

Using satellite-derived data to improve evapotranspiration and groundcover modelling

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Artist's rendition of a Landsat Satellite. Credit: NASA



*Eddy covariance at Alice Mulga Supersite.
Credit: TERN*



High Performance Computer. Credit: Viderium

The Long Paddock

- Home
- About
- Drought Declaration
- Drought & Climate Adaptation
- Southern Oscillation Index
- Climate Outlooks, Weather & Fire
- SILO
- AussieGRASS Rainfall / Pasture
- FORAGE
- Queensland Future Climate
- Rainfall Posters

14 Nov, 2019
Average SOI value for the last 30 days
-5.67

Latest on Long Paddock

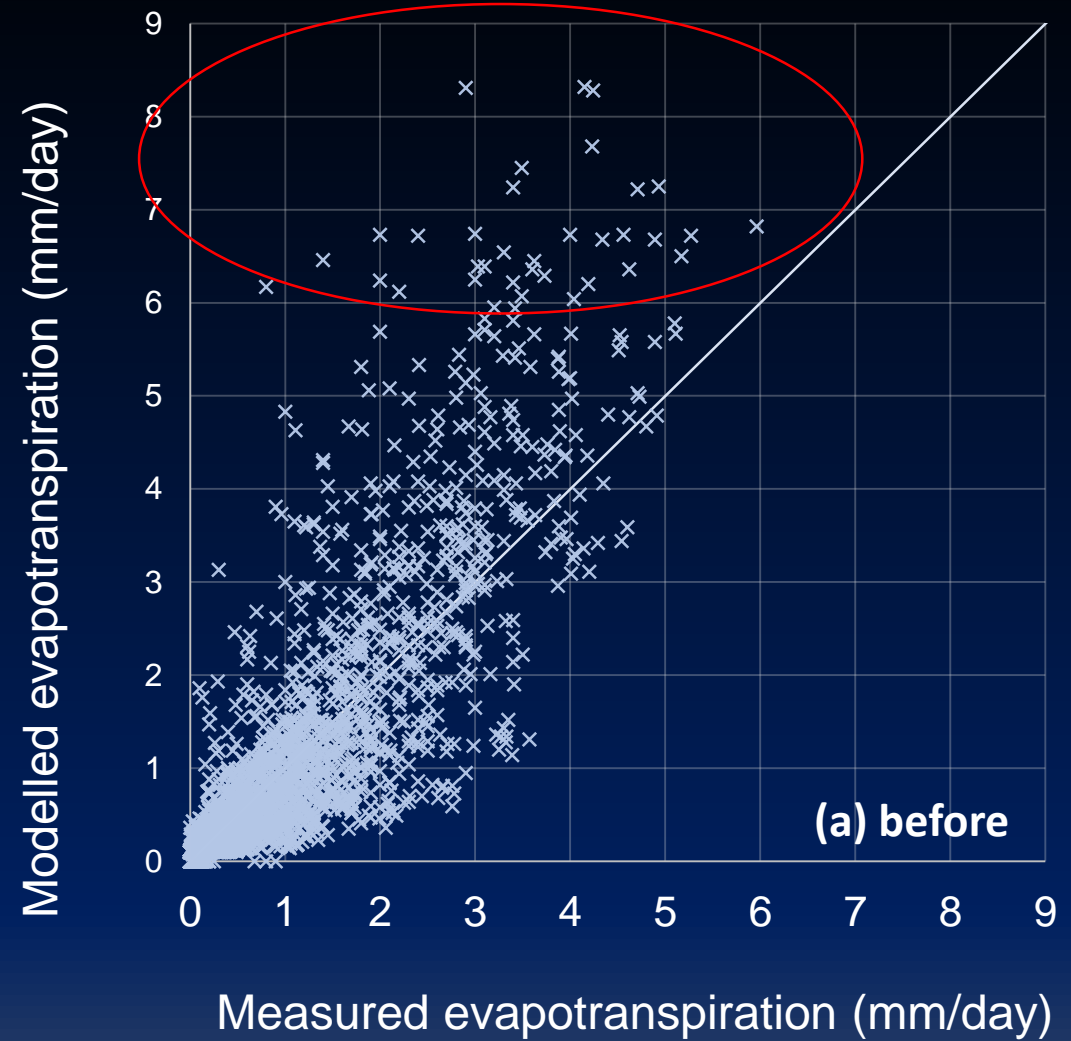
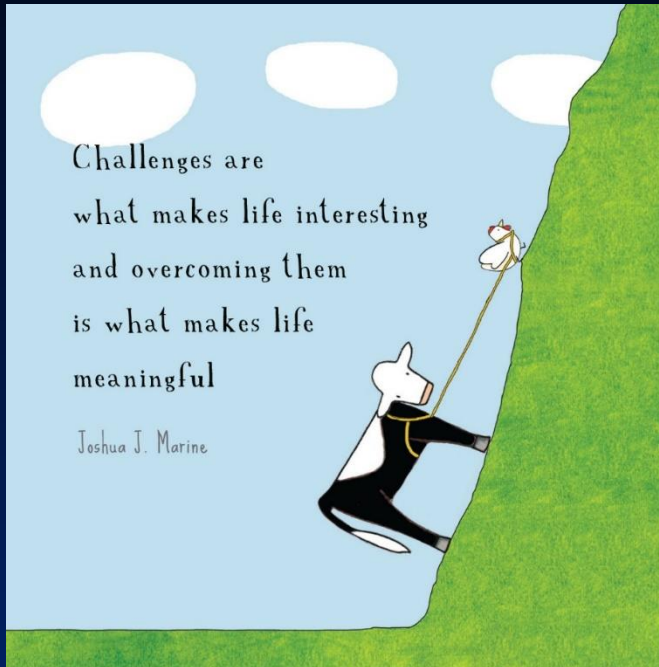
- 08** "Most Likely Tercile for Pasture Growth" Nov 3-month outlook map now available
- 22** Check out the new Drought Map Aug Sequence viewer
- 27** FORAGE Pasture Growth Alert report May now available

