

Cal Val activities for Albedo Products (e.g.)

MODIS V006 (reprocessing underway) Lead Schaaf

VIIRS (albedo codes delivered and being tested) Lead Schaaf

Scope CM (LAGS – Land albedo from Geostationary Satellites)
(Meteosat, GMS, GOES) Lead Alessio Lattanzio

Scope CM (Multiplatform Surface Albedo demonstrator from polar orbiting satellites) (AVHRR and MODIS) Leads Terhikki Manninen and Aku Riihelä. Note recent AVHRR paper by Sütterlin et al. 2015

Landsat8 (Landsat8 with MODIS BRDFs) Lead Schaaf

Note recent adaptation of code for Sentinel 2A

Globalbedo (MERIS, MODIS BRDFs) Lead J.-P. Muller

MISR albedo quantities Lead Diner

CERES surface upwelling shortwave Kato et al., 2013
and others...

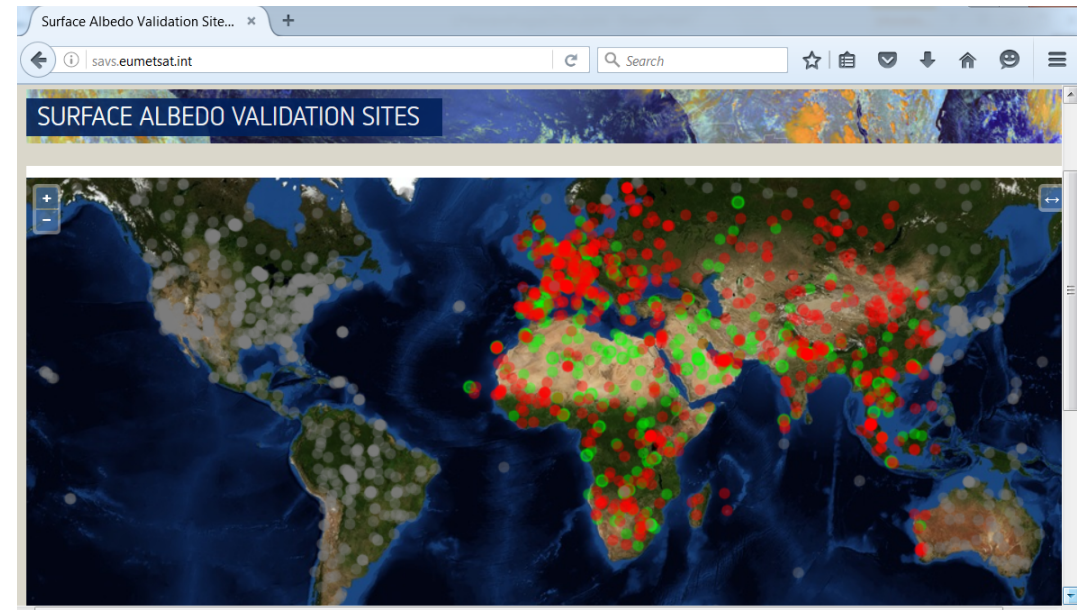
Cal Val activities for Albedo Products

Spatial representativeness(Román et al. 2011; 2013)

Baseline Surface Radiation Network (US-SURFRAD)

Fluxnet (Cescatti et al., 2012)

