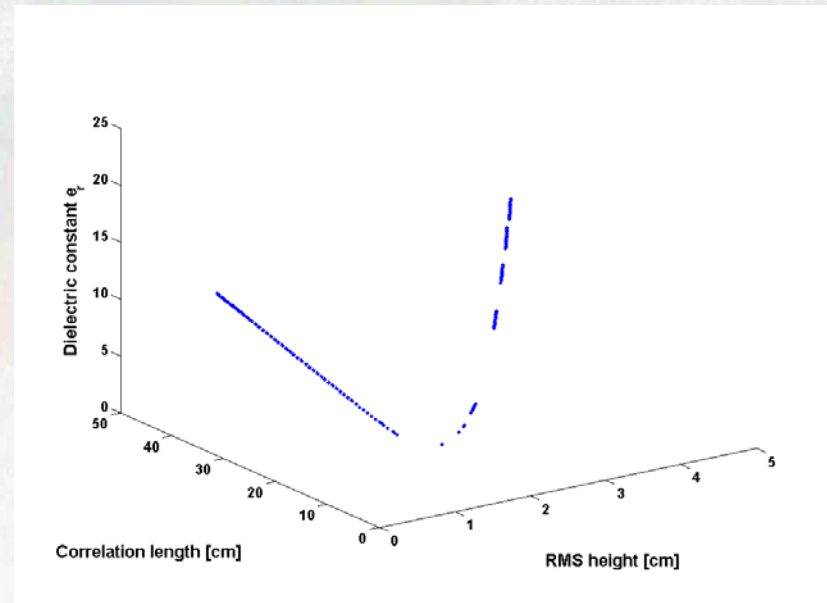
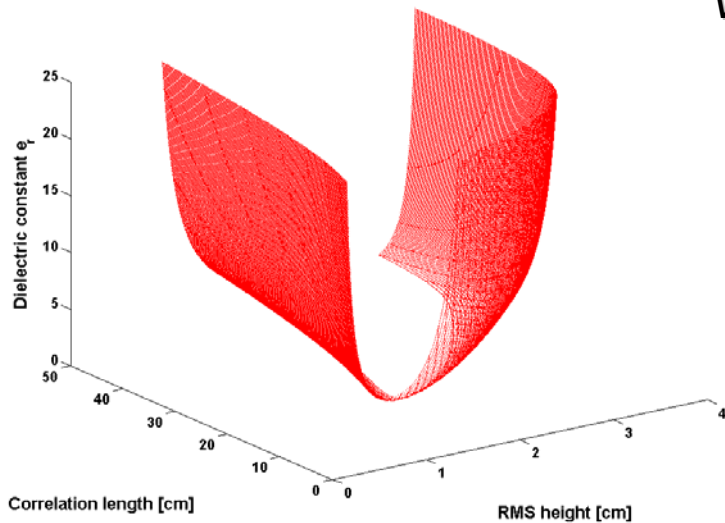
11 ASAR APC  
2 RSAT-2 HH/HV  
8 RSAT-2 FQ

