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An insitu-model-aircraft cross validation strategy for SMOS

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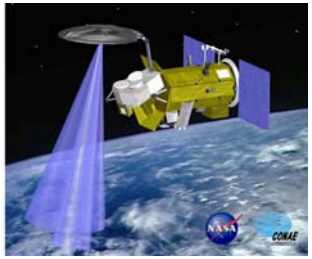
Microwave satellites: near-future

SMOS (Soil Moisture and Ocean Salinity)
launch 9 Sept. 2009 **40km 3days; synthetic aperture radiometer**

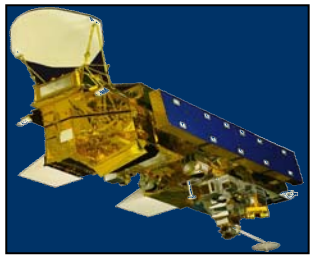


AQUARIUS (Ocean Salinity and soil moisture)
launch May 2010 **~100km 7days; "traditional" active passive**

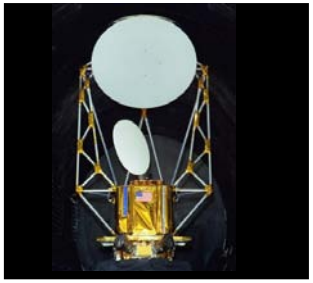
SMAP (Soil Moisture Active Passive)
launch ~2013 **40-10km 3days; high resolution active**

Microwave satellites: current

ASCAT (Advanced Scatterometer)
launched 2006 **50km 1-3days; c-band microwave scatterometer**



AMSR-E (Advanced Microwave Scanning Radiometer for the Earth observing system)
launched 2002 **25km 1-3days; "traditional" c-band radiometer**

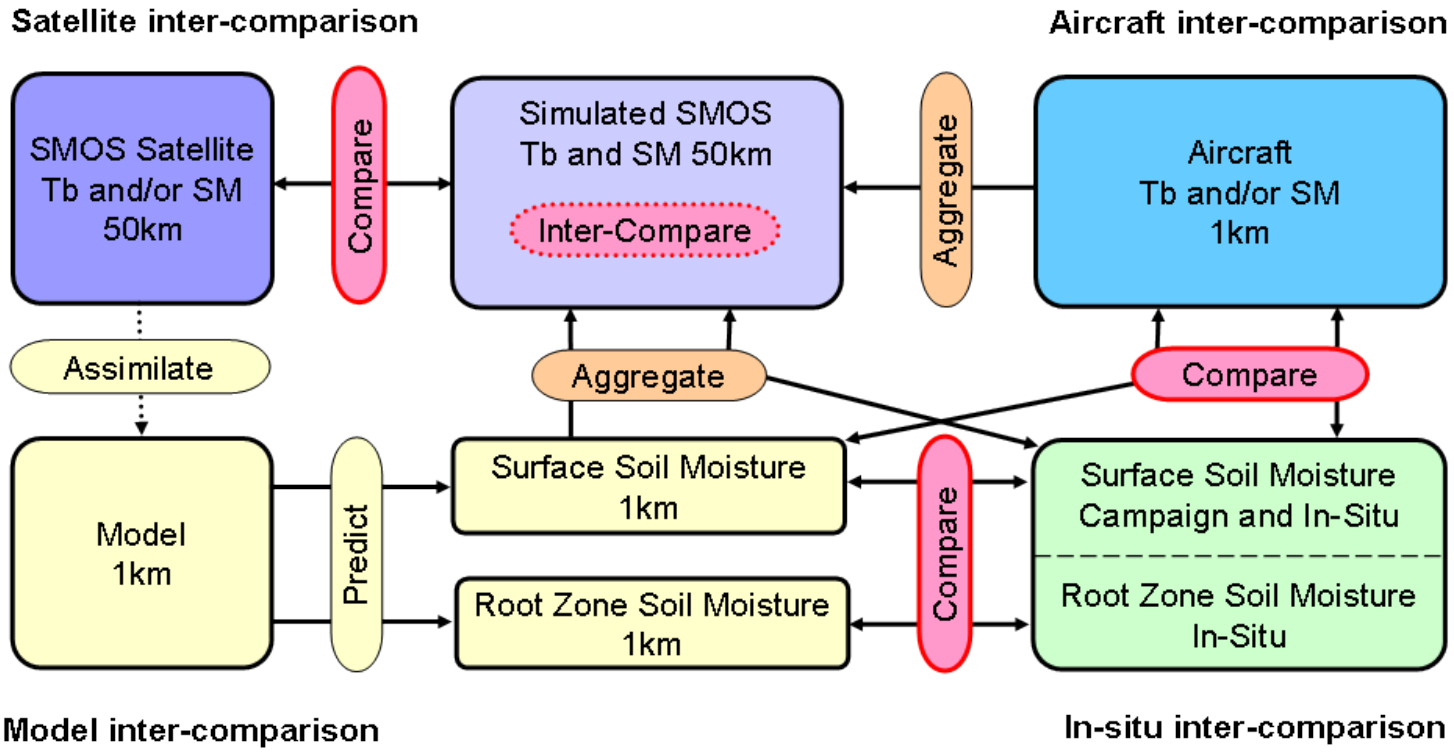


WindSAT (Wind Satellite)
launched 2003 **Same as AMSR-E but 6:30am/pm overpass time rather than 1:30am/pm**

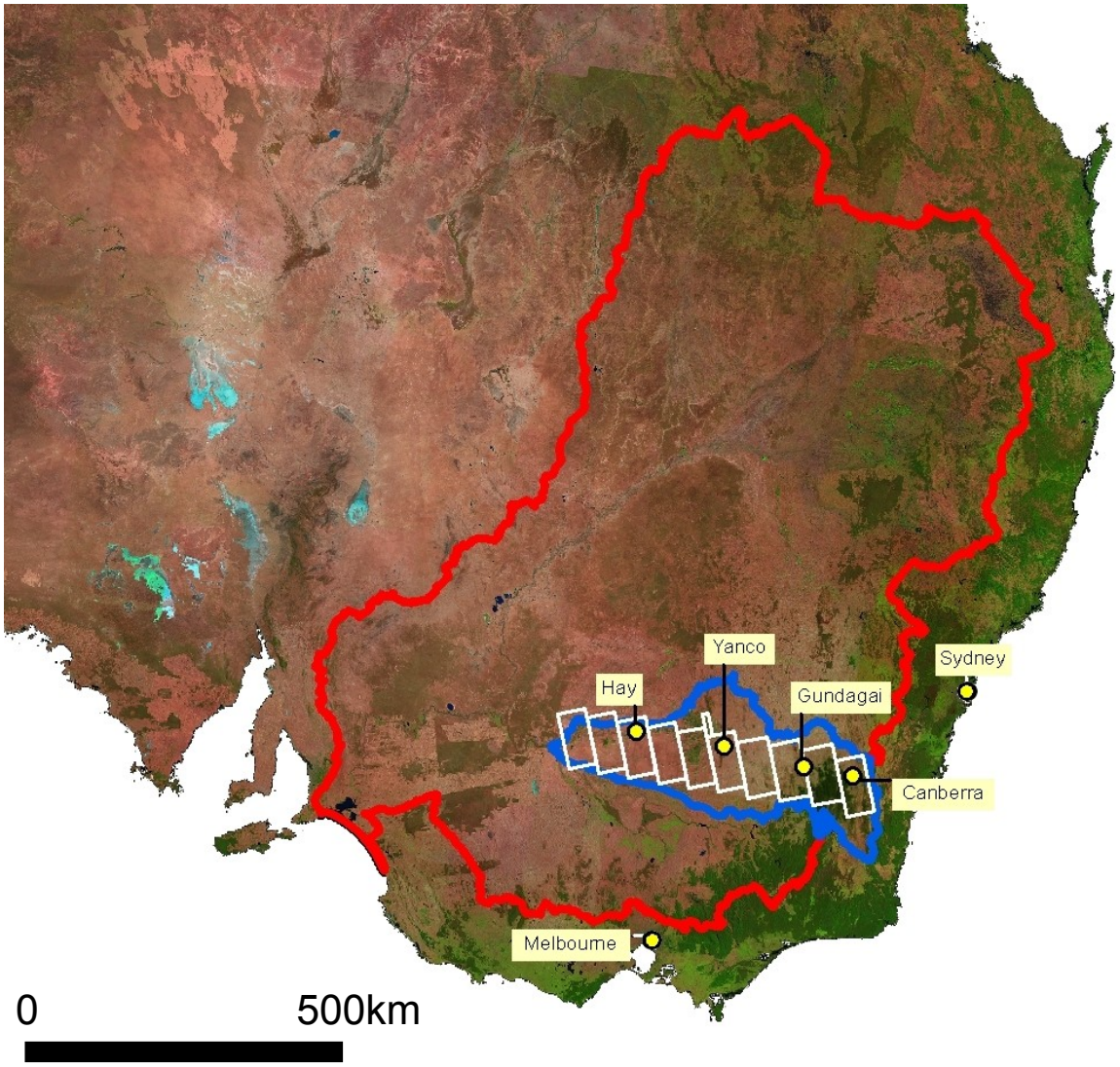
ASAR (Advanced Synthetic Aperture Radar)
launched 2004 **1km ~10days; c-band microwave scatterometer**