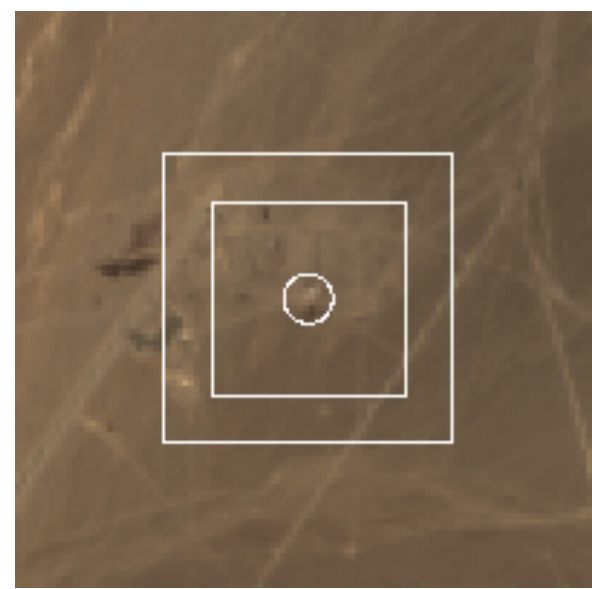
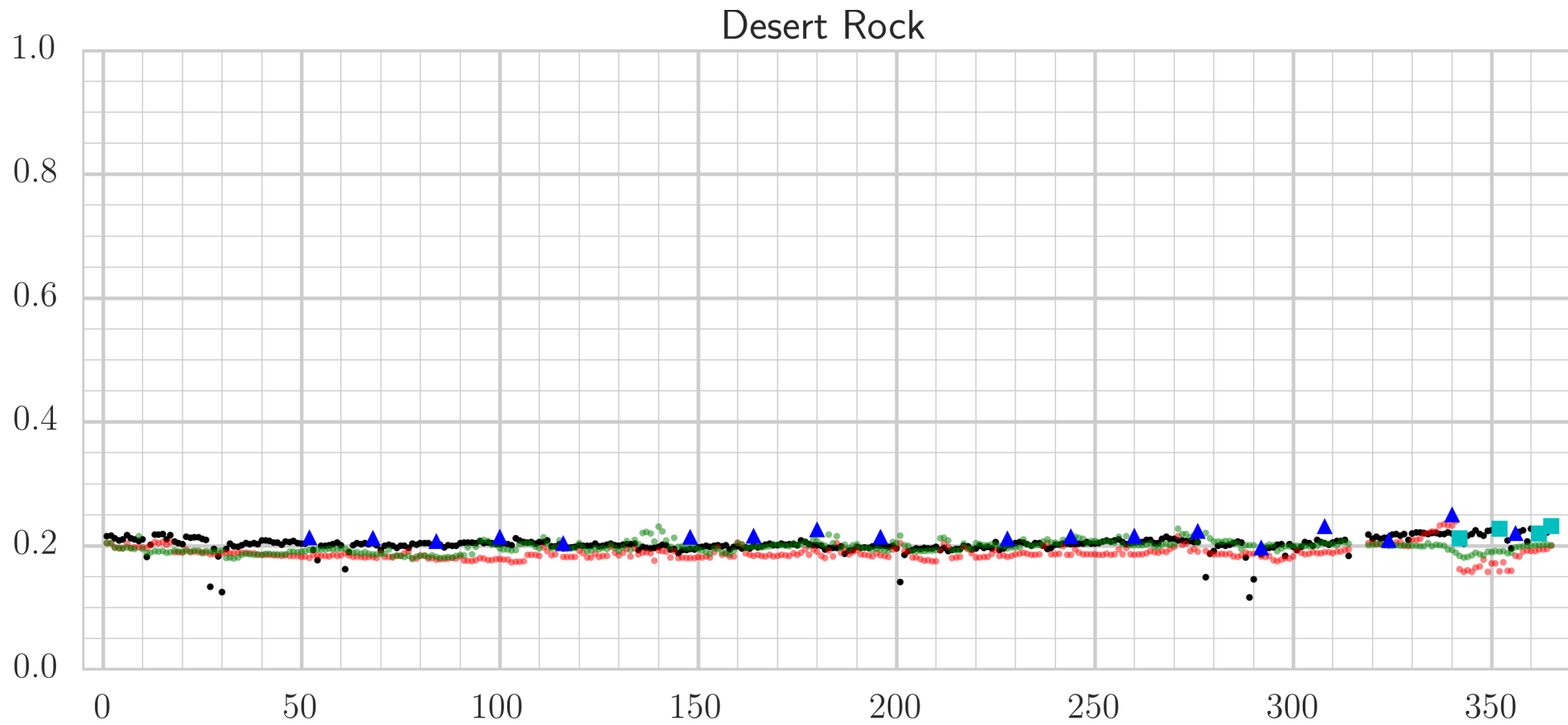
Surface Albedo Validation Sites (SAVS) <http://savs.eumetsat.int/>
(Loew et al., 2016)