# *In Situ Measurements*

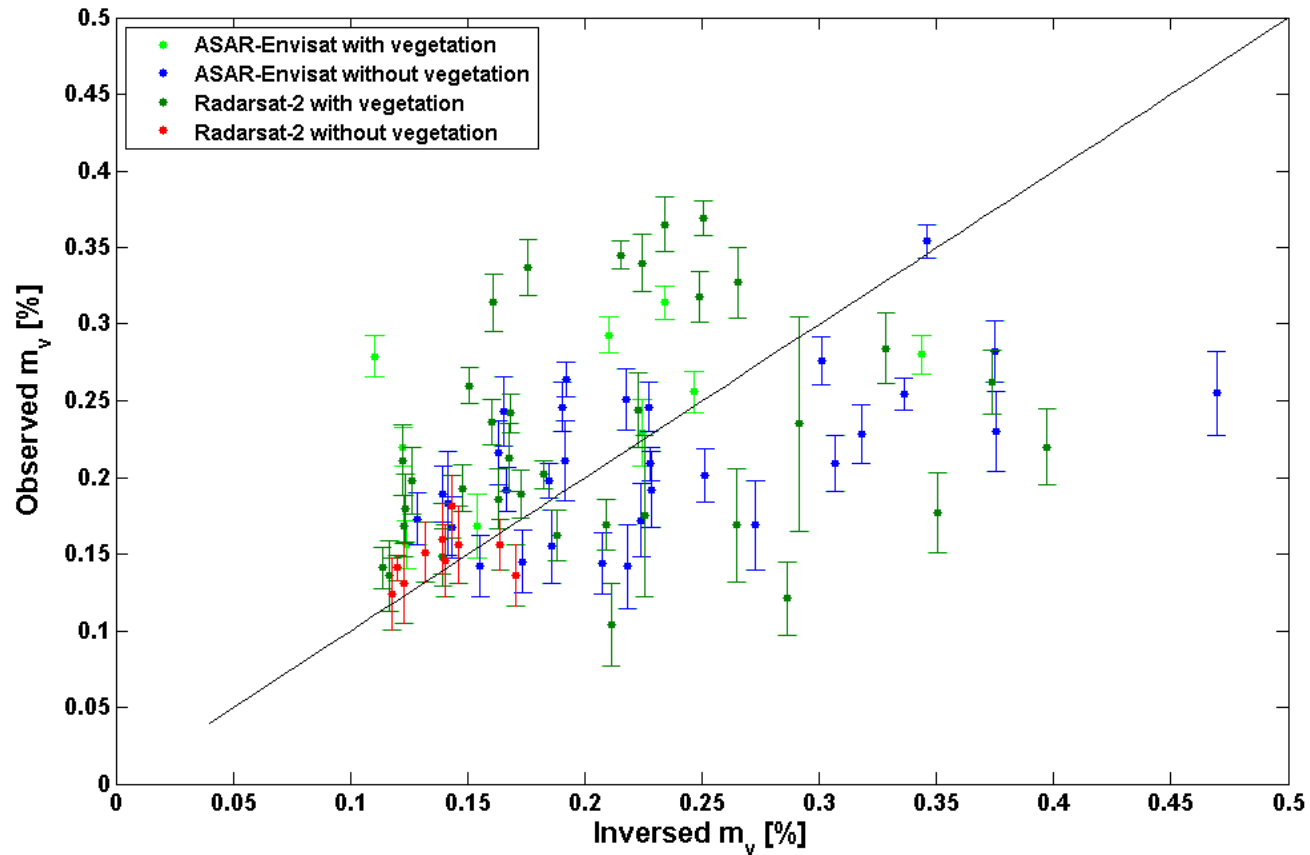




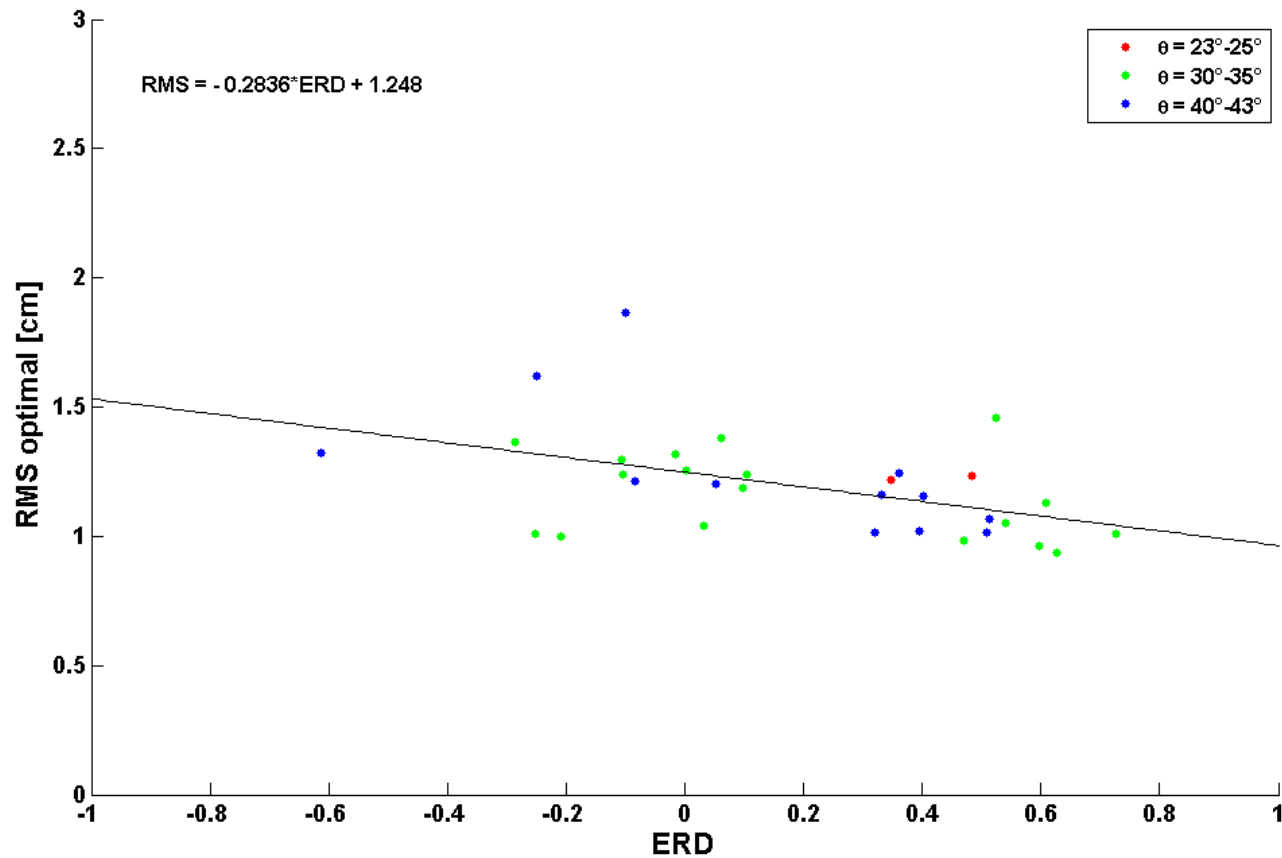
