MONASH University

Engineering

Towards global water and energy balance monitoring using GCOM-W1 in the MDB

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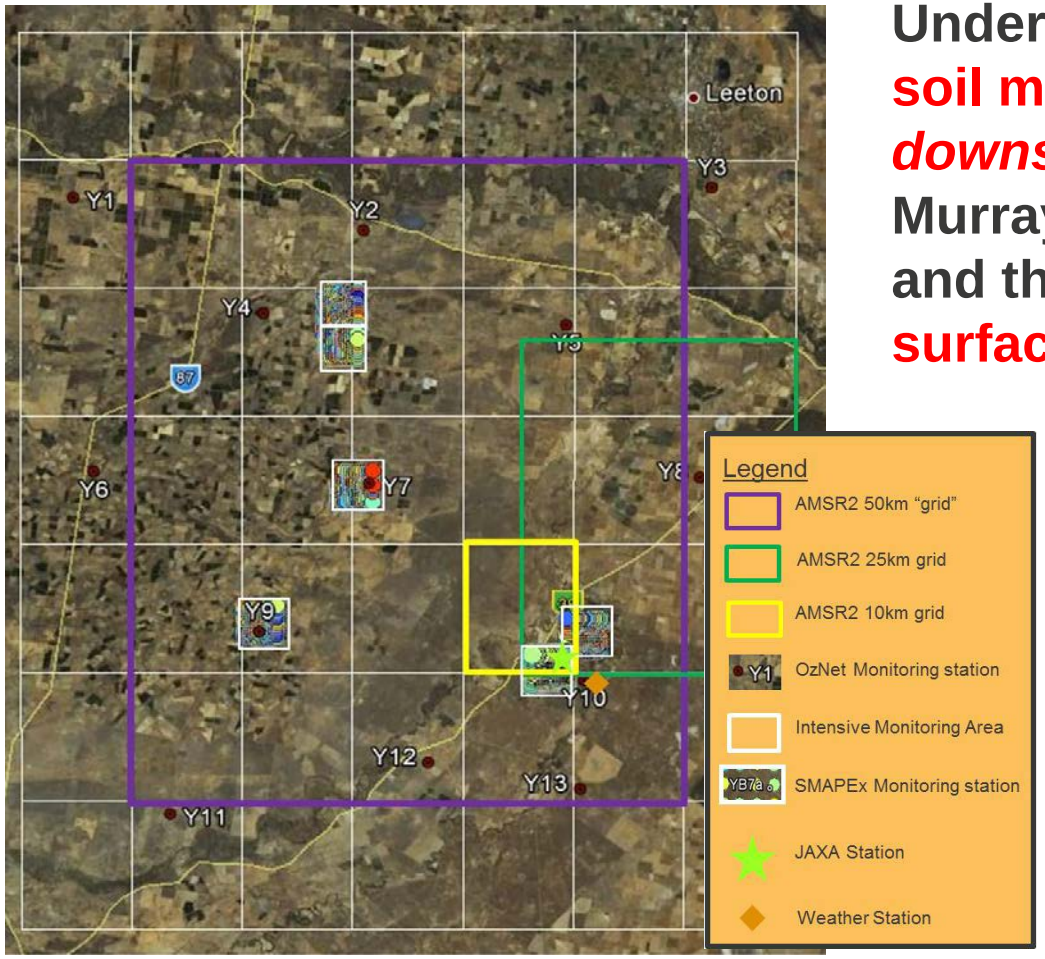
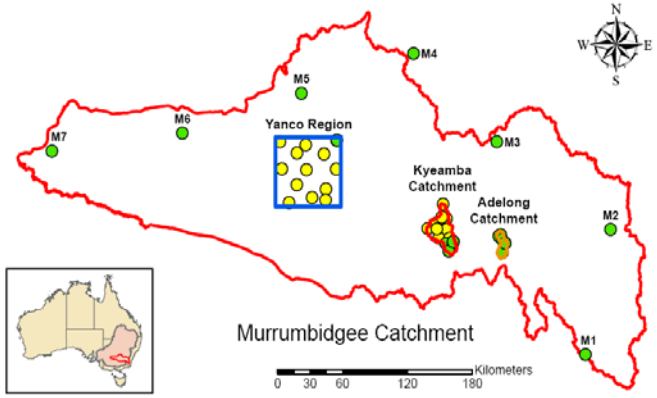
M.Y. Sun, G. Dumedah, F. Winston, T. Lubcke




Project Overview



Undertake validation of AMSR2 soil moisture observations *and downscaled products* in the Murray Darling Basin of Australia, and their subsequent use in land surface data assimilation systems.



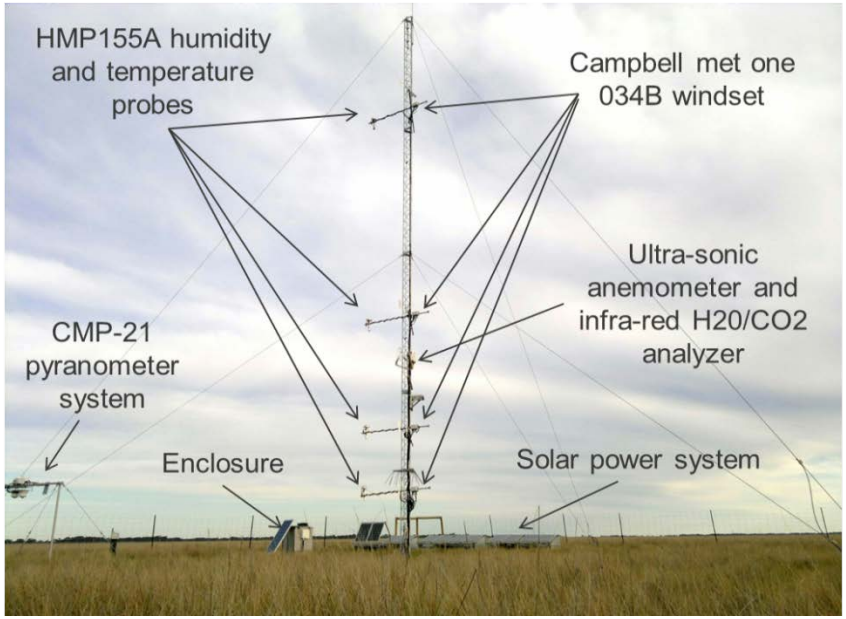
Specific Objectives

1. Install and maintain a flux validation tower in addition to soil moisture

2. Validate AMSR2 soil moisture products
   - understanding the point-to-pixel scaling of the study site
   - comparison between time series station data and AMSR2
   - *comparison between model predictions and AMSR2*

