Yenda Activities

John Hornbuckle
Overview of IrriSATSMS

Satellite images used to determine plant performance of an irrigators crop

Incorporates management/soil/water/salinity constraints

ETo from Weather Stations

Potential Evaporation based on Atmospheric Demand

Determination of a crop coefficient (Kc) from satellite image

Representing Individual Paddocks

ETc = ETo X Kc

Crop water use determined and irrigation requirement

Daily irrigation scheduling information delivered to irrigators through SMS
Kc maps available online across Australia

http://www.irrigateway.net/kcmap/
Gwydir - Cotton
Issues

• Forecast ETo data
  • Developed own 7 day forecast – see www.irrigateway.net

• Water-Carbon-Energy nexus

• Rainfall – Runoff
  • Move from Californian summers (little rain) to more wet summers where rainfall begins to significantly contribute to irrigated plant water use
Yenda monitoring

Energy Balance Instrumentation

Sapflow sensors

Electromagnetic Soil Surveys – EM38

Dripper Uniformity – spatial water application
COSMOS Soil Moisture Probe – van dijk

Measurement principle

Proportional counter
\(^3\text{B}\) or \(^{10}\text{He}\)
turns neutron into pulse count

Moderator
(polyethylene)
keeps slow neutrons in

Producer
(Cadmium)
uses fast neutrons to produce slow neutrons

Reflector
(polyethylene)
keeps out slow neutrons
14 Proposed sites
Advantages and Disadvantages

**Advantages**
- Large radius of integrated measurement (~700 m)
- Non-contact, no moving parts = rugged
- Salt, ice, rocks no problem
- Integrates over several dm depth

**Disadvantages**
- Still early days for this application
- Corrections for variations in cosmic radiation dose (solar activity, pressure, humidity) proposed but need more verification
- Source depth varies with water content (10 to 70 cm)
- Price (~$20k)
COSMOS – Yenda site

• Probe will be installed within the next few weeks

• Ability to control irrigation water will be used to test the use, accuracy and sensitivity of the probe

• Issues
  • Sensitivity at the wet end (problem for irrigation soils)
  • Response time at the wet end
Future

- Moving irriSAT to commercial footing for field/farmer scale

- Newer Australian projects are focused on irrigation water demand/ordering at the irrigation area scale – possibly more use/potential application of NAFE/SMOS data

- New projects in Cambodia and Iraq on irrigation water management – interested in any RS data anyone here maybe using/generating for these regions

- Ensuring Landsat remains operational