Climate risk information for rural Queensland

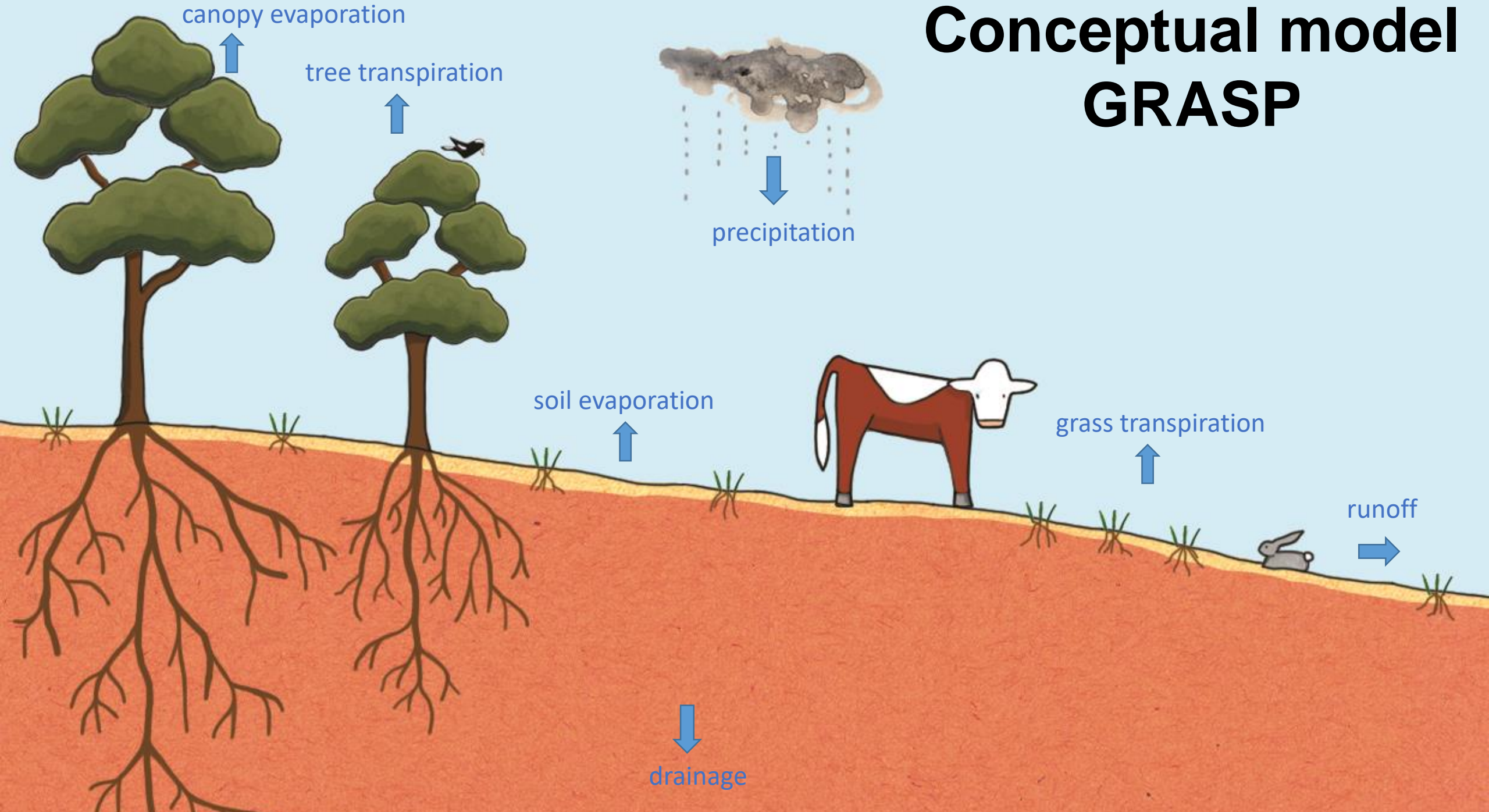
A Queensland Government initiative providing seasonal climate and pasture condition information to the grazing community