NEON (20 sites) Change in management

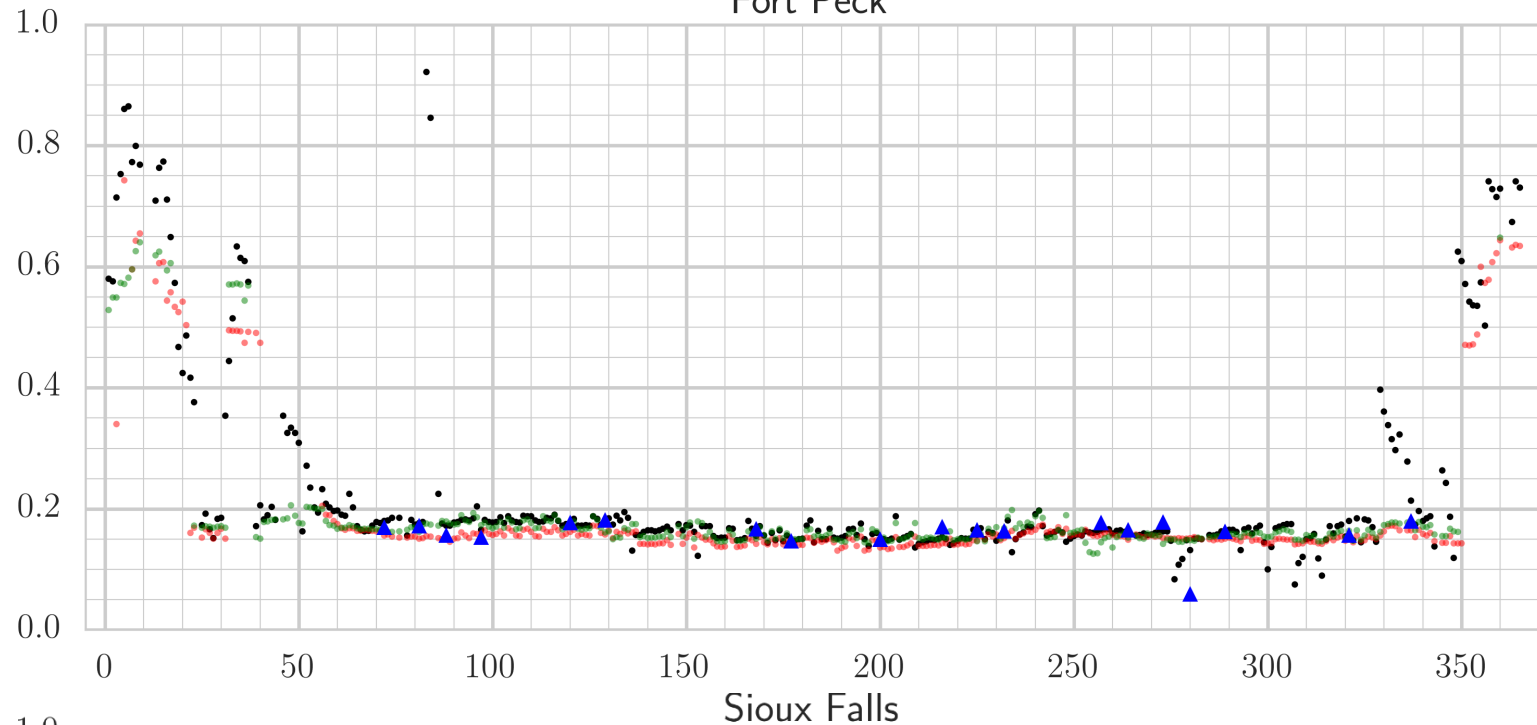
Battelle selected in March, took over NEON in April

