

Understanding Australia's Changing Ecosystems

Linking Long Term Satellite Image and Field Survey Archives

Project Outline

Aim: To build and pilot test a capability to separate natural and human induced environmental changes, and to assess the impacts of environmental management activities: by linking long term (up to 40 years) of regularly (monthly) collected satellite image data sets and concurrent ecosystem field survey data for vegetation, to measure, map and understand how Australian ecosystems, specifically their vegetation, have changed, and are continuing to change.

Objective 1: Time series analysis – of linked image and field data sets to map changes in vegetation properties and separate natural and human induced changes

Personnel:

Phinn and Scarth [UQ]
Held [TERN, CSIRO]
Google Earth Engine team

Data Sets:

- Landsat archive base
- Landsat fractional cover and persistent green Auscover products
- Processed annual field survey data (vegetation composition and cover) from TERN long term survey plots (desert, temperate woodlands, coastal), in Maps or Earth Engine matched to Landsat archive product scales

Software:

Earth Engine
Maps Engine
ENVI/IDL
QGIS

Activities:

- For each long term survey site identify the time series analysis information required to characterise natural variability at various time scales (annual, seasonal, monthly) for separation from natural disturbances and human activities.
- Determine how to integrate annually sampled field data into the time series analysis to validate and constrain results.
- Develop and implement code for time series analysis of integrated image and long term field survey data for desert, forest and coastal forest sites.
- Develop and implement summary spatial and temporal output plots for Earth or Maps Engine display

Objective 2: Linking image and field data sets to accurately map vegetation composition and structural properties .

Personnel:

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Google Earth Engine,
Maps Engine and ODK teams

Data Sets:

- Landsat fractional cover and persistent green Auscover products
- Annual field survey data (vegetation composition and cover) from TERN long term survey plots (desert, temperate woodlands, coastal), in initial format as supplied from TERN and LTERN portals

Software:

Earth Engine
Maps Engine
ODK – field apps
ENVI/IDL
QGIS

Activities:

- Assess and modify ODK tools to match up with LTERN site data
- Establish methods to link Auscover and LTERN vegetation survey data to scale of Landsat TM archive products
- Produce linked vegetation survey and extracted Landsat vegetation cover data sets
- ODK toolkit for long term field survey data collection and integration with Landsat vegetation products to input and produce summary output plots for individual sites.

Outputs:

Obj (1) time series analysis tools applicable to long term, and temporally dense satellite image archives; and Obj (2) an operational method to derive linked image/field data sets, for improved and validated satellite image biophysical maps of Australian vegetation composition, structure and condition variables.
Peer reviewed papers and available as fully documented code with instructions for use on publically accessible environmental data portals,