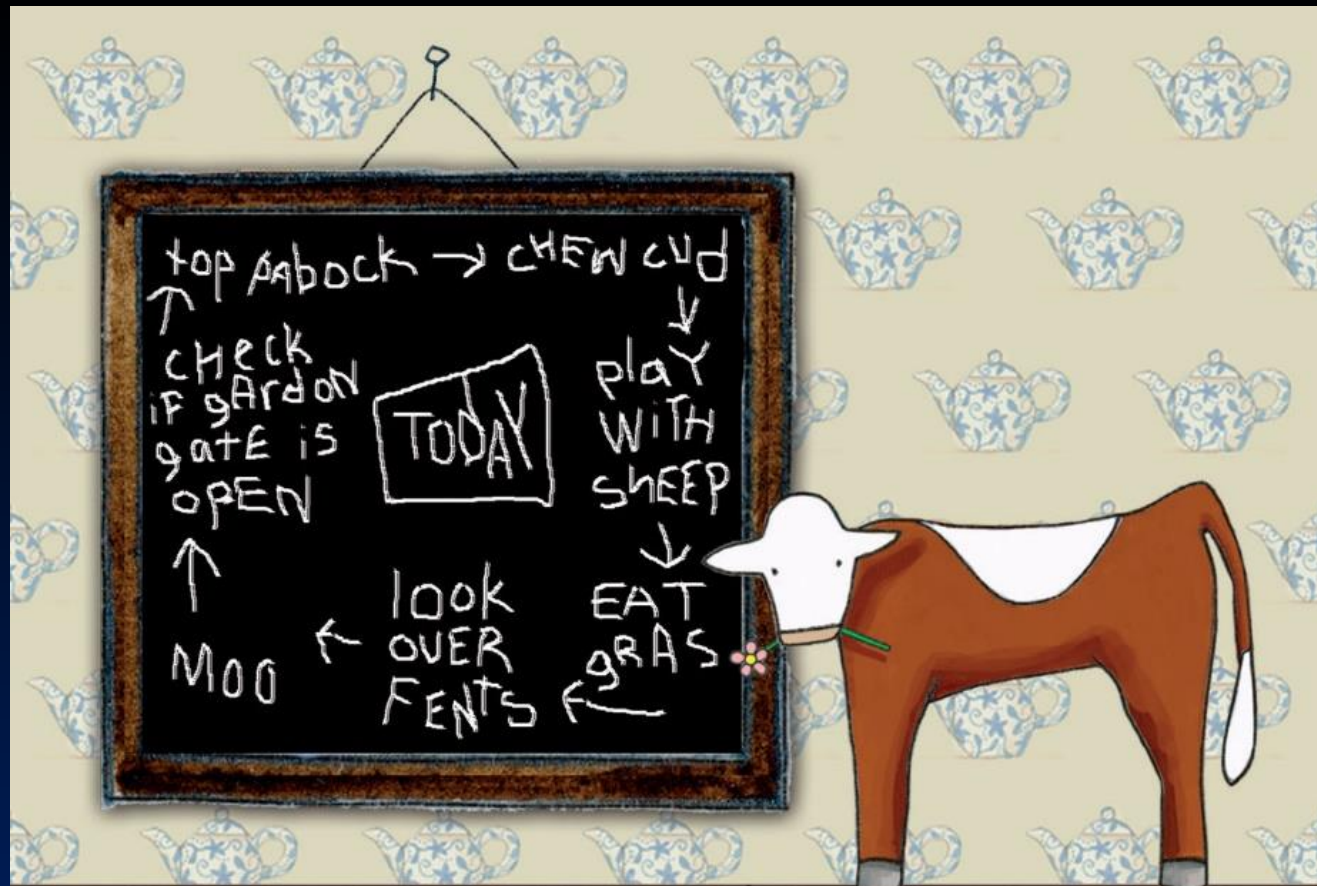


The challenge (and motivation) – improve evapotranspiration



Conceptual model GRASP



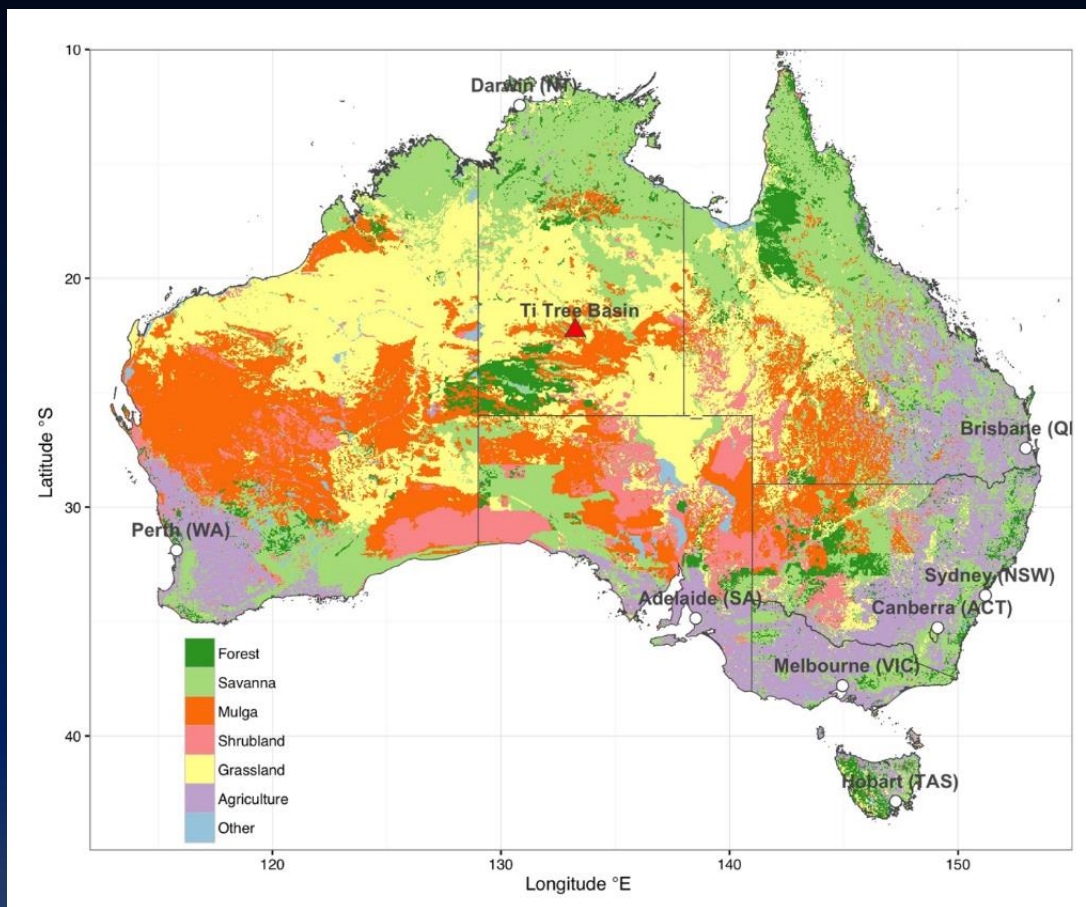


Long story about
model improvements
and optimisation

Illustration by Rachael Flynn, Red Tractor Designs, used with permission.



TERN Alice Mulga Supersite Ozflux network - eddy covariance flux towers



9 years of daily measured evapotranspiration data from 2010

Savanna Woodland - Alice Mulga Supersite