3. Validate derived root-zone soil moisture AND land surface fluxes
   - official products
   - in-house studies

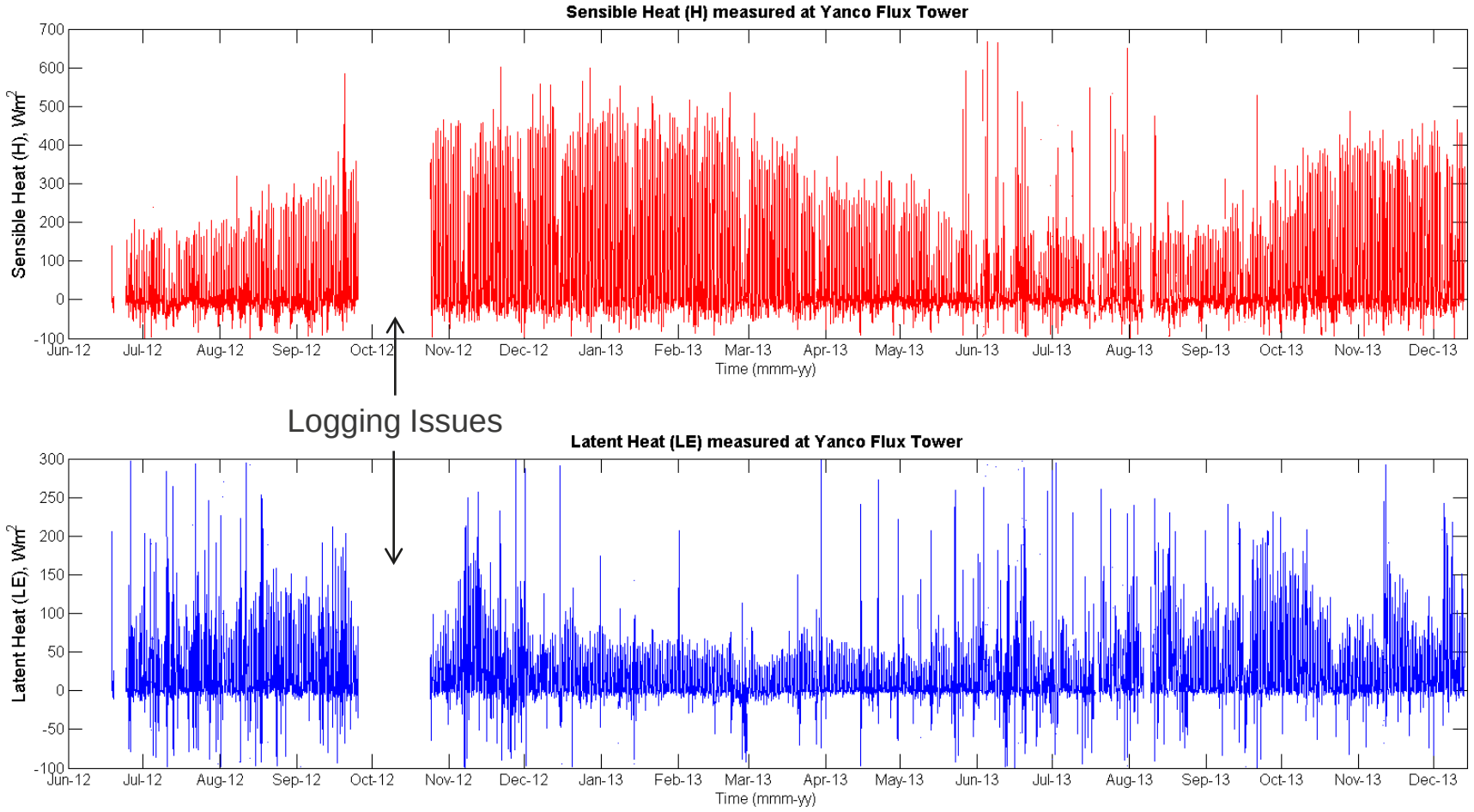
1. Install JAXA Flux Tower & Weather Stn



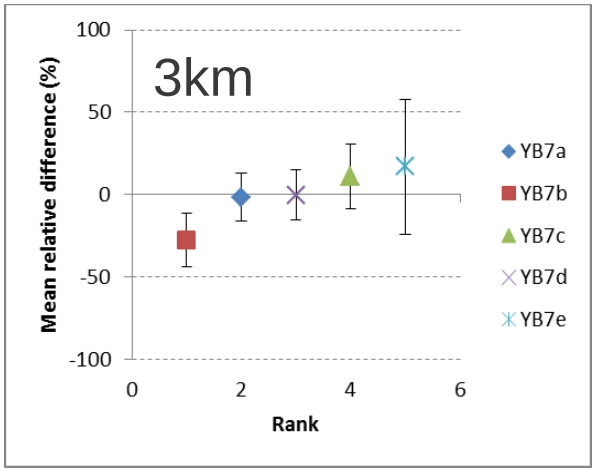
http://www.arts.monash.edu.au/ges/research/climate/jaxa/

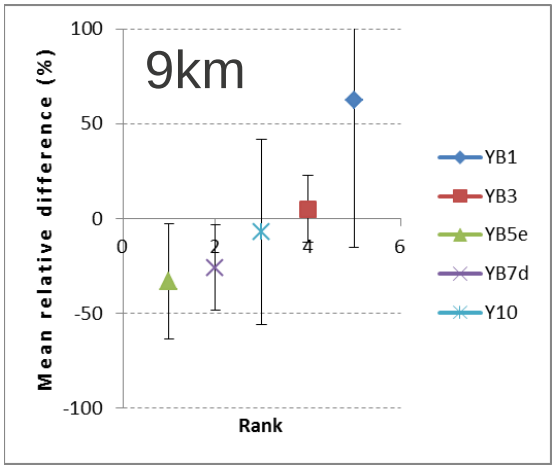
Operational since June 2012

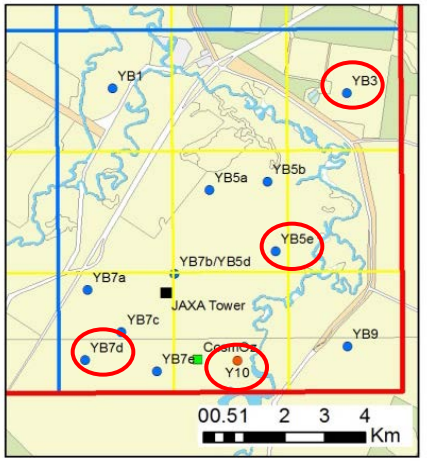
1. Maintain JAXA Flux Tower & Weather Stn

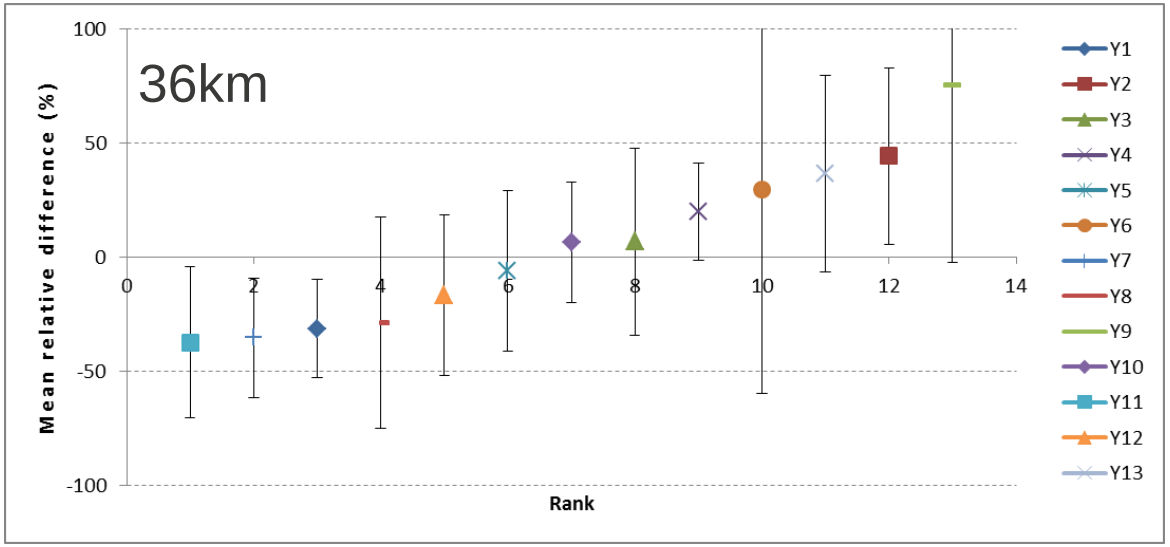


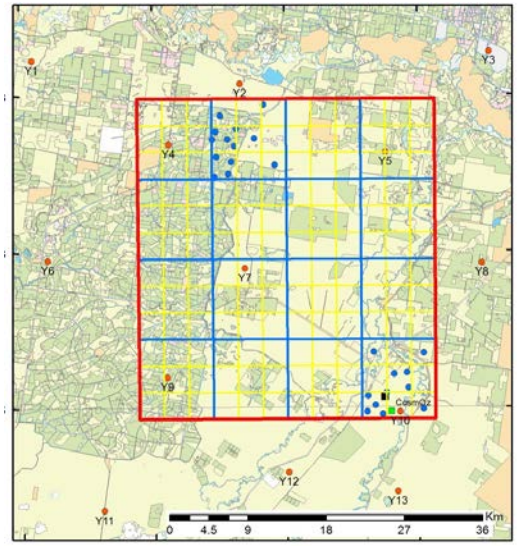
2a. Understand the Point-to-Pixel Scaling