Cal Val activities for Albedo

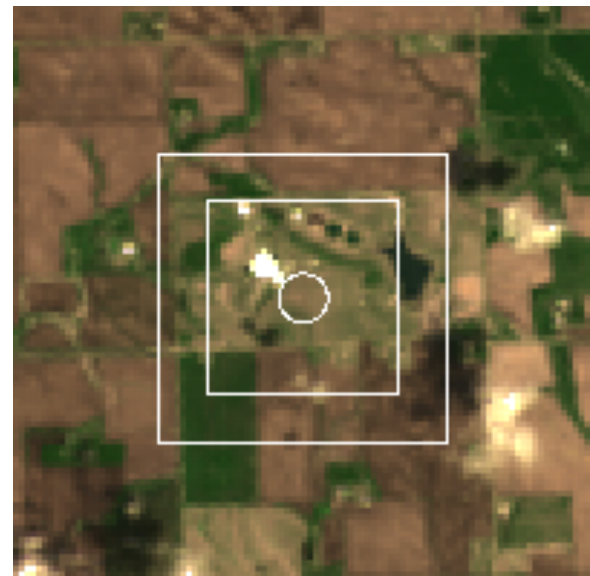
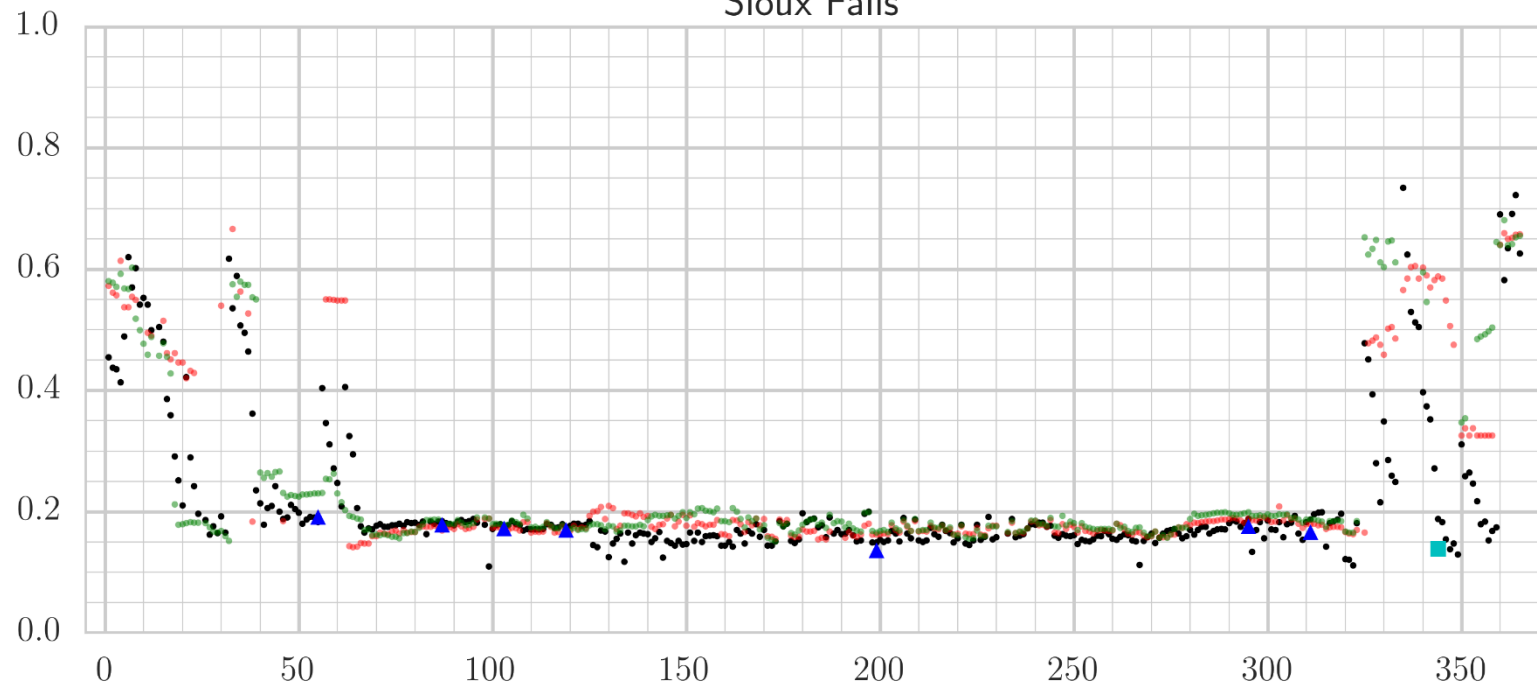