The cross-validation strategy

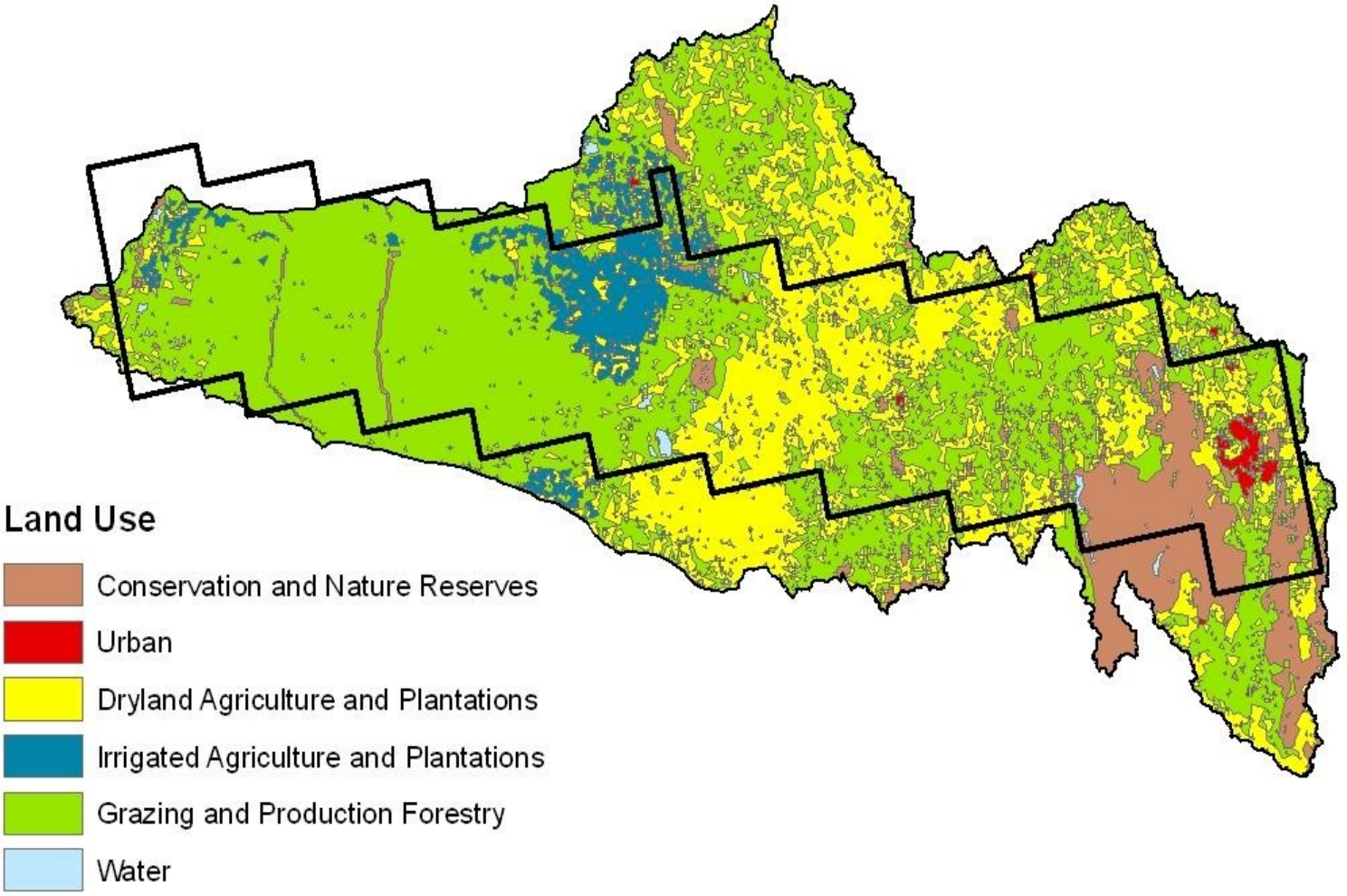
A SMOS cross-validation strategy using in-situ measurements, airborne measurements, model predictions and satellite observations