HH *Search for Solution(s)*



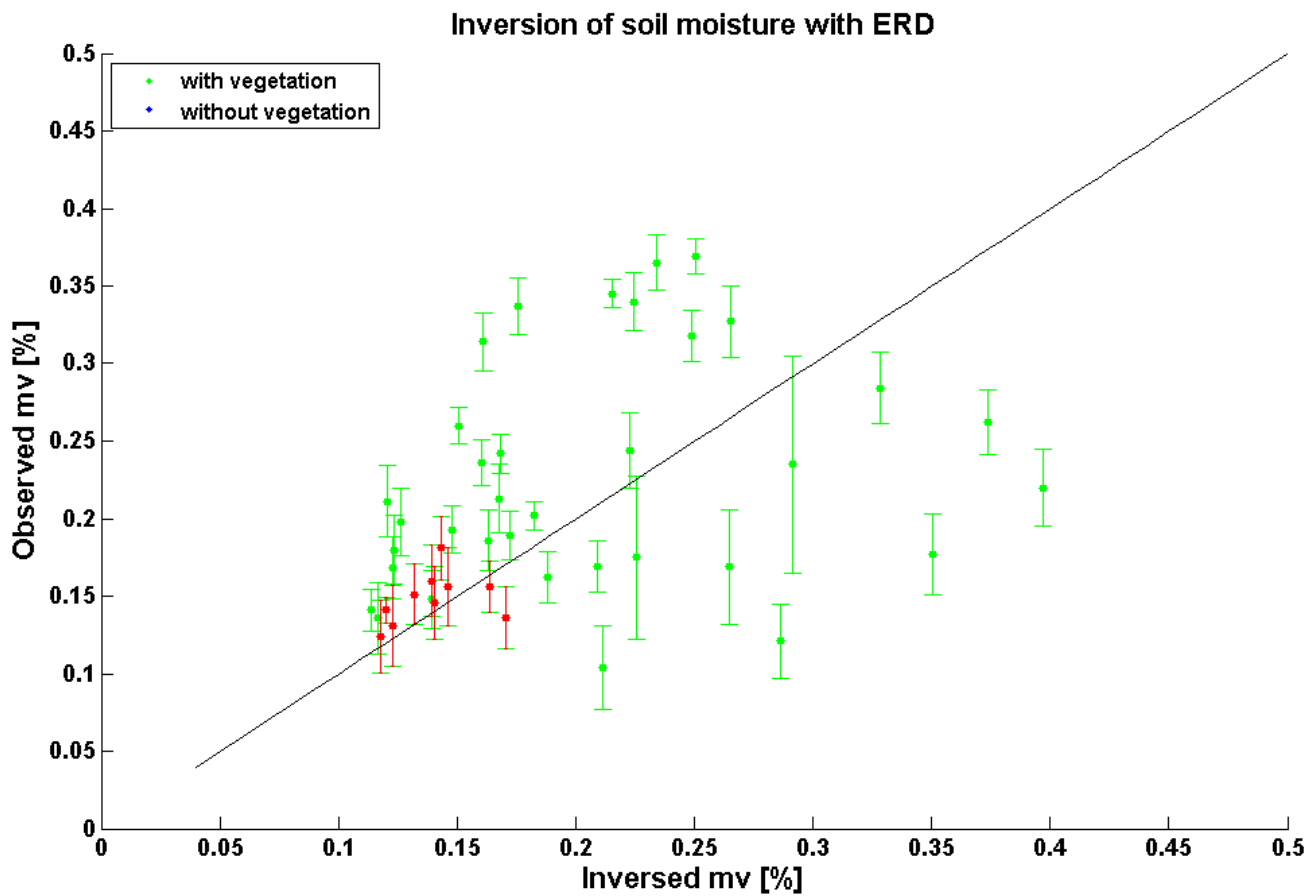
# $M_V$ estimation