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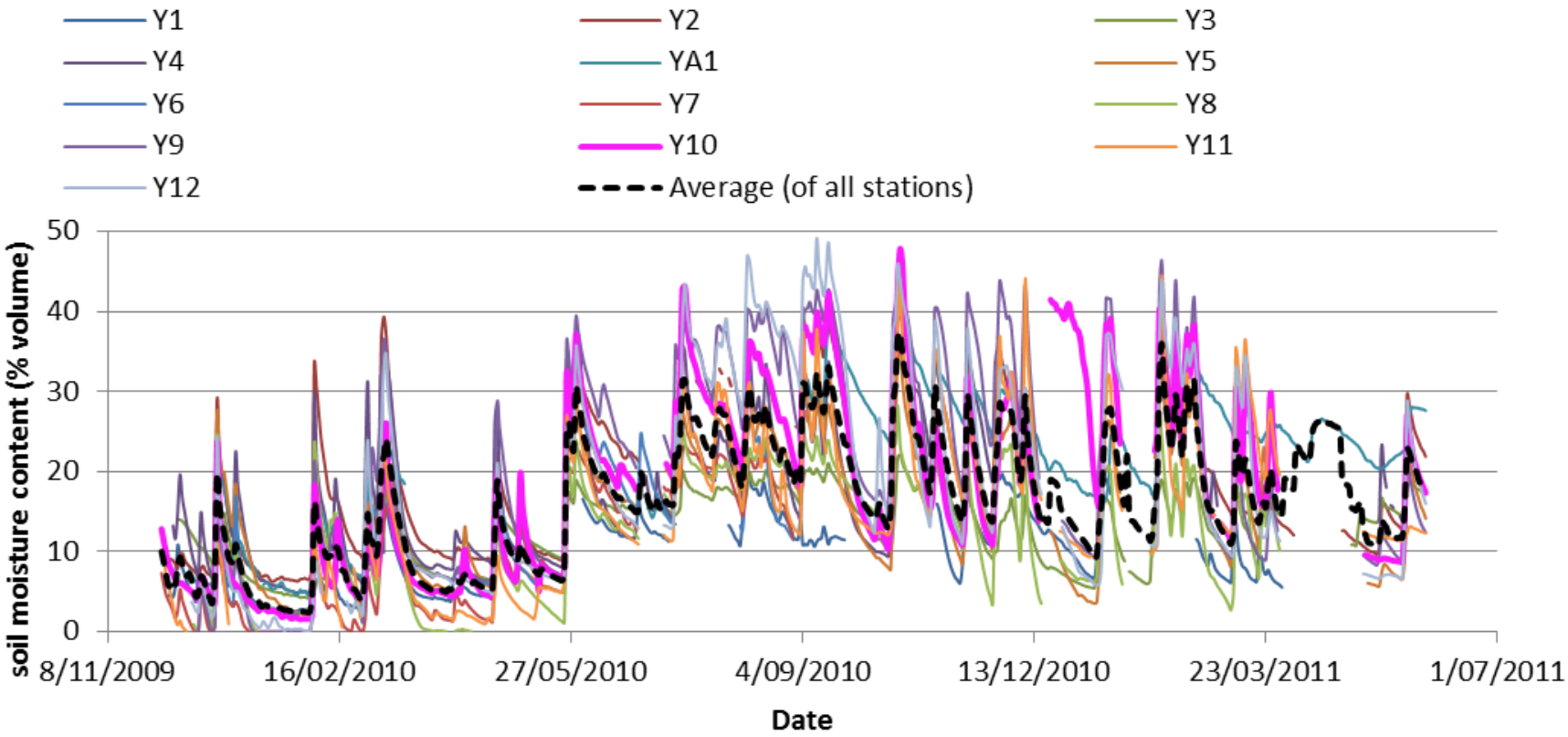
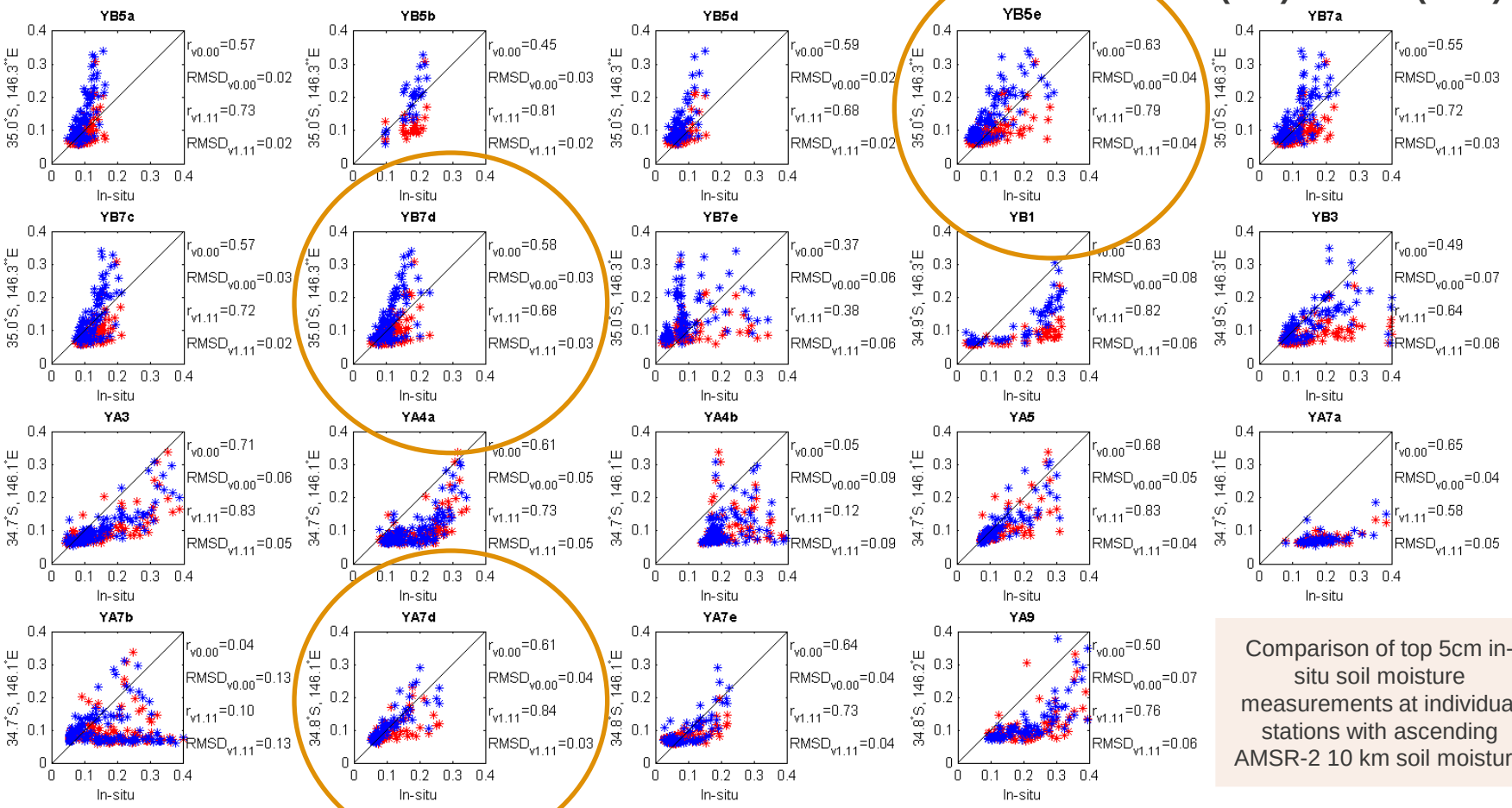


Disseldorp, D, Yee, M, Monerris, A and Walker, JP, 2013. Development of a SMAP satellite validation site using temporal stability analysis. *20th International Congress on Modelling and Simulation (MODSIM)*, Adelaide, Australia, 1-6 December, 2013.