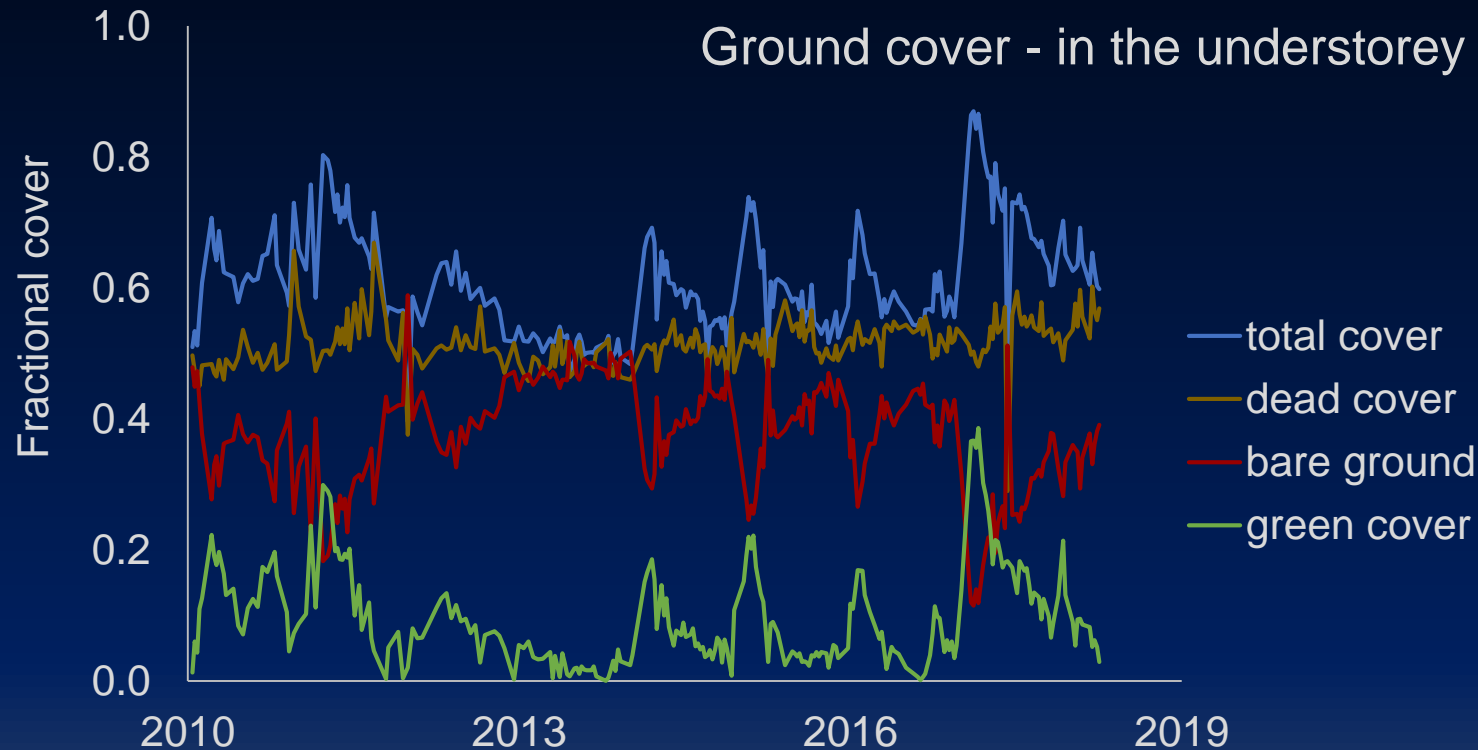
Tree canopy – persistent green
(satellite-derived FPC – Landsat and Sentinel)

Grass understorey
(satellite-derived fractional green cover - Landsat)



Fractional ground cover – Landsat

Fractional Cover splits the landscape into **three** parts, or fractions; **green** (leaves, grass, and growing crops), **brown** (branches, dry grass or hay, and dead leaf litter), and **bare ground** (soil or rock).