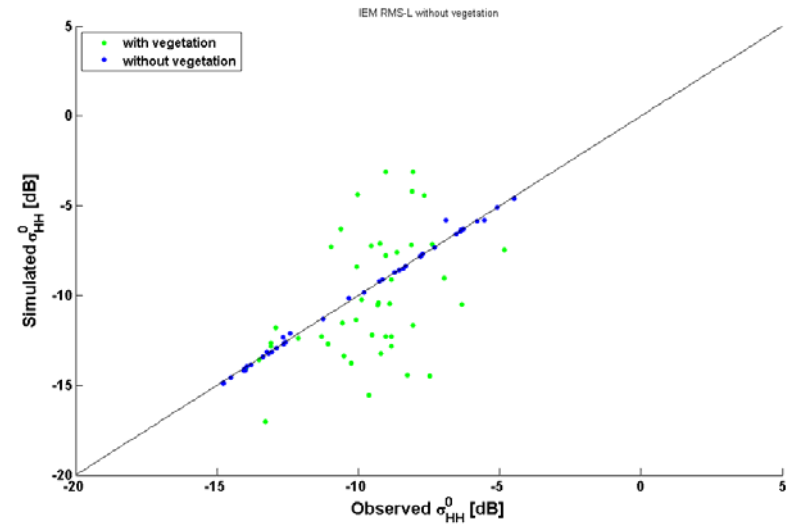
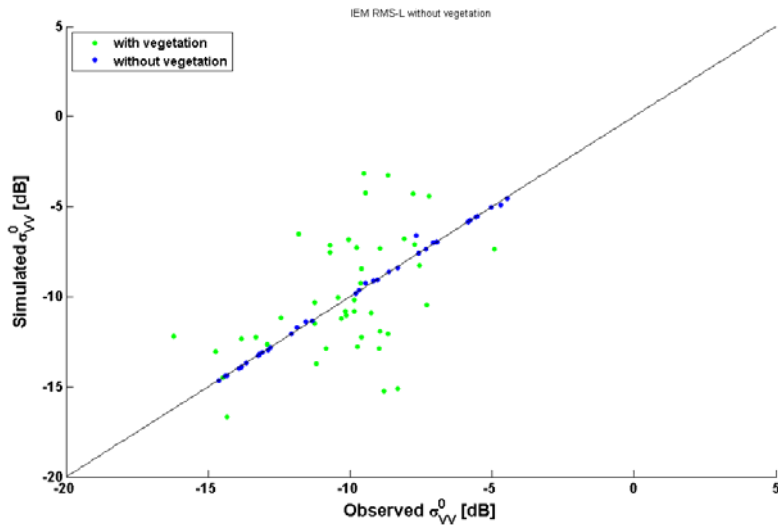
# Use of ERD