2b. In-situ Comparison with AMSR2 SM

AMSR2 2012 v0.0 (red) vs v1.1 (blue)

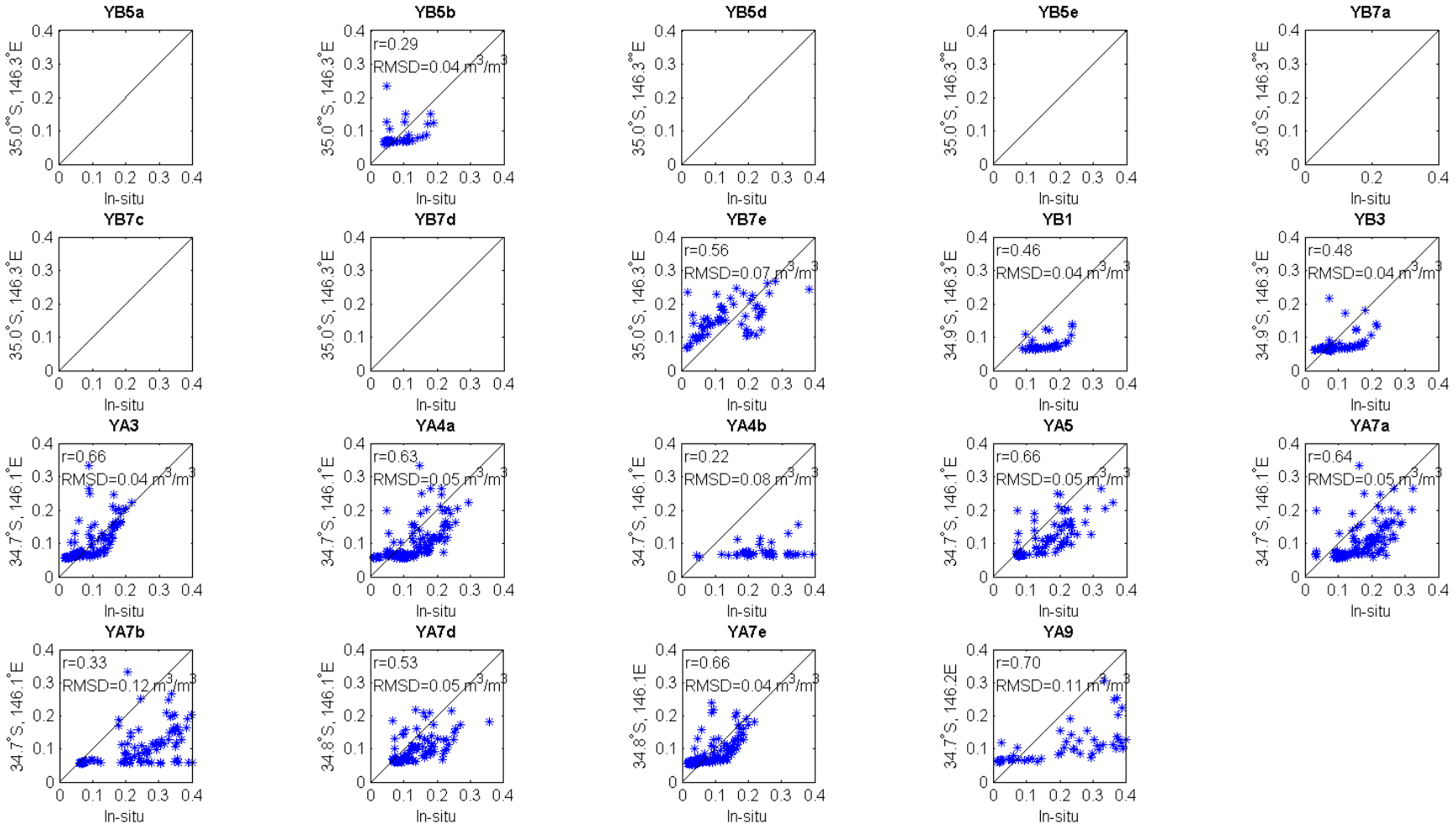


Comparison of top 5cm in-situ soil moisture measurements at individual stations with ascending AMSR-2 10 km soil moisture

M. Yee, JP. Walker, G. Dumedah, A. Monerris and C. Rüdiger , 2013. Towards Land Surface Model validation from Using Satellite Retrieved Soil Moisture. 20th International Congress on Modelling and Simulation (MODSIM), Adelaide, Australia, 1-6 December, 2013.

2b. In-situ Comparison with AMSR2 SM

AMSR-2 2013 v1.1



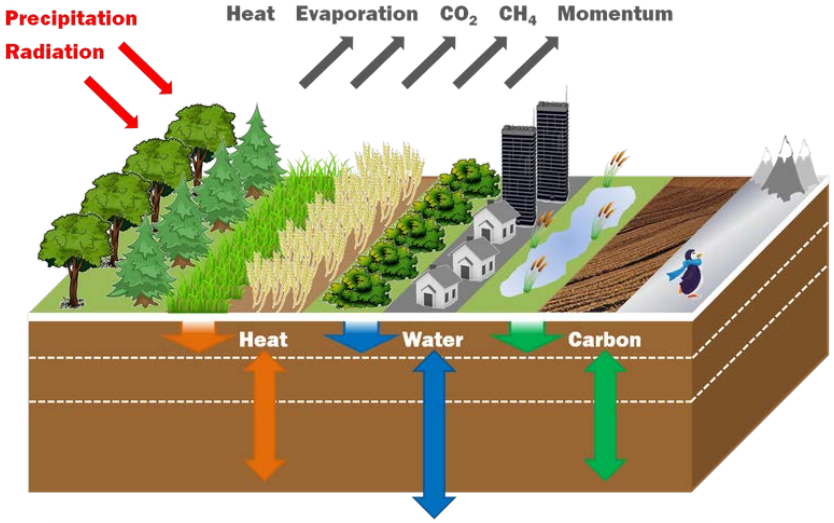
2c. Model Comparison with AMSR2 SM

ACCESS/AWAP (Meteorology)

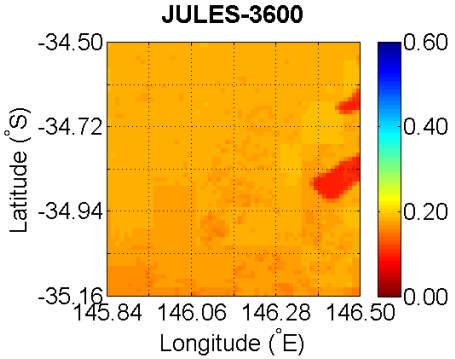
Digital Atlas of Australian Soils

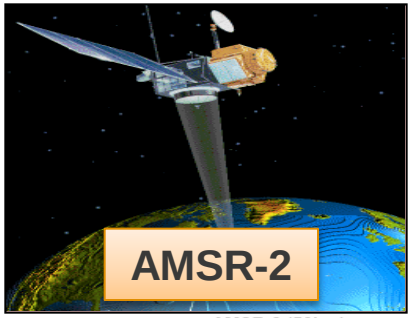
National Dynamic Land Cover

JULES LAND SURFACE MODEL

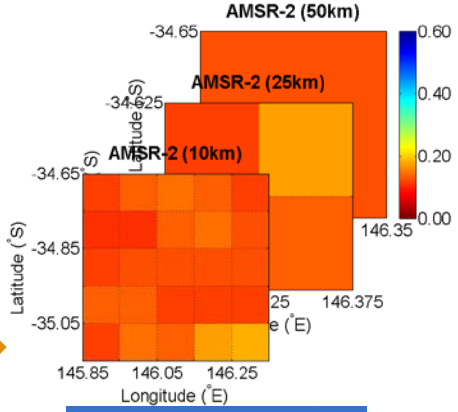


OUTPUT (Soil moisture)