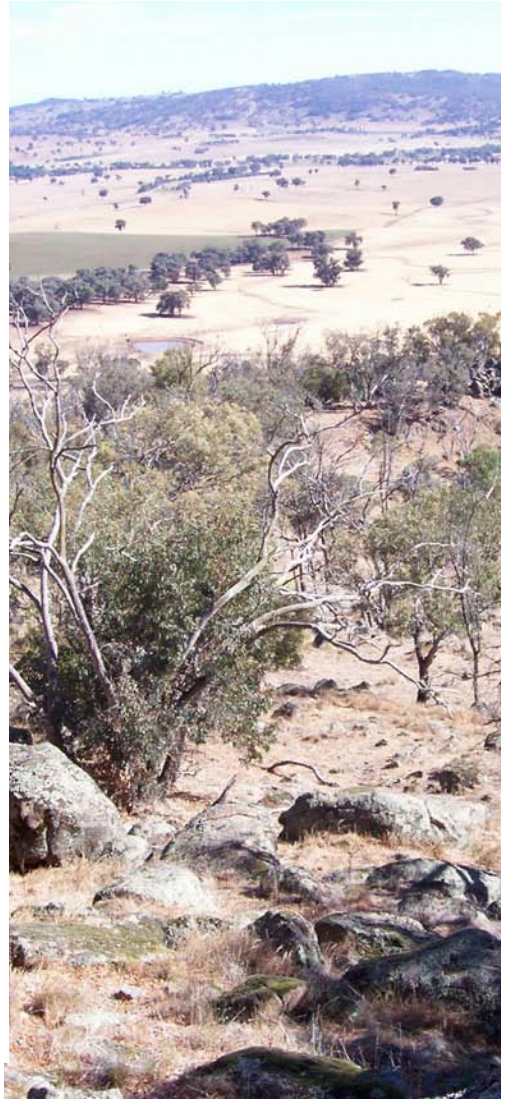


The Murrumbidgee: A demonstration test-bed

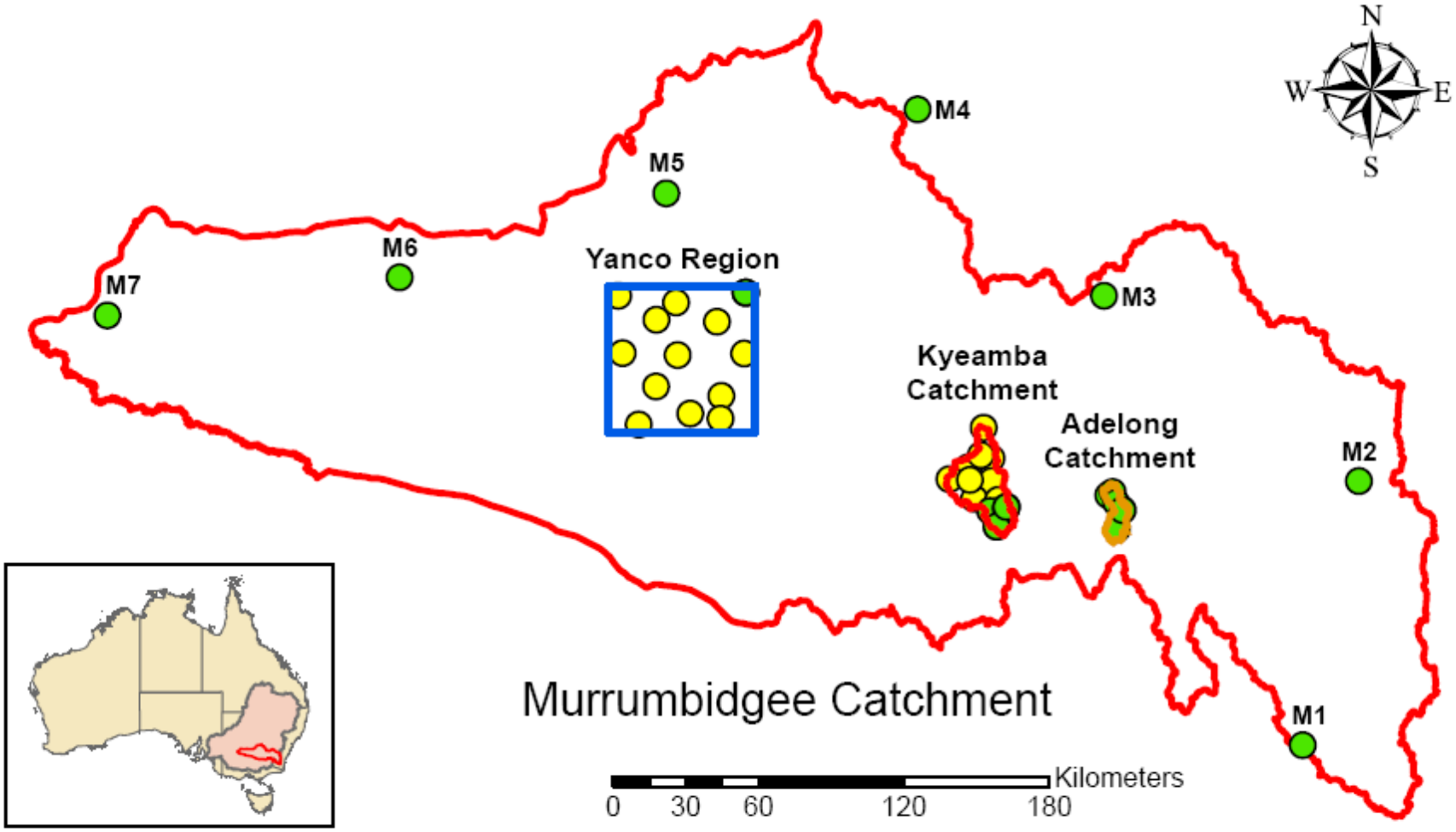


Murrumbidgee Catchment characteristics

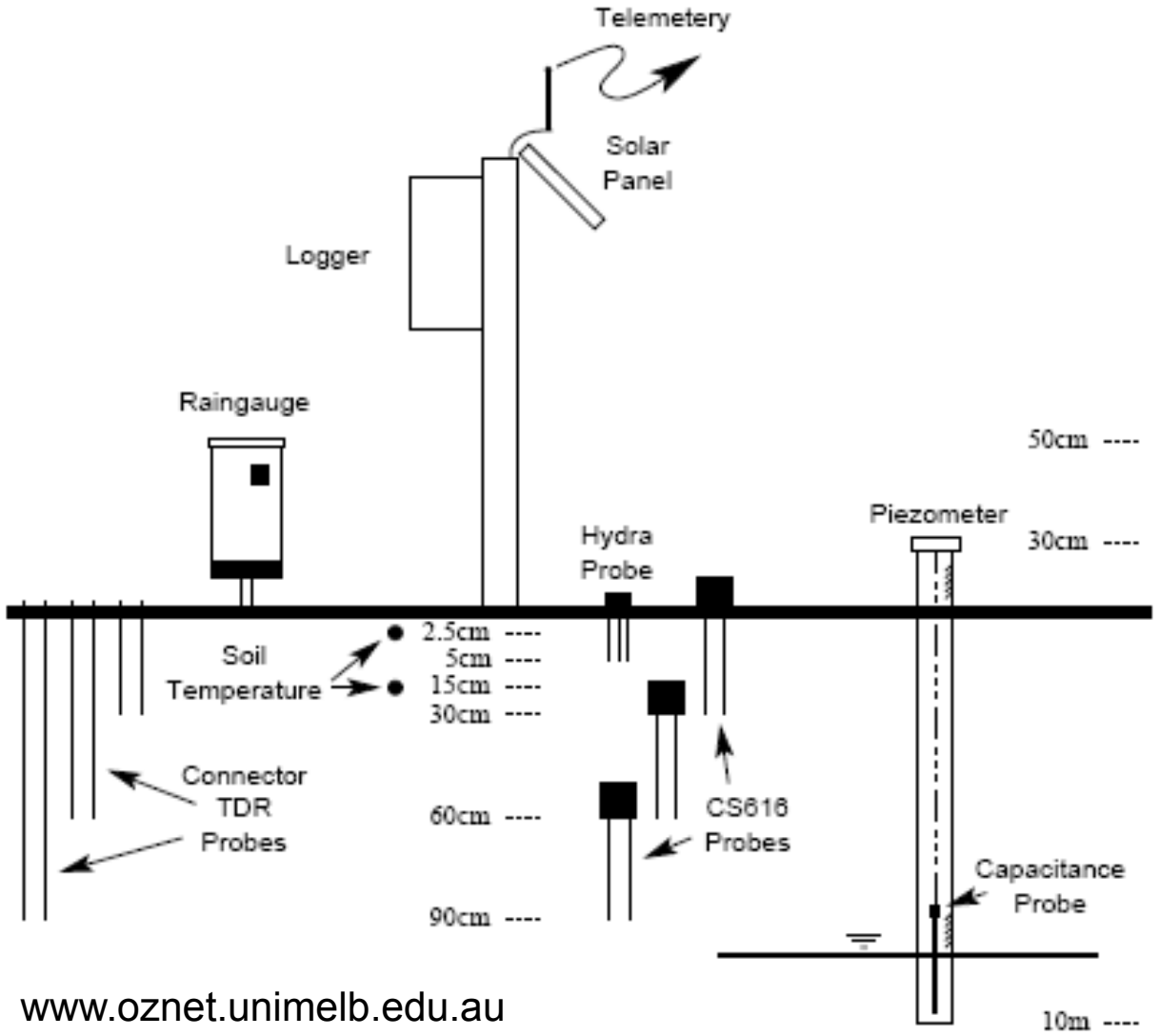




Murrumbidgee Catchment monitoring

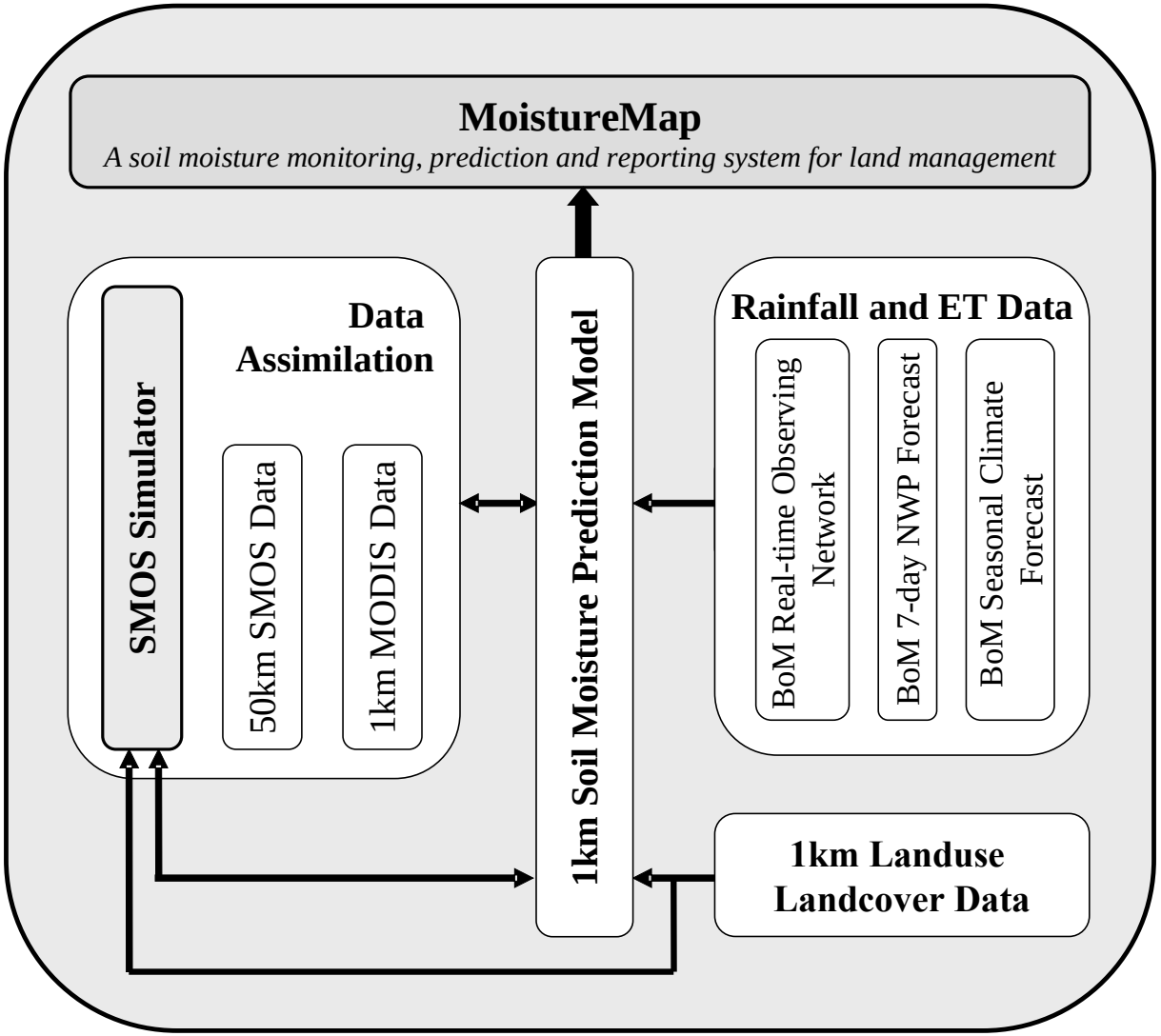


OzNet monitoring network

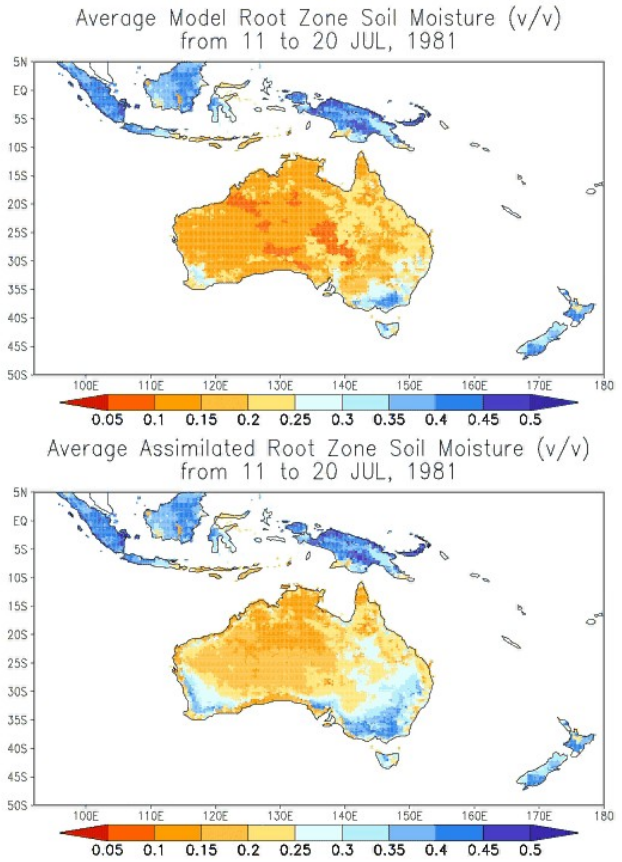


www.oznet.unimelb.edu.au

MoistureMap: An overview …