- In Situ
- MODIS
- VIIRS
- ▲ OLI
- MSI

Fort Peck



Sioux Falls



Cal Val activities for Biomass

GEDI and BIOMASS are combining efforts for evaluation (and NISAR NASA-ISRO Synthetic Aperture Radar)

ALS efforts Asner et al., NEON, G-LiHT, LVIS (forest and cryosphere), EcoSar (Pband), Forest Services

TLS QSM (Raumonen et al., 2013) Object (tree) reconstruction
Destructive sampling in Australia (and QSM) Calders et al. 2014

Highly Capability TLS (e.g. Riegl) vs allometric measures

Gabon, Wytham Woods, Brazil, Peru, Switzerland etc.

Wageningen, UCL, Zurich, UQueensland, etc.

Highly Practical TLS (e.g. CBL, Zebedee)

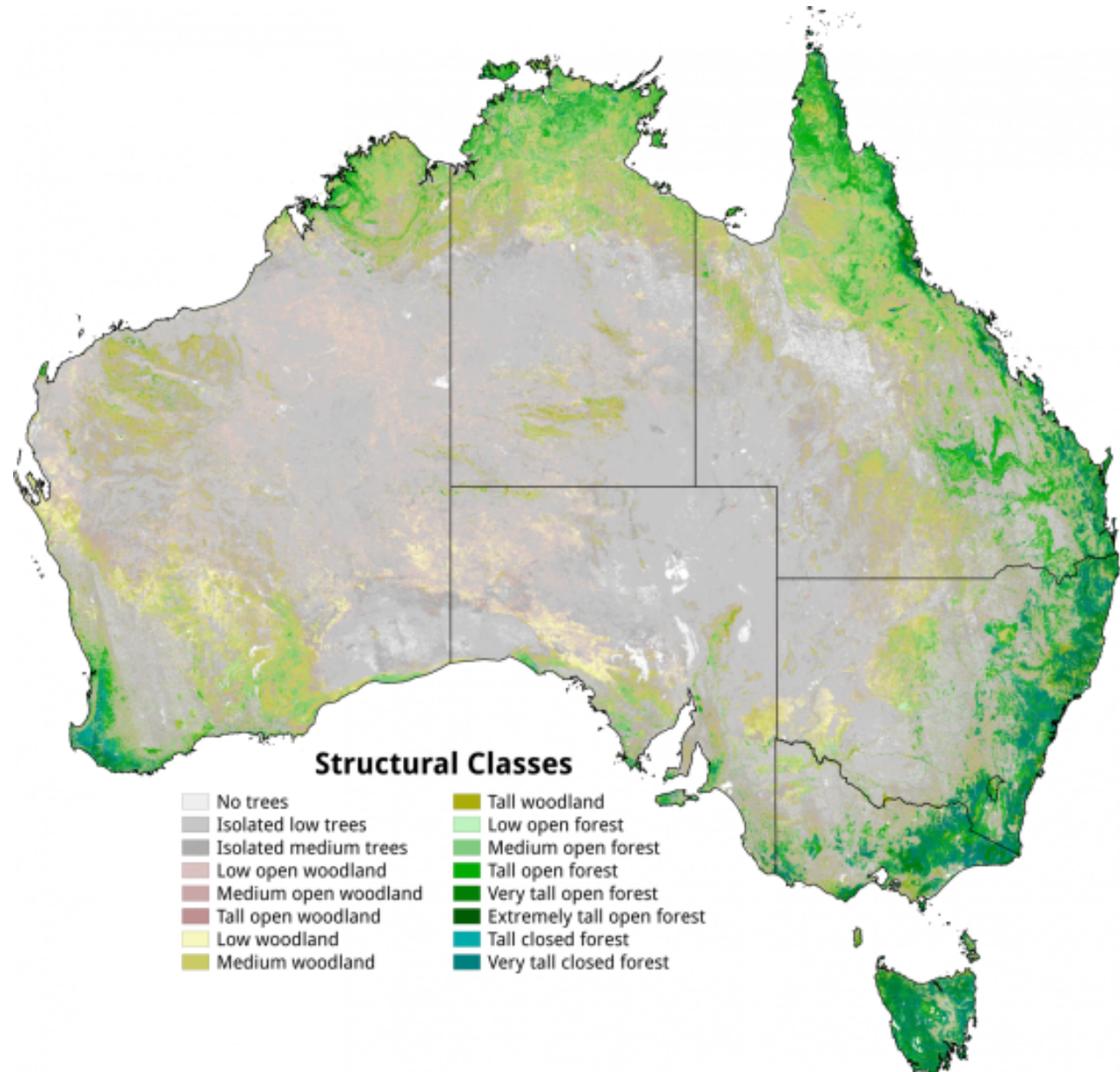
UMassBoston, RIT, UQueensland, CSIRO, SDSU