AMSR-2



Soil Moisture Stations

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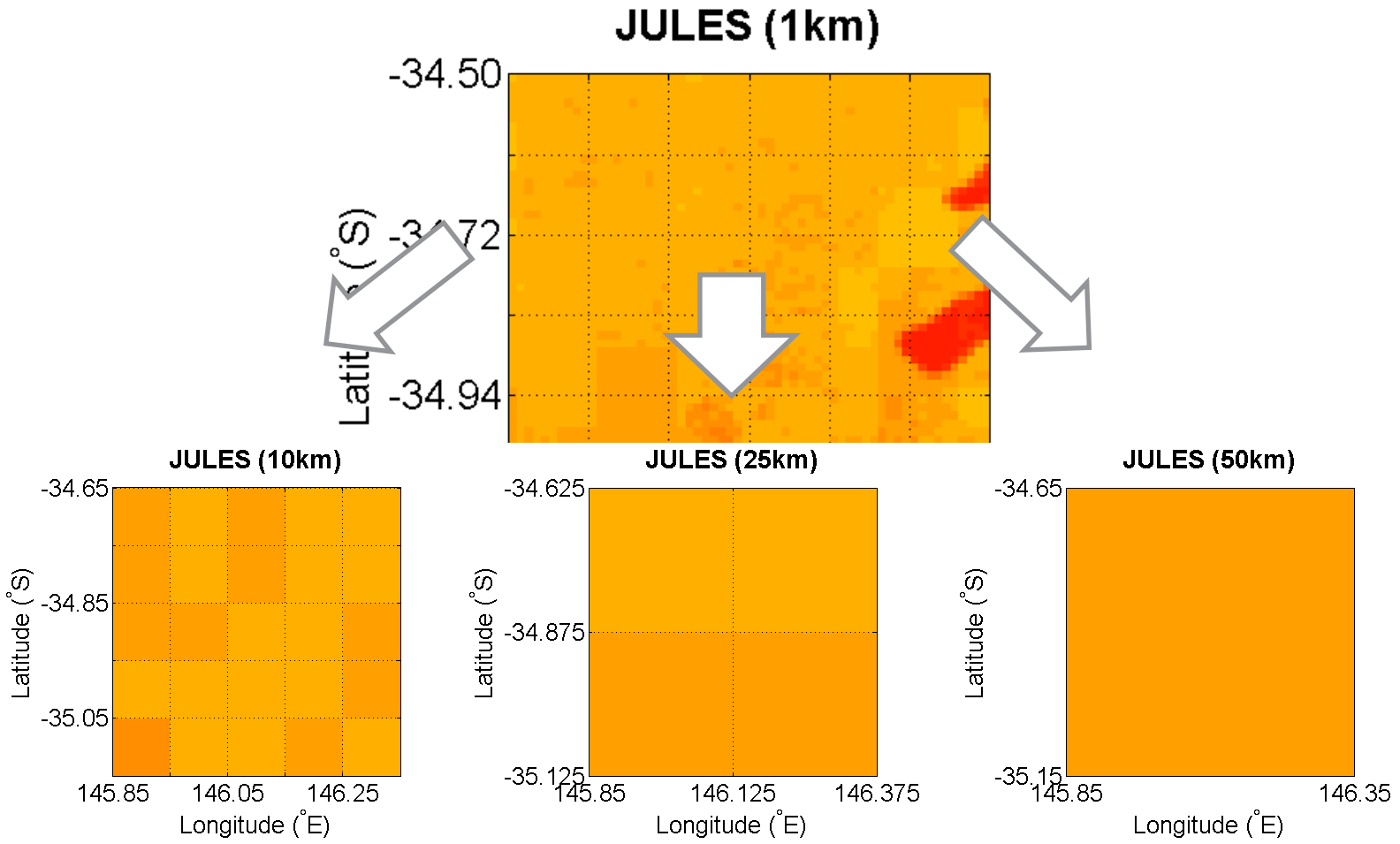
2c. Model Comparison with AMSR2 SM



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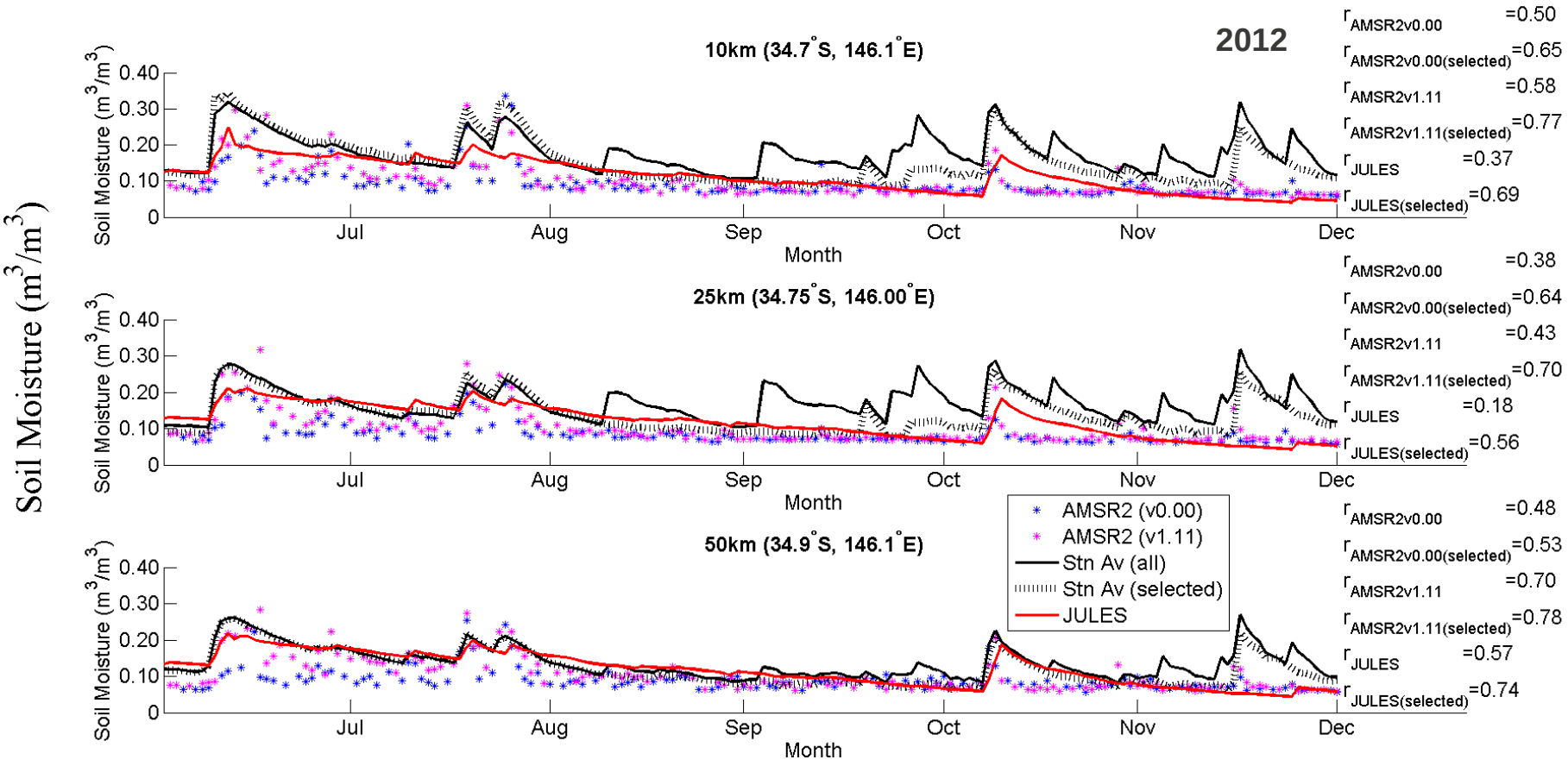