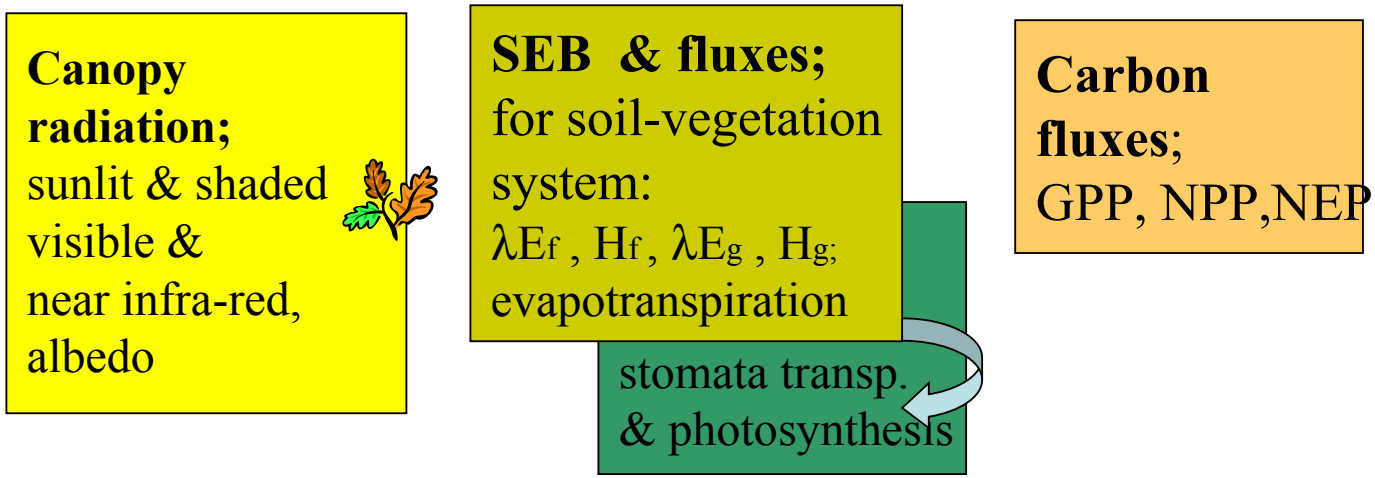


SMMR Assimilation



Walker et al. (2003), MODSIM

CABLE: CSIRO Atm. Bio. Land Exchange



Airborne sensing instruments

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Thermal Imager

6 x Skye VIS/NIR/SWIR Spectrometers

R/G/B/NIR

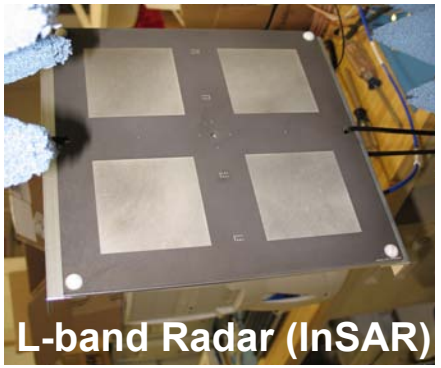
Video

Hyperspectral
(400 to 900nm)

Hyperspectral
(400 to 2500nm)