# $M_V$ estimation with ERD

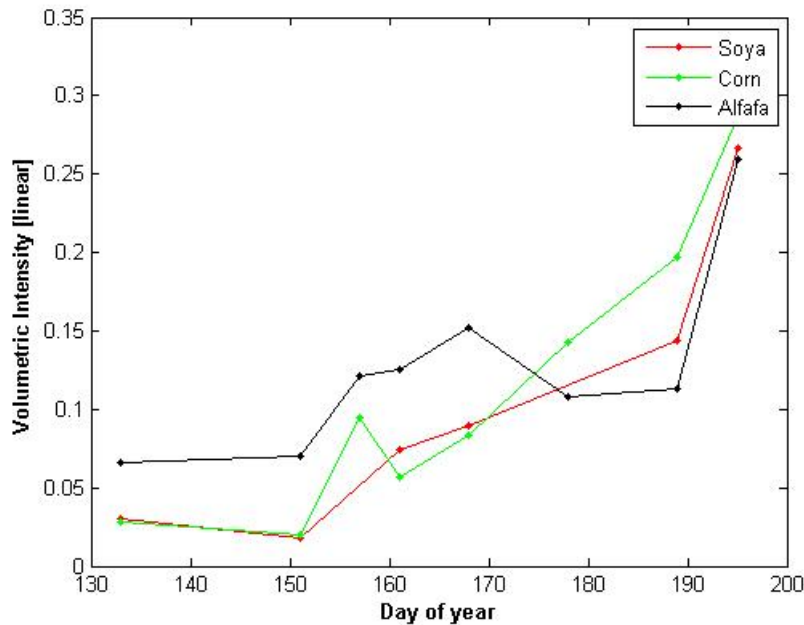


• *Using Pre-Veg Roughness Estimation +  $M_V$  measurements to observe vegetation impact*