Method developed by developed by the Joint Remote Sensing Research Program

Scarth, P., Röder, A., Schmidt, M., 2010. Tracking grazing pressure and climate interaction - the role of Landsat fractional cover in time series analysis. In: Proceedings of the 15th Australasian Remote Sensing and Photogrammetry Conference (ARSPC), 13–17 September, Alice Springs

Satellite data from:

- USGS Landsat dataset
- European Space Agency's Sentinel-2 satellite
- data extracted from Queensland Government Remote Sensing Centre data store

Data derived - fractional cover method

(Scarth et al. 2010)

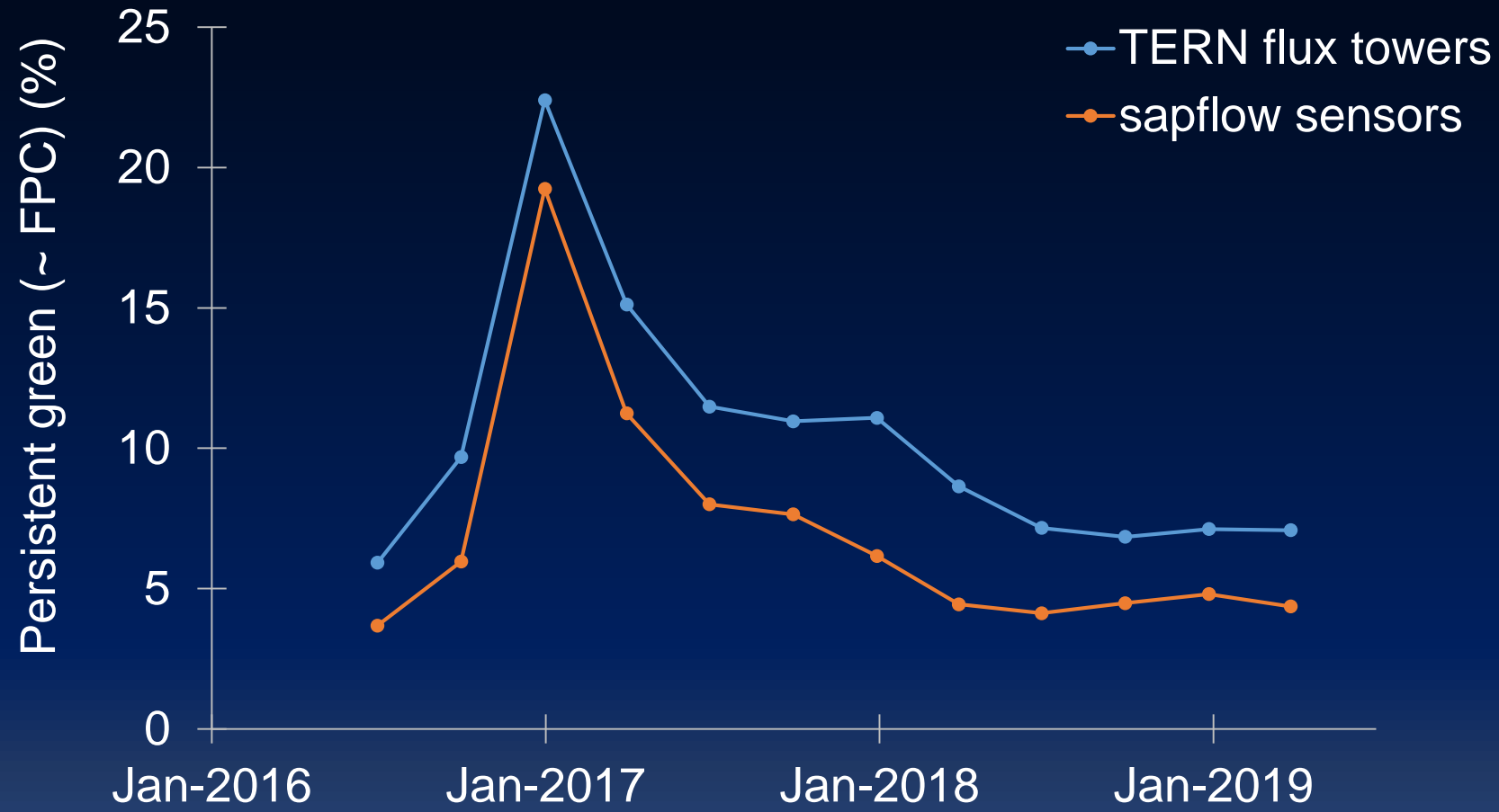
Fractional cover is biophysical - it's calibrated against ground observations. NDVI is a ratio which means that it will not scale. Both used as a measure of greenness.