21MPixel Camera

Full Waveform Laser Scanner

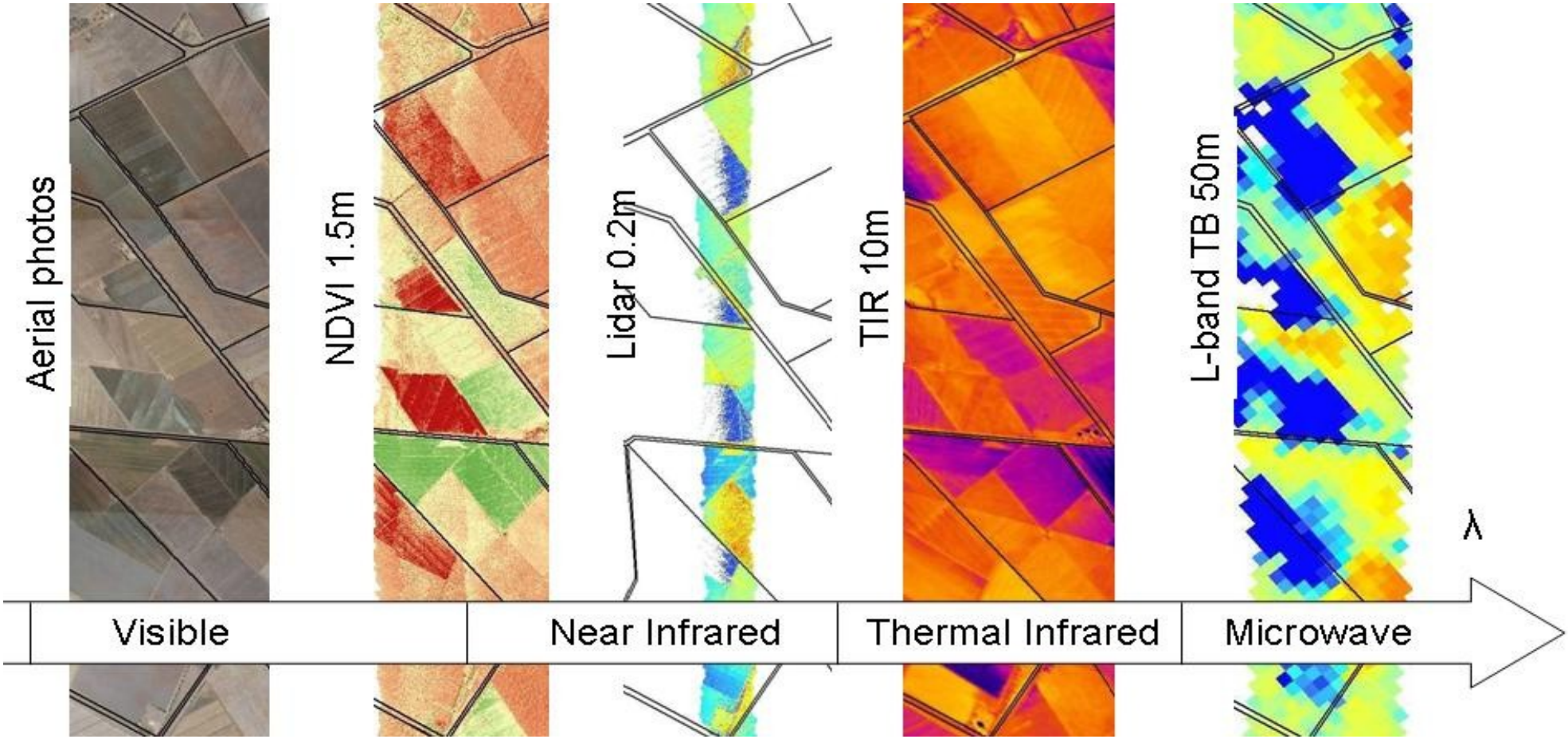


L-band Radar (InSAR)

6 x Everest TIR's

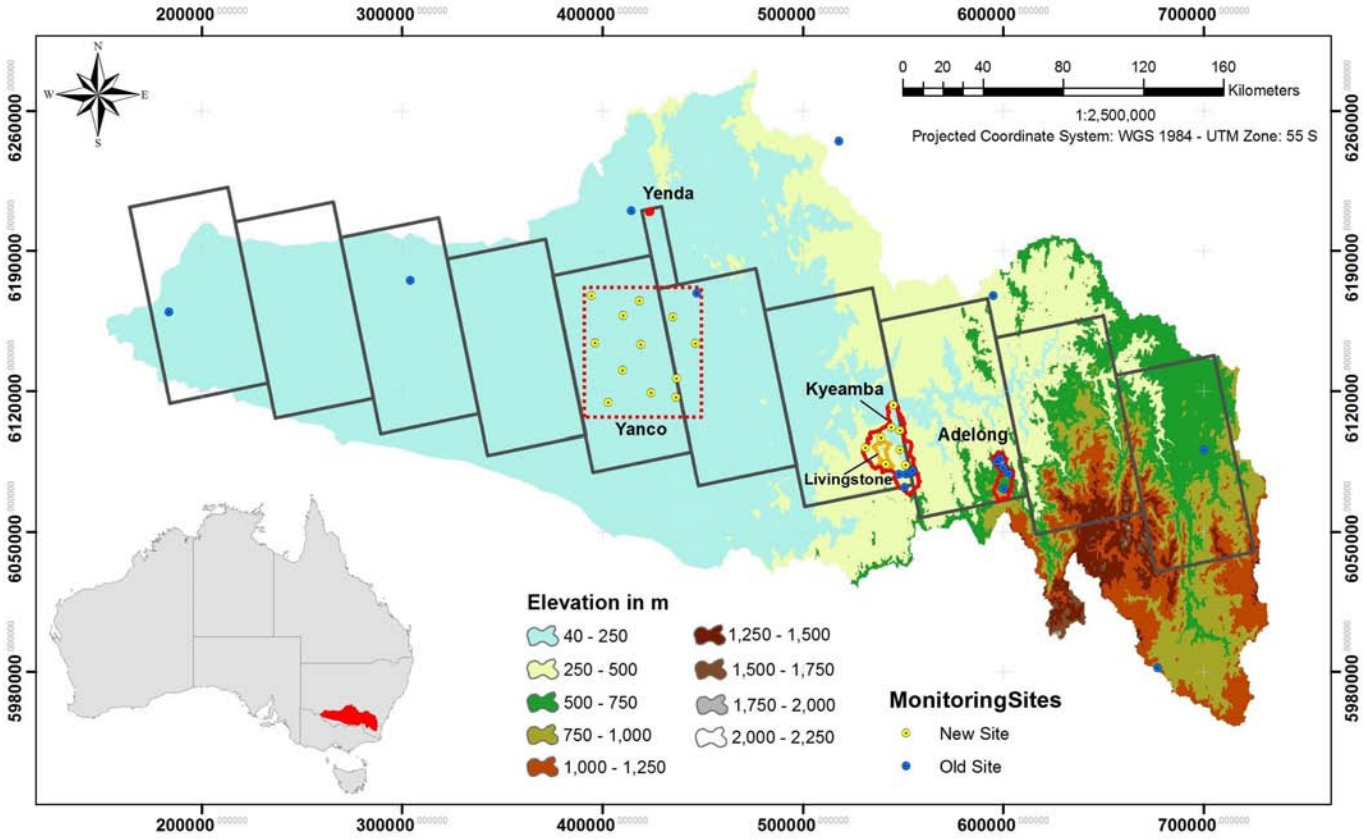
L-band Radiometer

Multi-spectral data: example



Merlin, Walker et al., 2009. Adv. Water Resour.

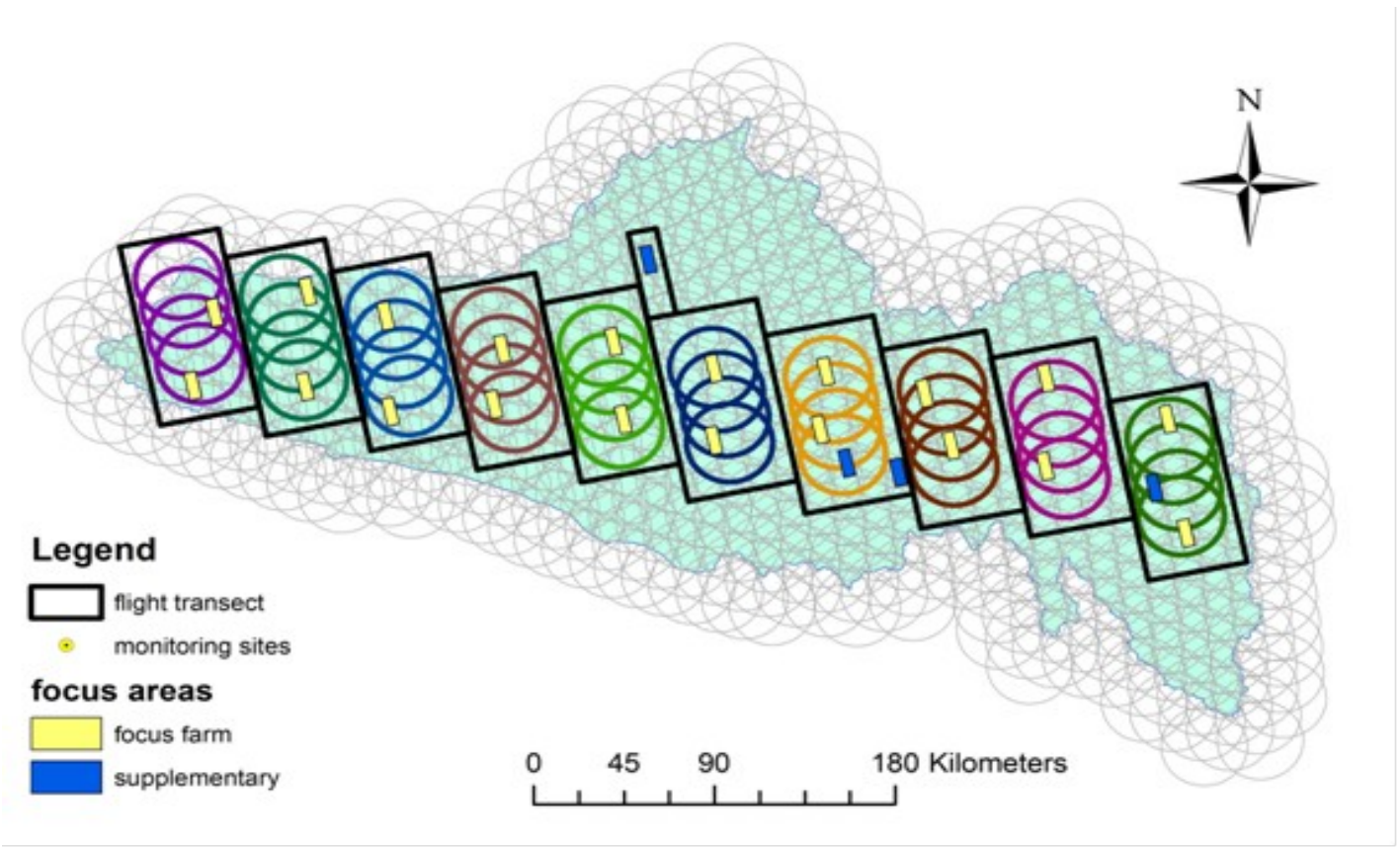
AACES campaigns



To be conducted in Nov 2009 and Feb 2010 + 2 more times
Full pixel coverage at 1km resolution