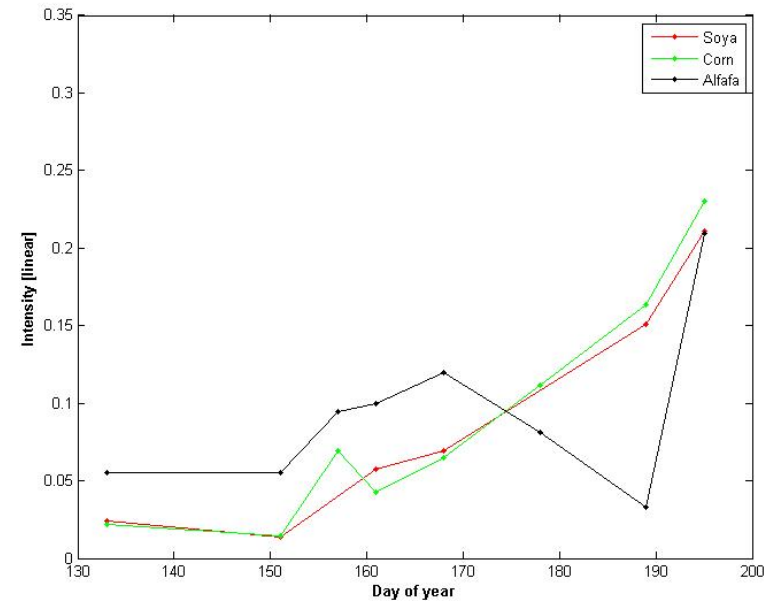


- Volumetric contribution for Soya, Corn and Alfalfa

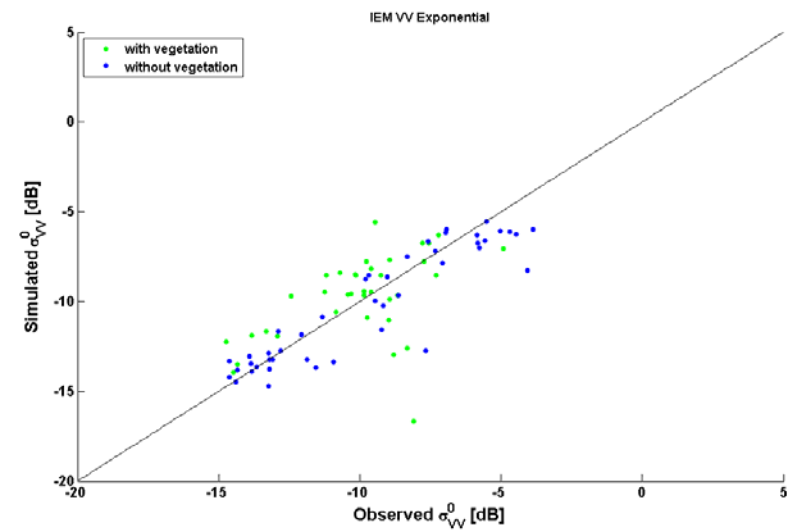
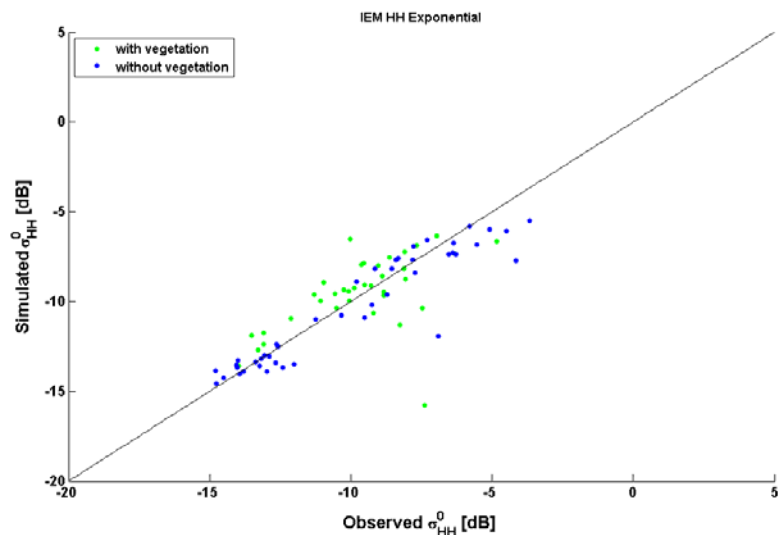
*Freeman & Durden*



*Yamaguchi et al.*



# *Volumetric & dihedrals contributions reduced*



## *Work in progress*

- Vegetation modeling from hemispherical photo
  - Gap fraction (openness) of the canopy in replacement/adjustment attenuation model



Hemispherical Photo



## ***Conclusion***

- Quick results from known method still show potential for soil moisture covered by crop, even at C-band.
- The LUT is still a viable approach over vegetation by using the polarimetric information