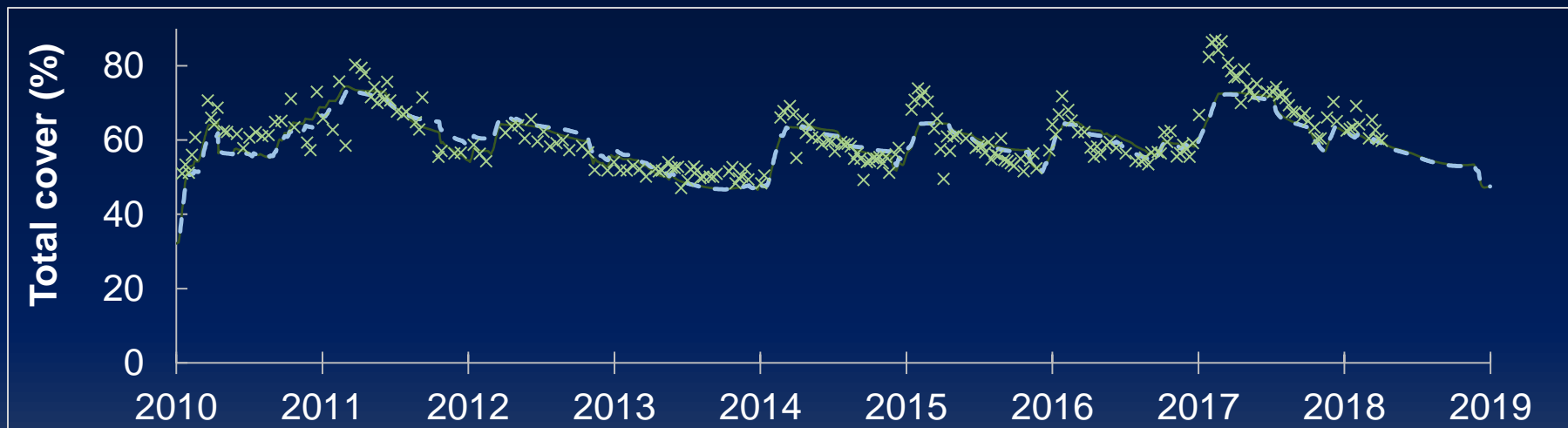
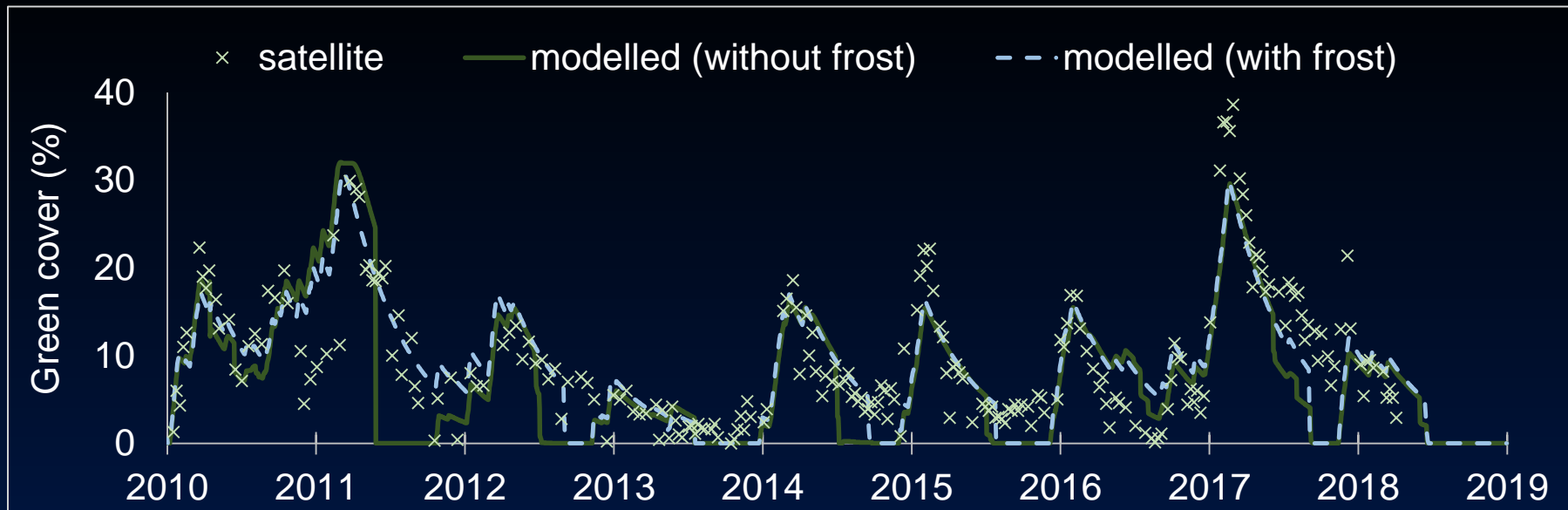
Cross check against field measurements:

- Field measurements of ground cover and FPC made by TERN AusPlots
- provides a check on remotely sensed estimates (v. impo ☆)