20 SMOS pixels + transect flight

AACES campaigns



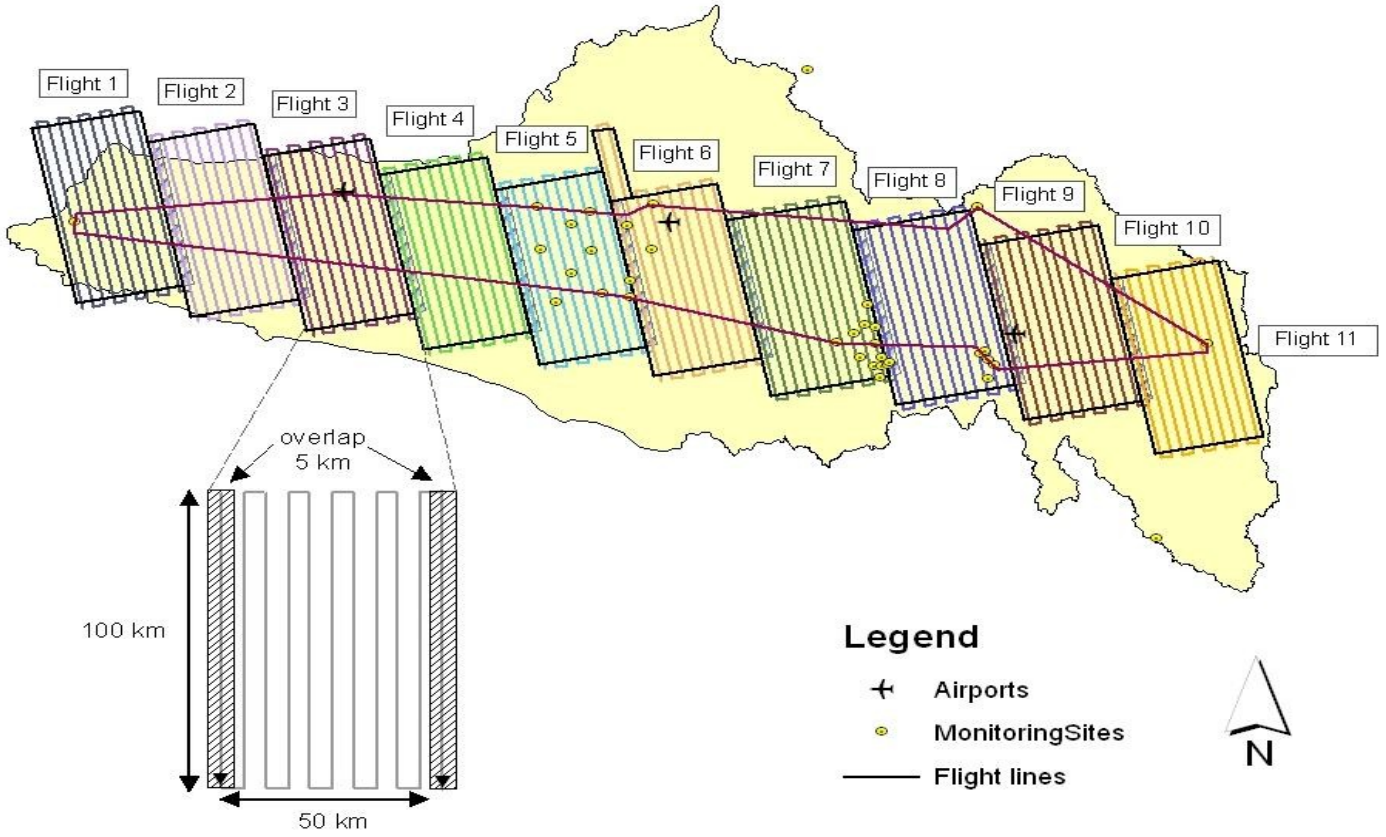
Australian Airborne Cal/Val Experiment for SMOS

AACES

To be conducted in Nov 2009 and Feb 2010 + 2 more times
Full pixel coverage at 1km resolution

20 SMOS pixels + transect flight

AACES campaigns



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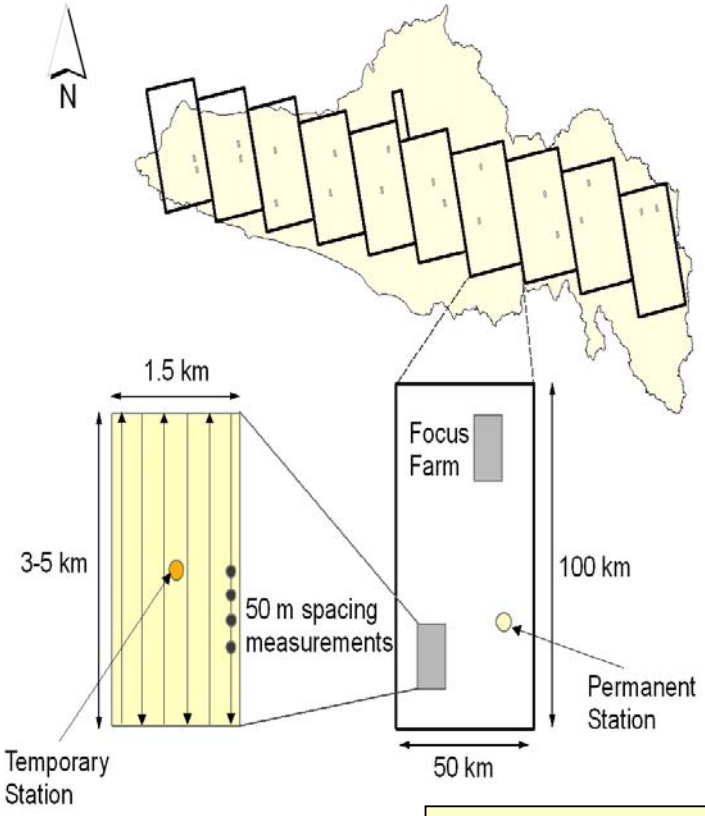

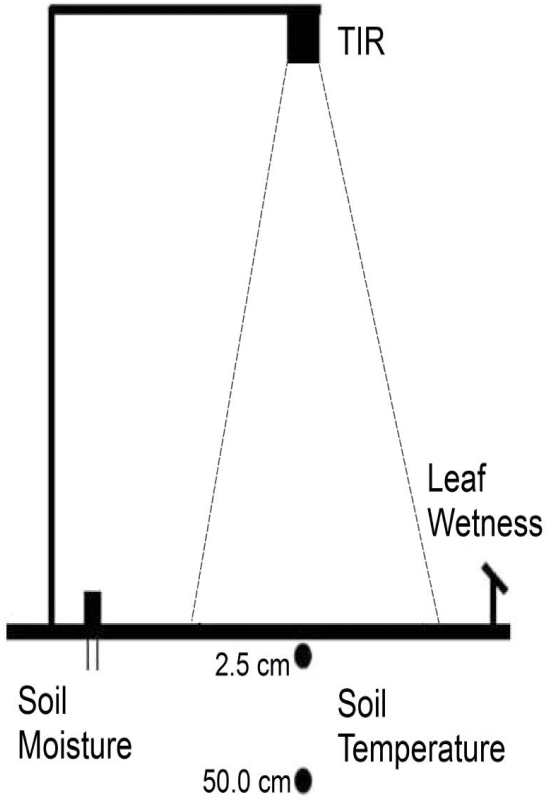

Vegetation	**Soil moisture**
water content	**Veg type/height**
biomass	**Rock fraction**
type	**Dew**
LAI	**Roughness**
spectral	**Grav. Moisture**