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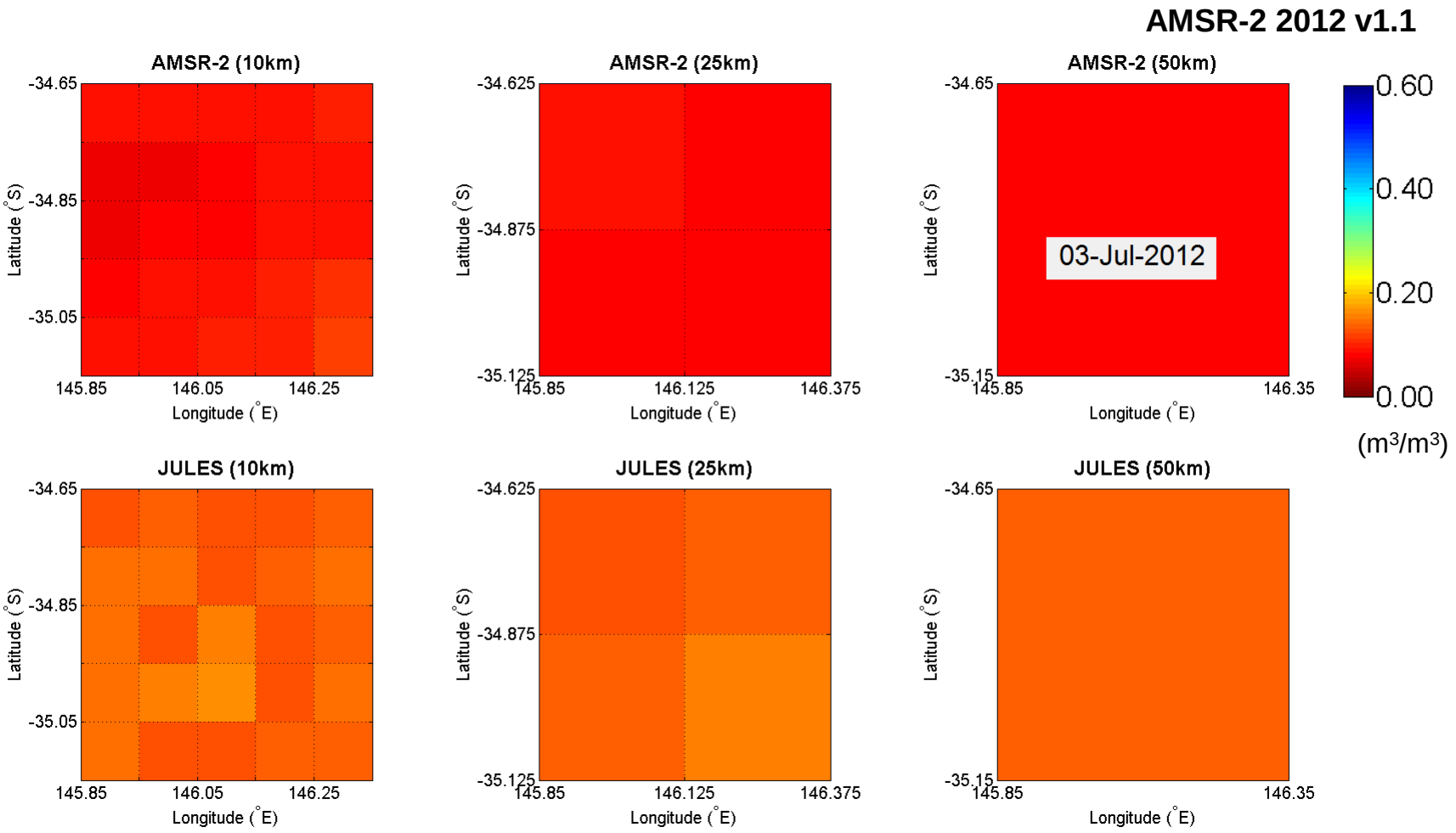

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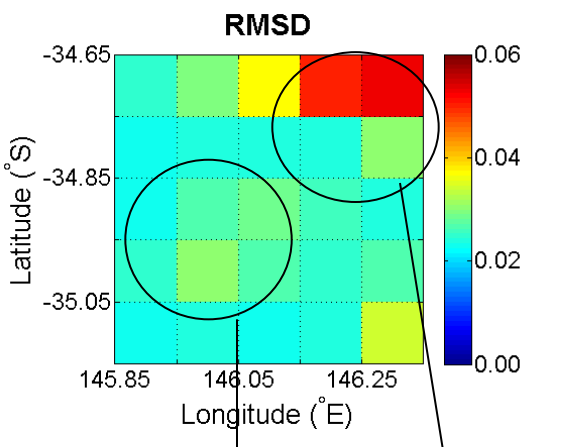
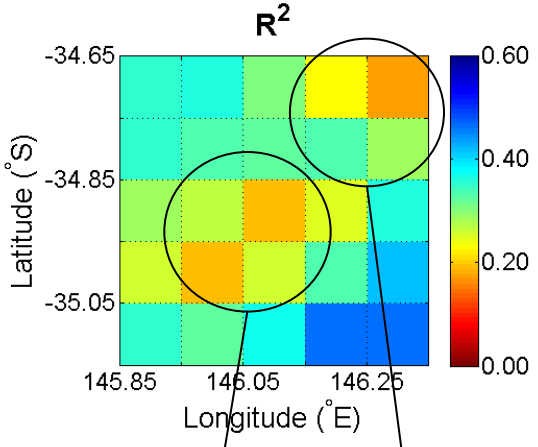
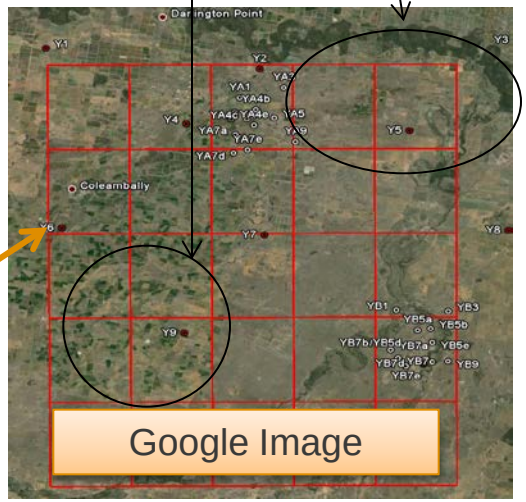
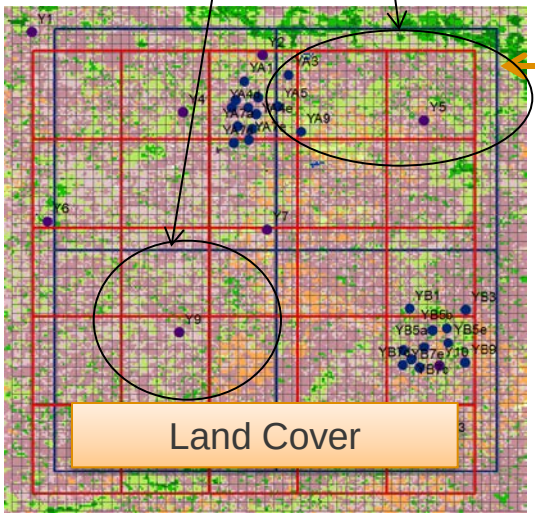