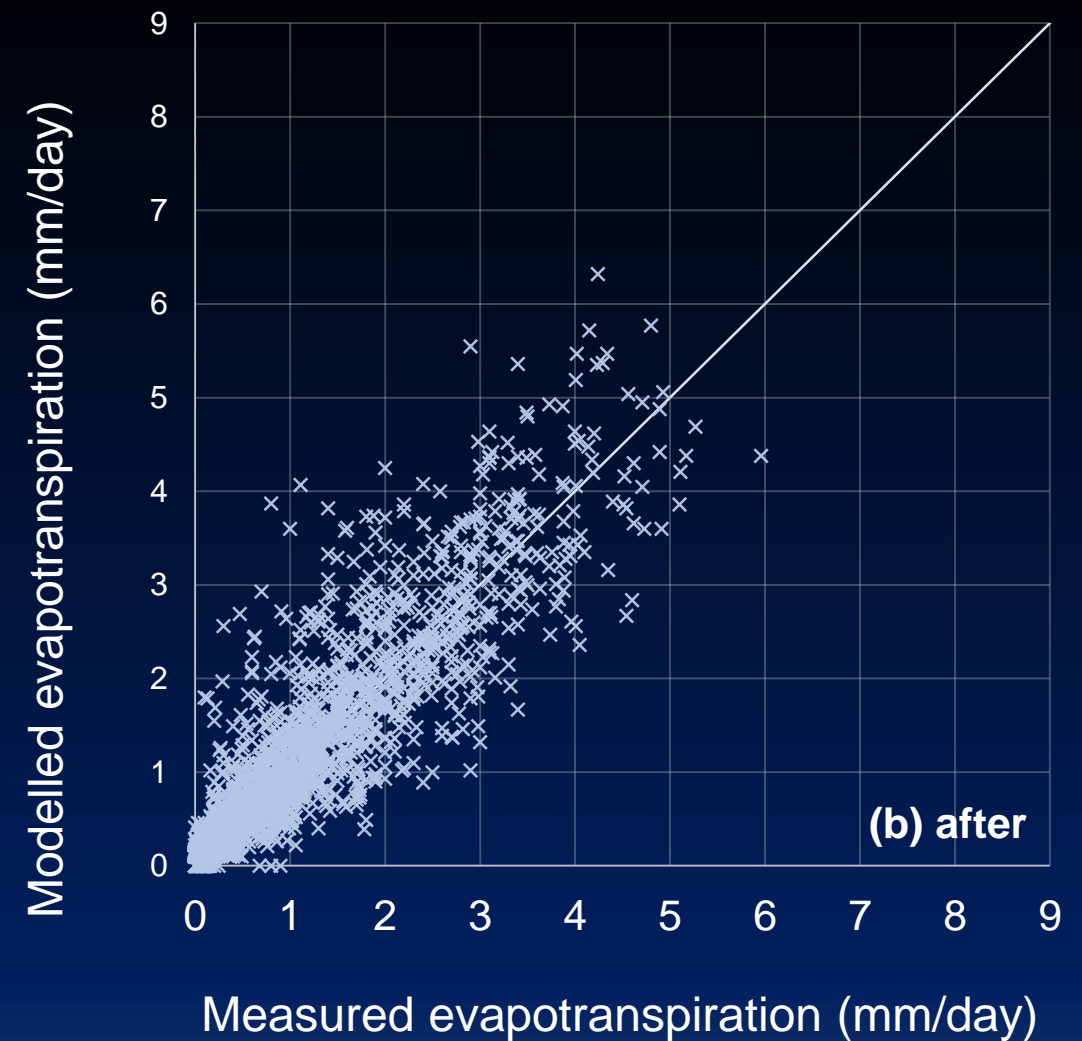
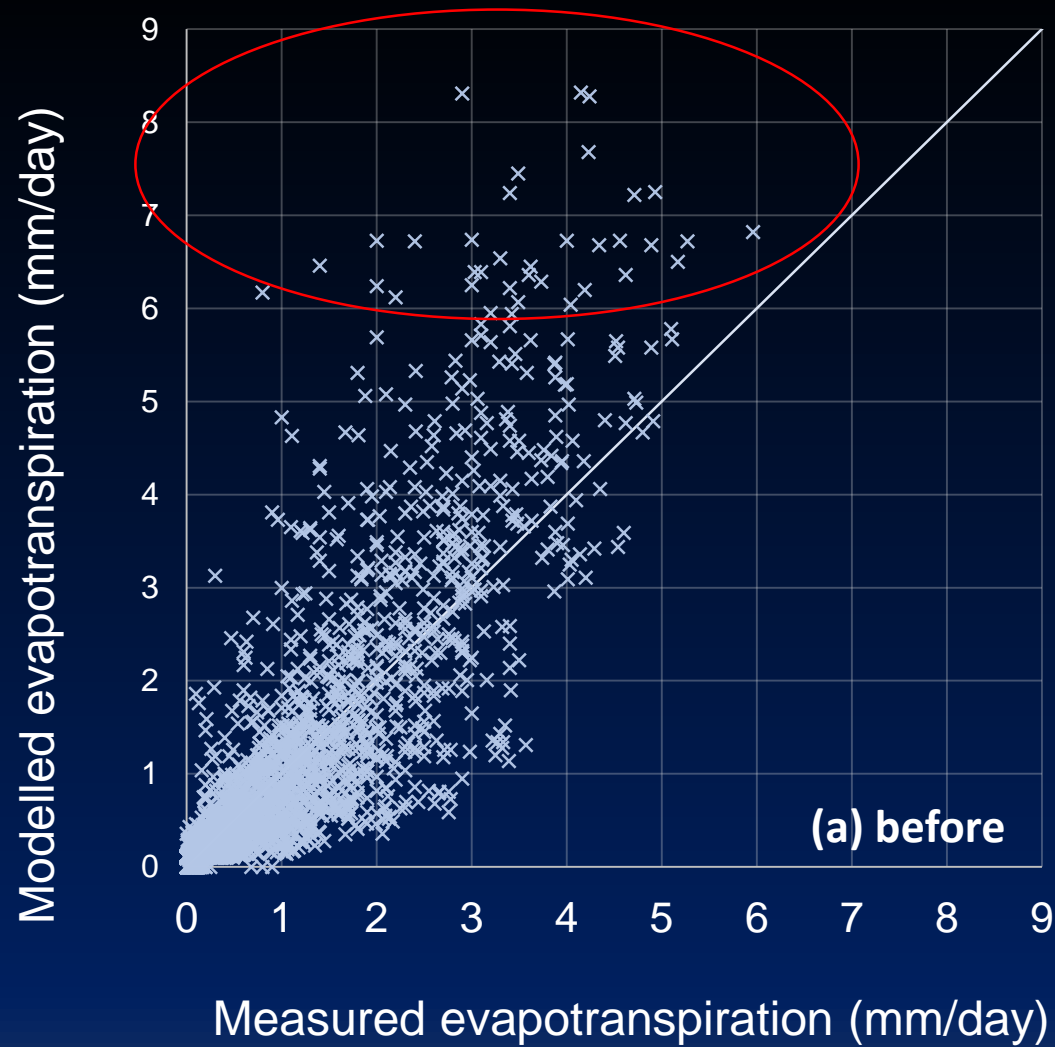