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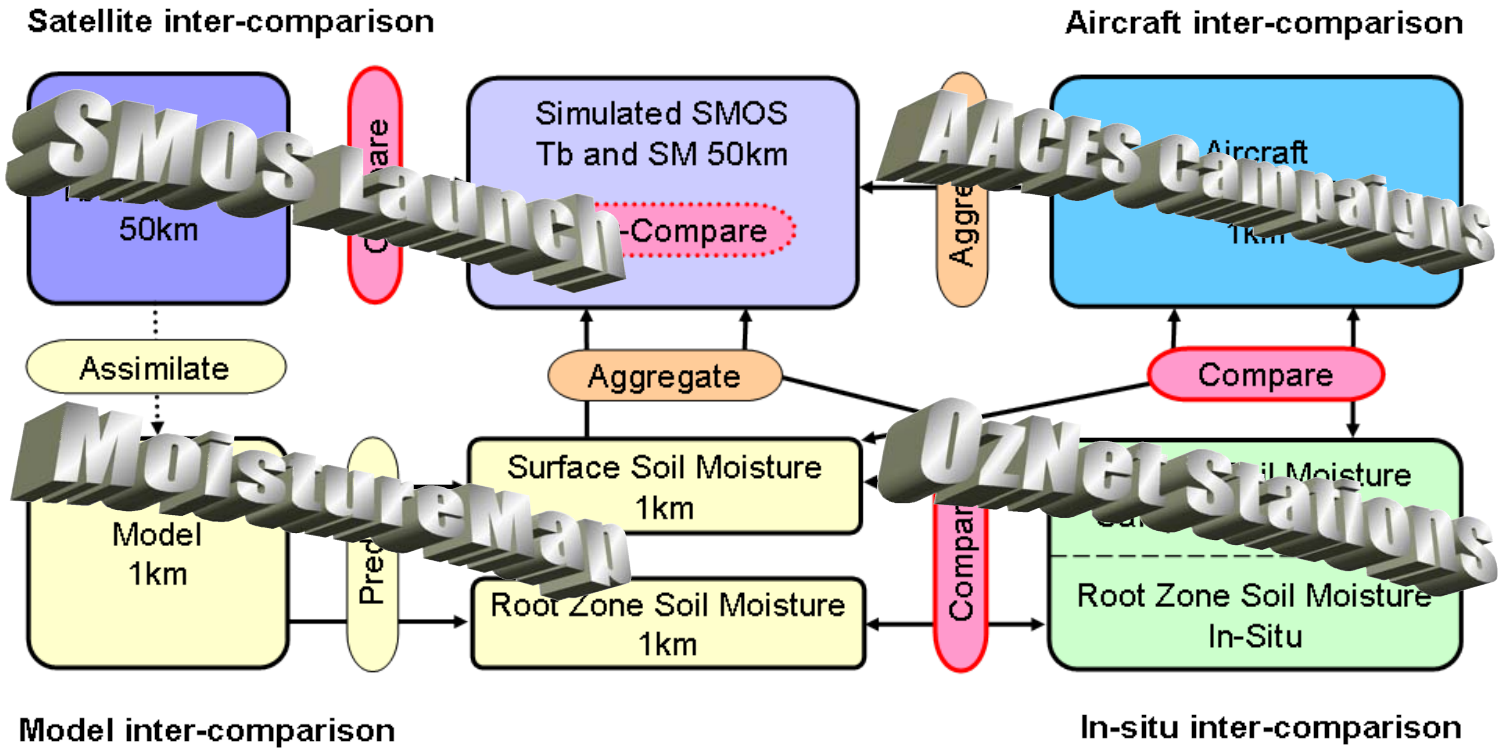
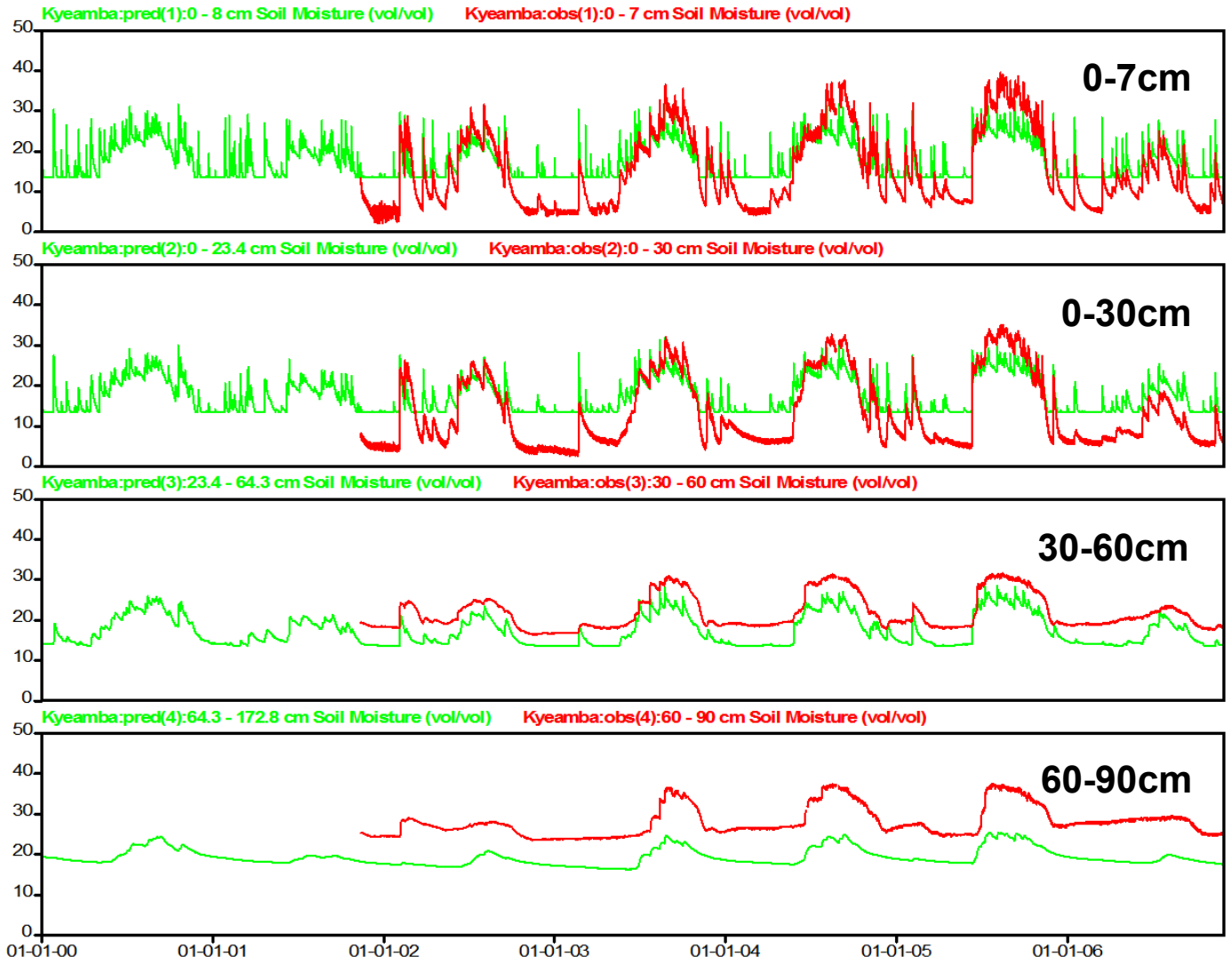