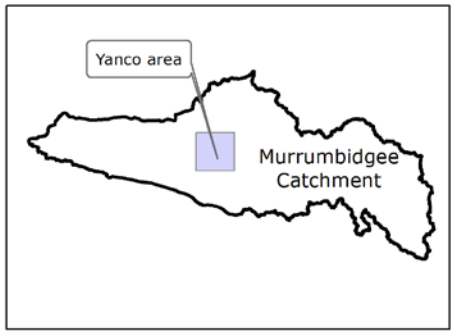


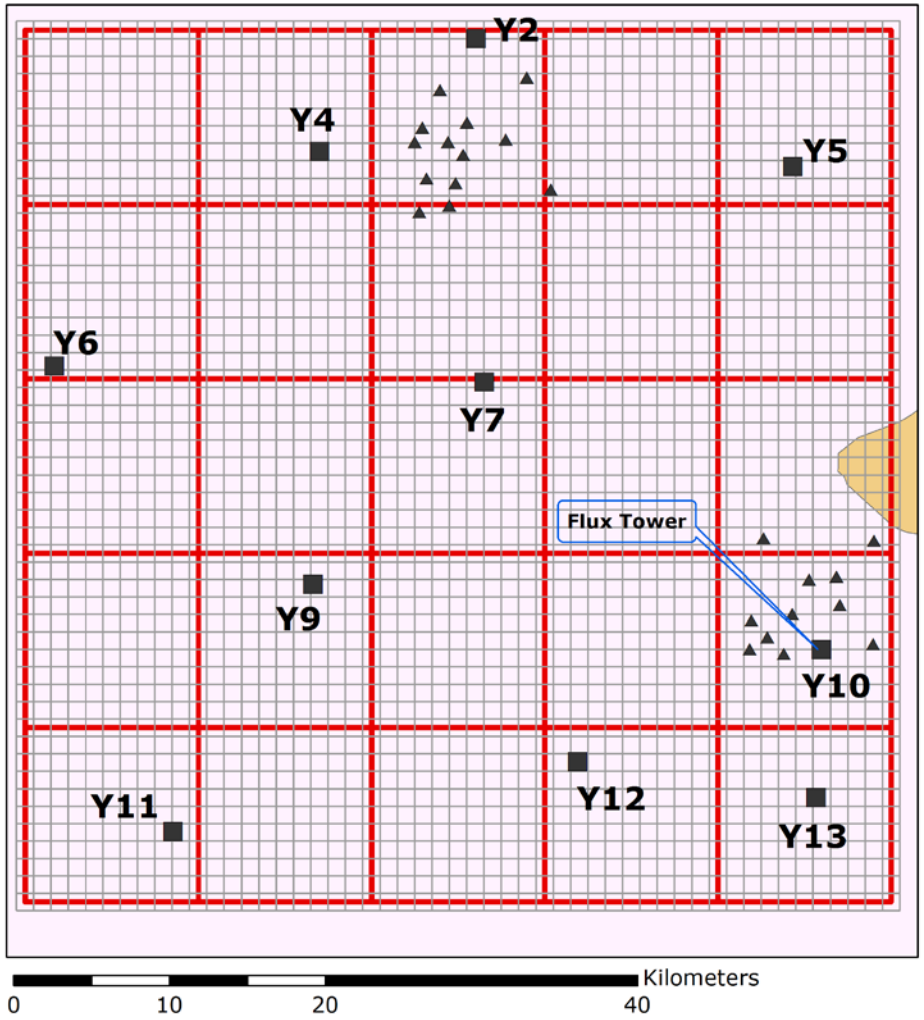


Irrigation/ Cropping Activities

Trees and water bodies

3. Validation of Derived SM and Fluxes





Legend

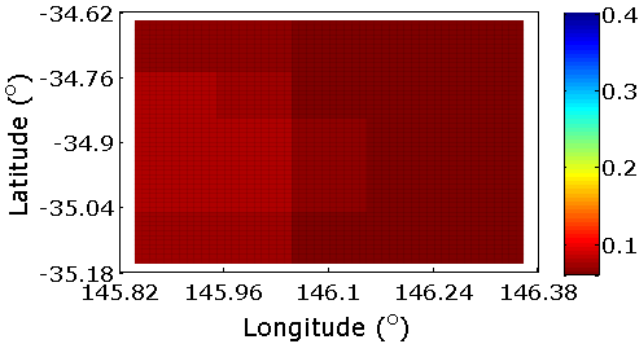
- SMAPEx stations
- OzNet stations
- MODIS 1km Grids
- 10km AMSR2 Grids

Surface Soil Texture

- Sand
- Sandy Loam
- Loam

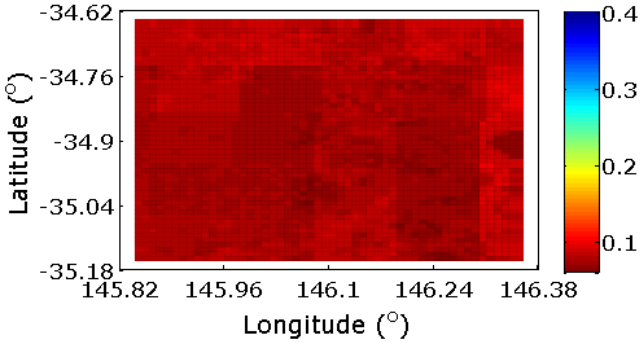
3. Validation of Derived SM and Fluxes

AMSR2 – level 3

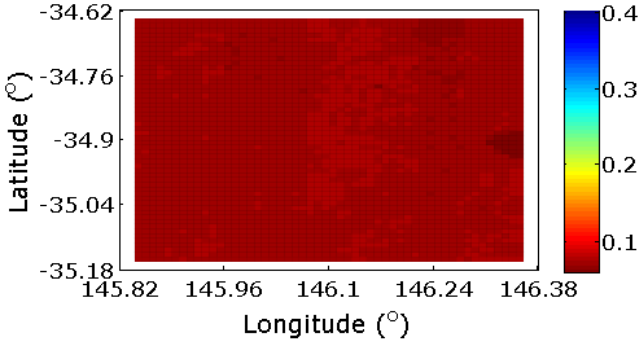


Soil Moisture in the Yanco area on 23 July, 2012

Model estimate



Updated - EnKF



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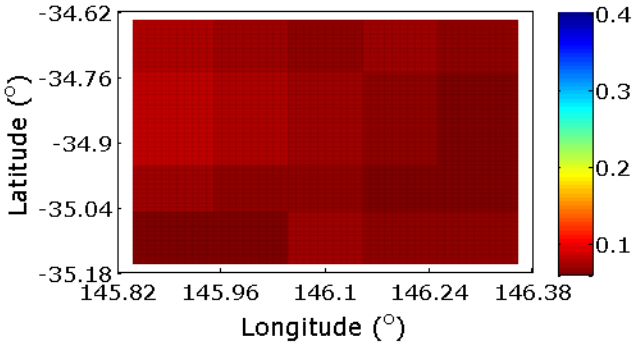
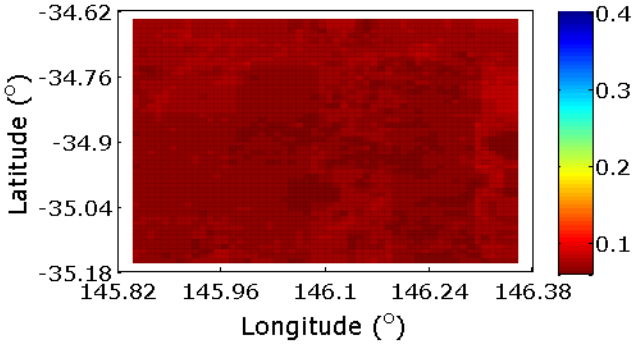