Foliage Projected Cover (FPC) from Sentinel-2 imagery





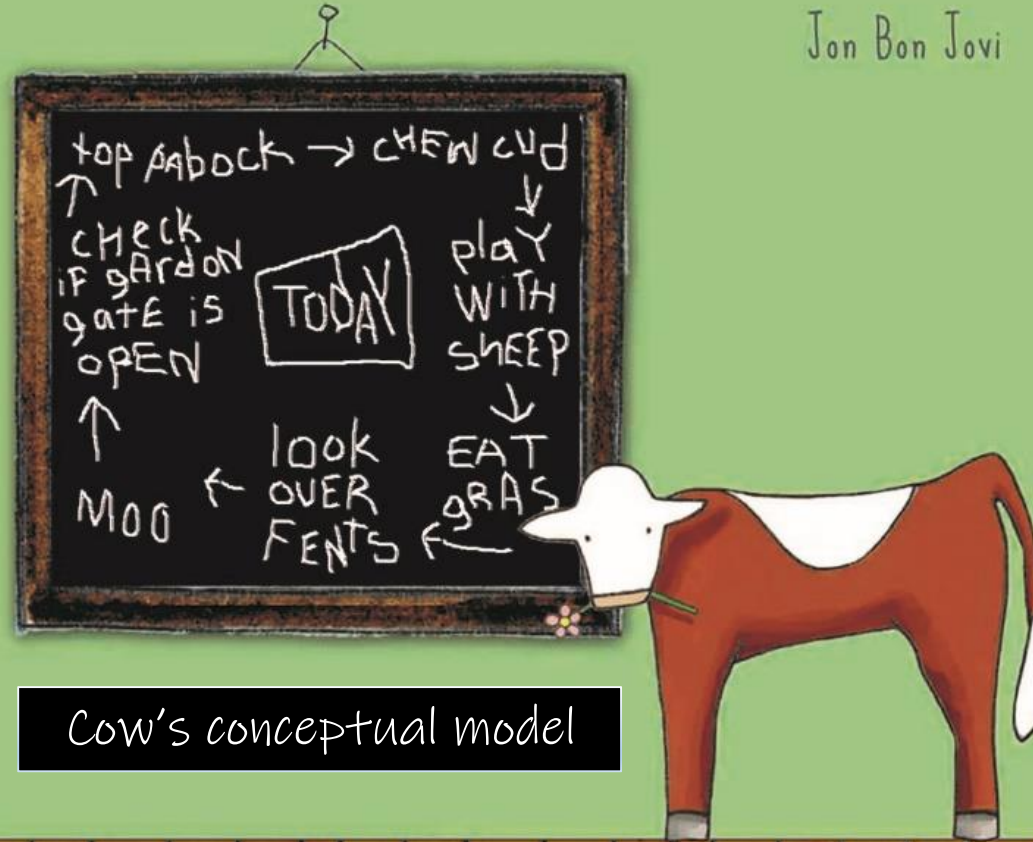
Green and total understorey cover after model improvements and optimisation compared to Landsat fractional cover at the Alice Mulga site.



Daily evapotranspiration before and after model improvements and optimisation compared to Alice Mulga flux tower data

Map out your future, but do it in pencil

Jon Bon Jovi



Cow's conceptual model

Red Tractor Designs

Thank you for listening.

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