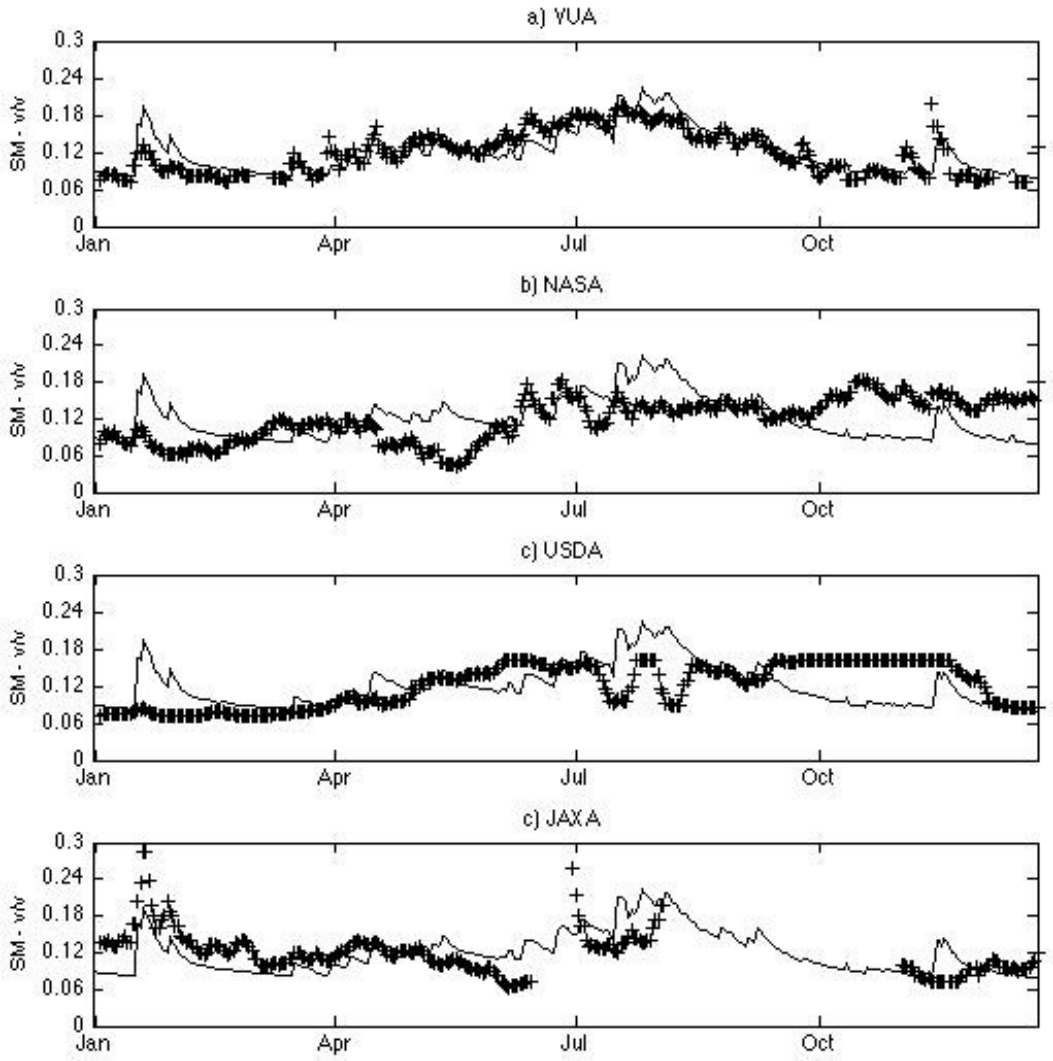
CABLE validation: Kyeamba



Model

Stn Obs

AMSR-E validation: Adelong

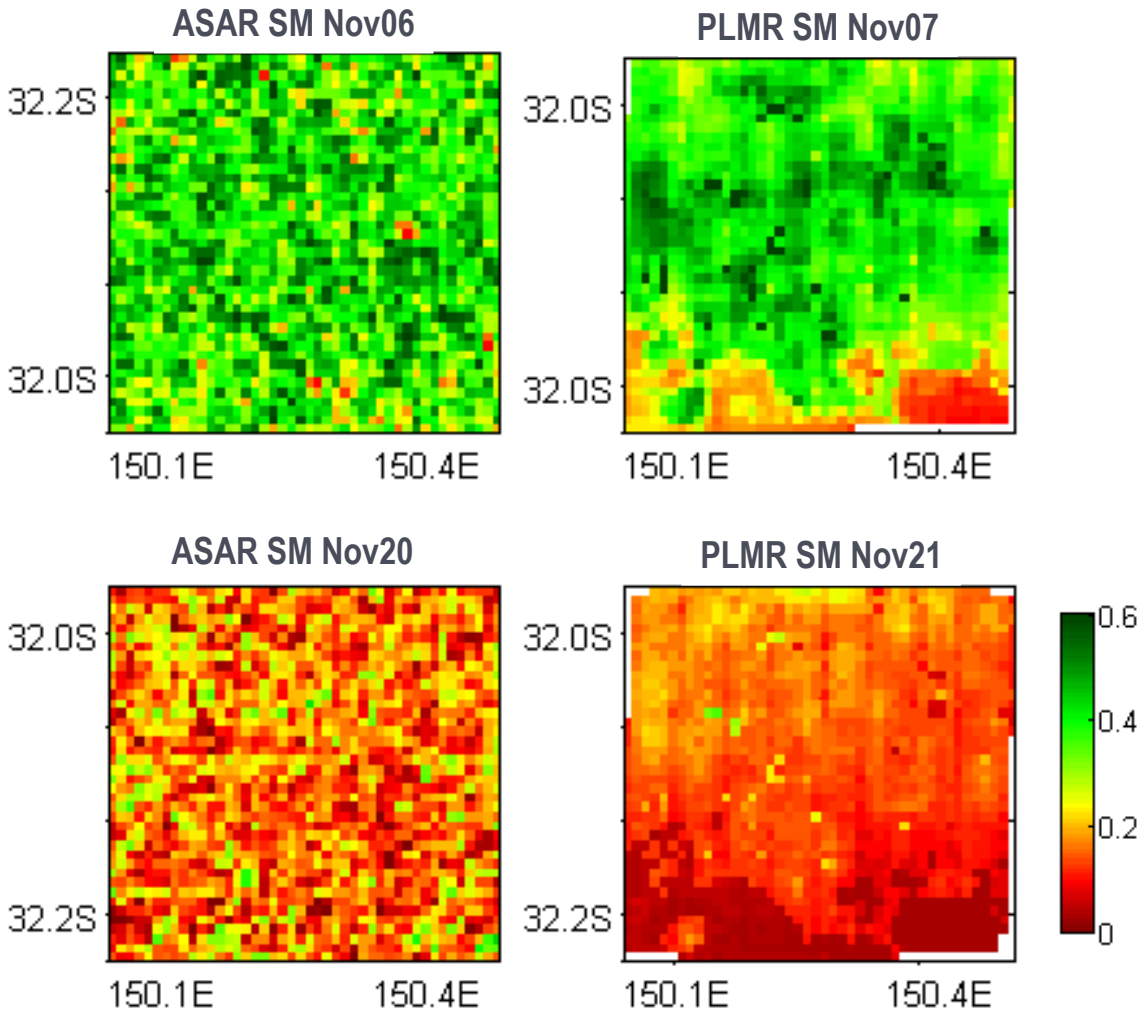


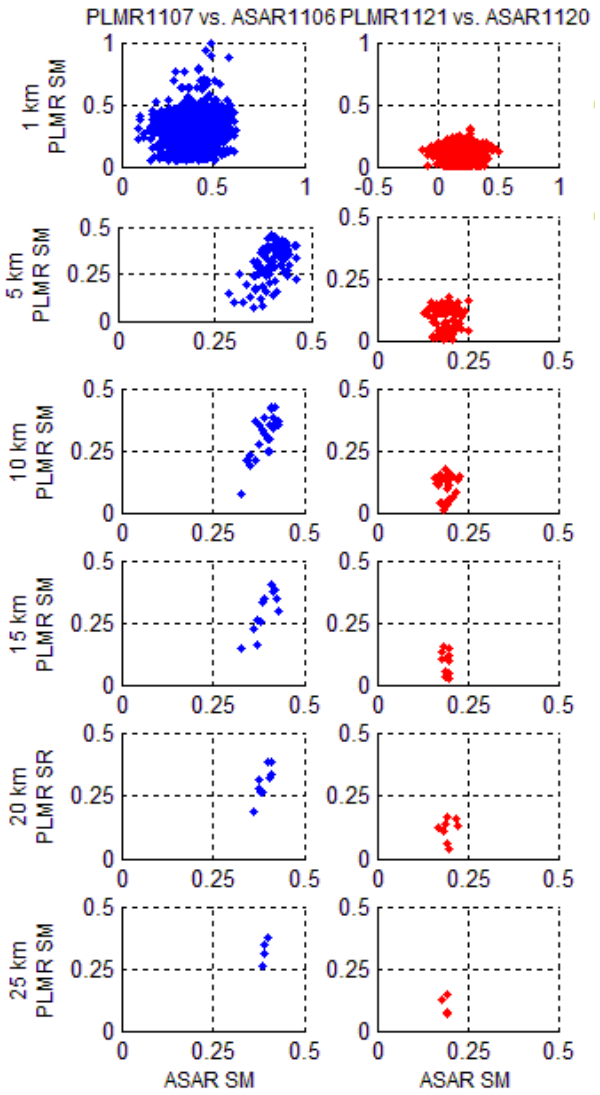
- Stn Obs

+ AMSR-E

Draper, Walker et al. (2009) RSE

ASAR validation





Mladenova, Walker et al. (In Review) TGARS

"Make no little plans; they have no magic to stir the blood and probably will themselves not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will not die." Daniel Burnham

Raphael
The School of Athens