Soil Moisture in the Yanco area on 11 August, 2012

Model estimate



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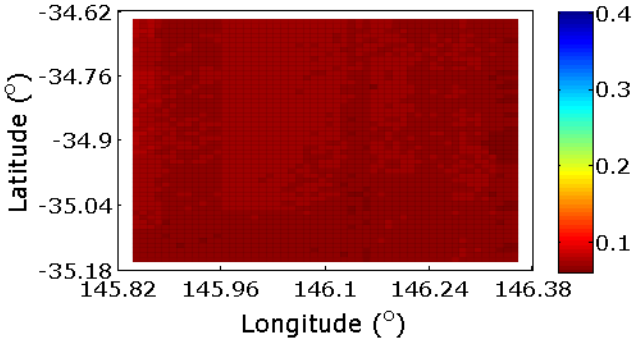

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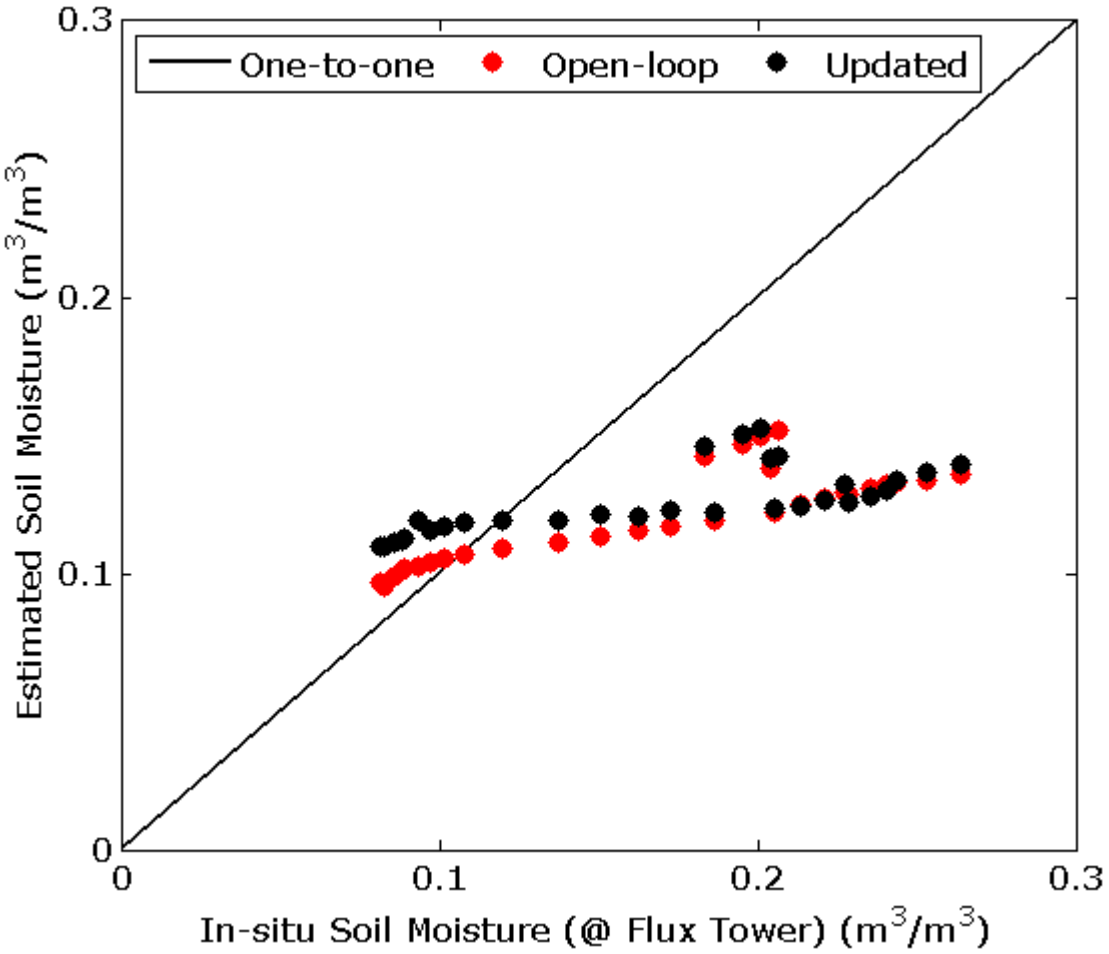

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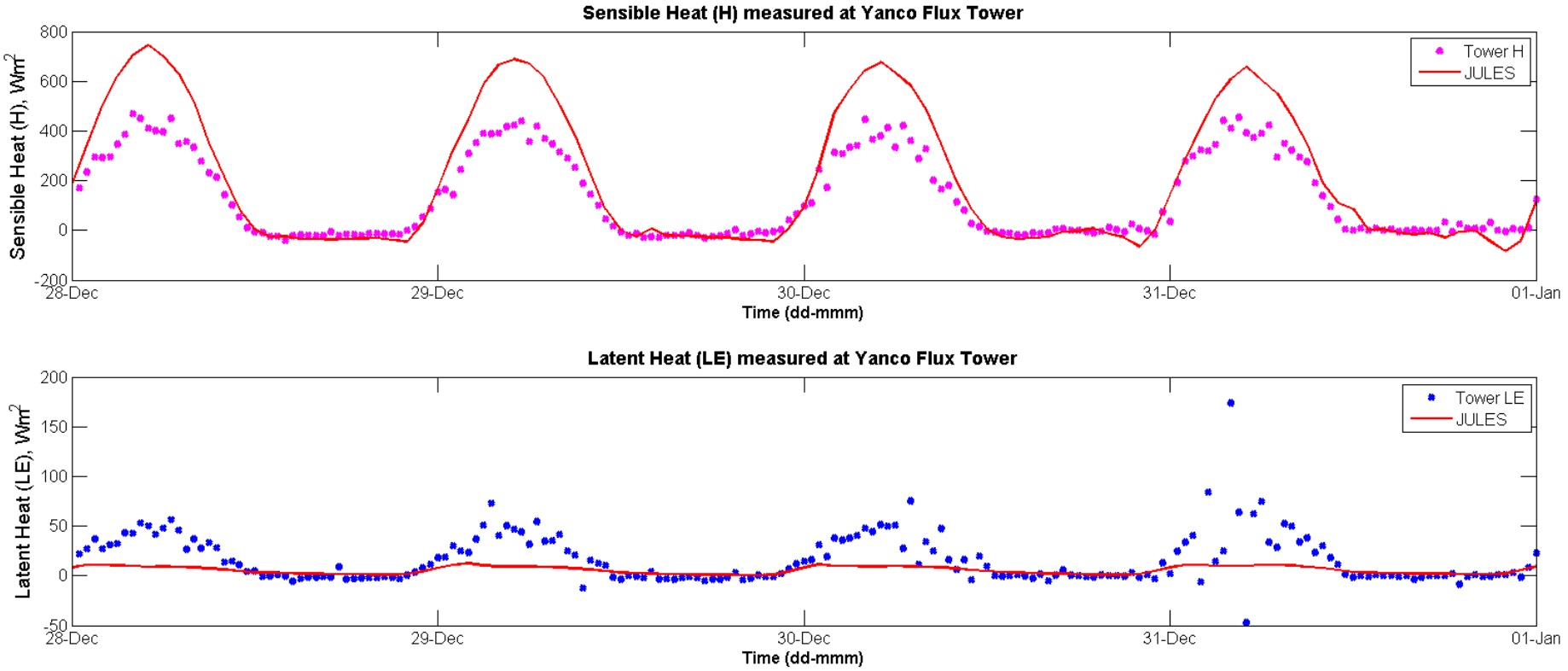

3. Validation of Derived SM and Fluxes

- Official Products
  - We do not yet have access, but will be visiting with Prof Koike in September for 2 weeks to further develop this.
- Downscaled Products
  - We do not yet have access to official downscaled products, but are continuing dialogue with Prof Matsushima and are initiating some in-house downscaling.

Summary Slide

A flux tower has been installed and maintained in the MDB and incorporated into experiments.

Representative soil moisture stations have been identified.

These station measurements have been compared to model predictions and AMSR2.