Multispectral instruments DWEL, SALCA, Kaasalainen (BU, USalford, FGI)

TLSiig (instrument inter-comparison Brisbane 2013) <http://tlsiig.bu.edu/> A. Strahler

RCN (instrument inter-comparison Harvard Forest 2017) <http://tlsrcn.bu.edu/>

Tern Vegetation height and structure - derived from ALOS-1 PALSAR, Landsat and ICESat/GLAS, Australia coverage



TERN Biomass Plot Library - National collation of tree and shrub inventory data, allometric model predictions of above and below-ground biomass, Australia (DWEL, Riegl, CBL, Zebedee)

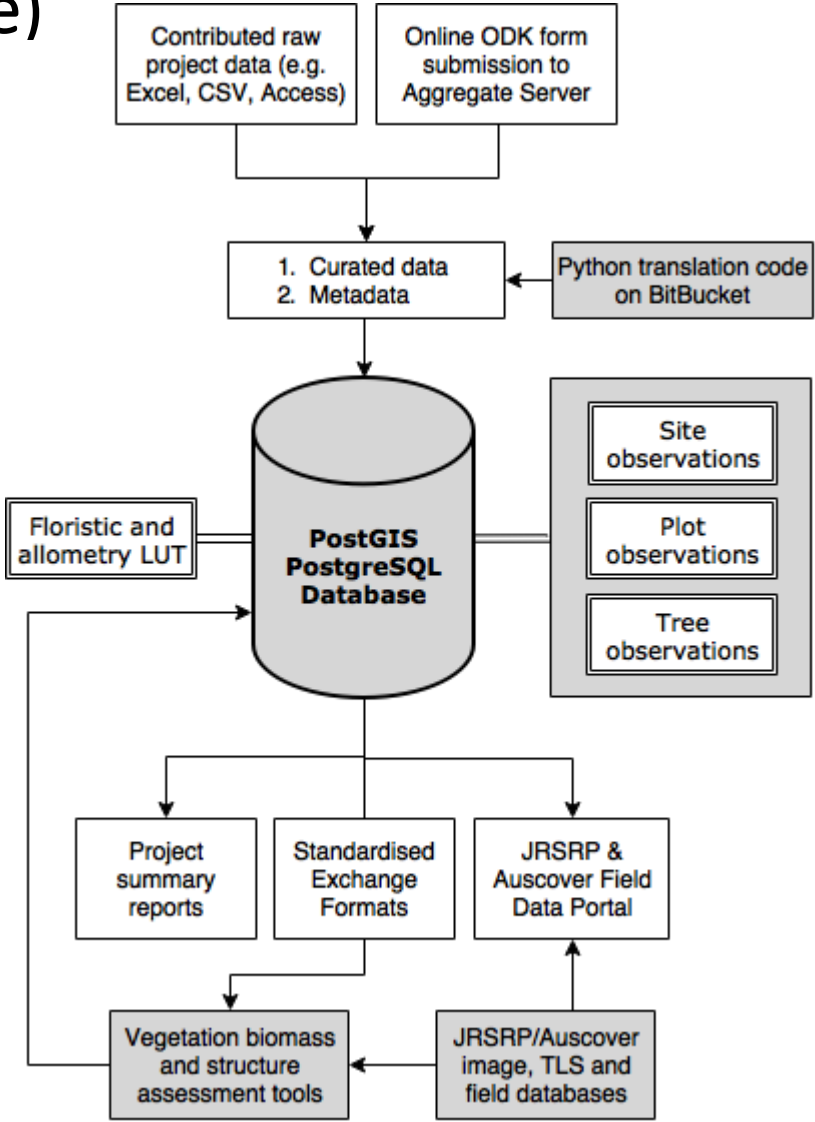
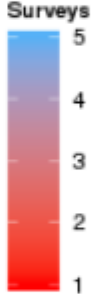
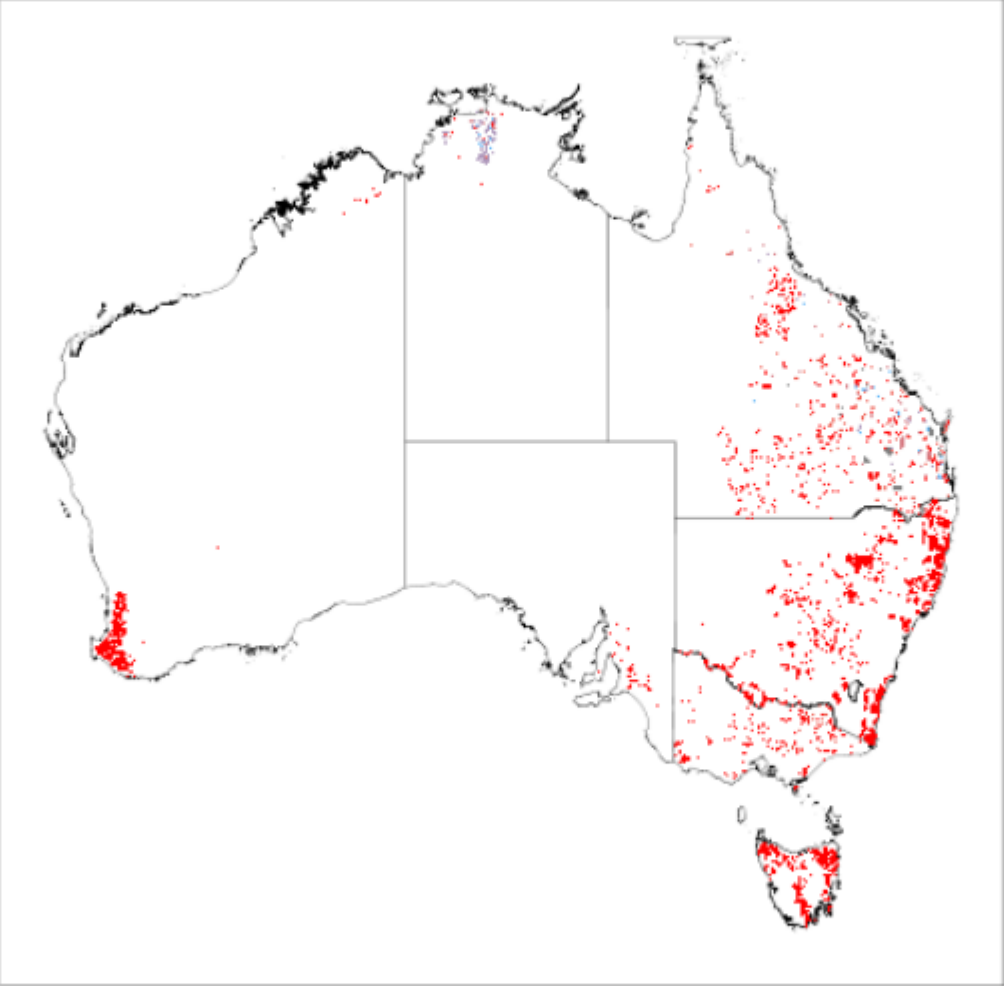
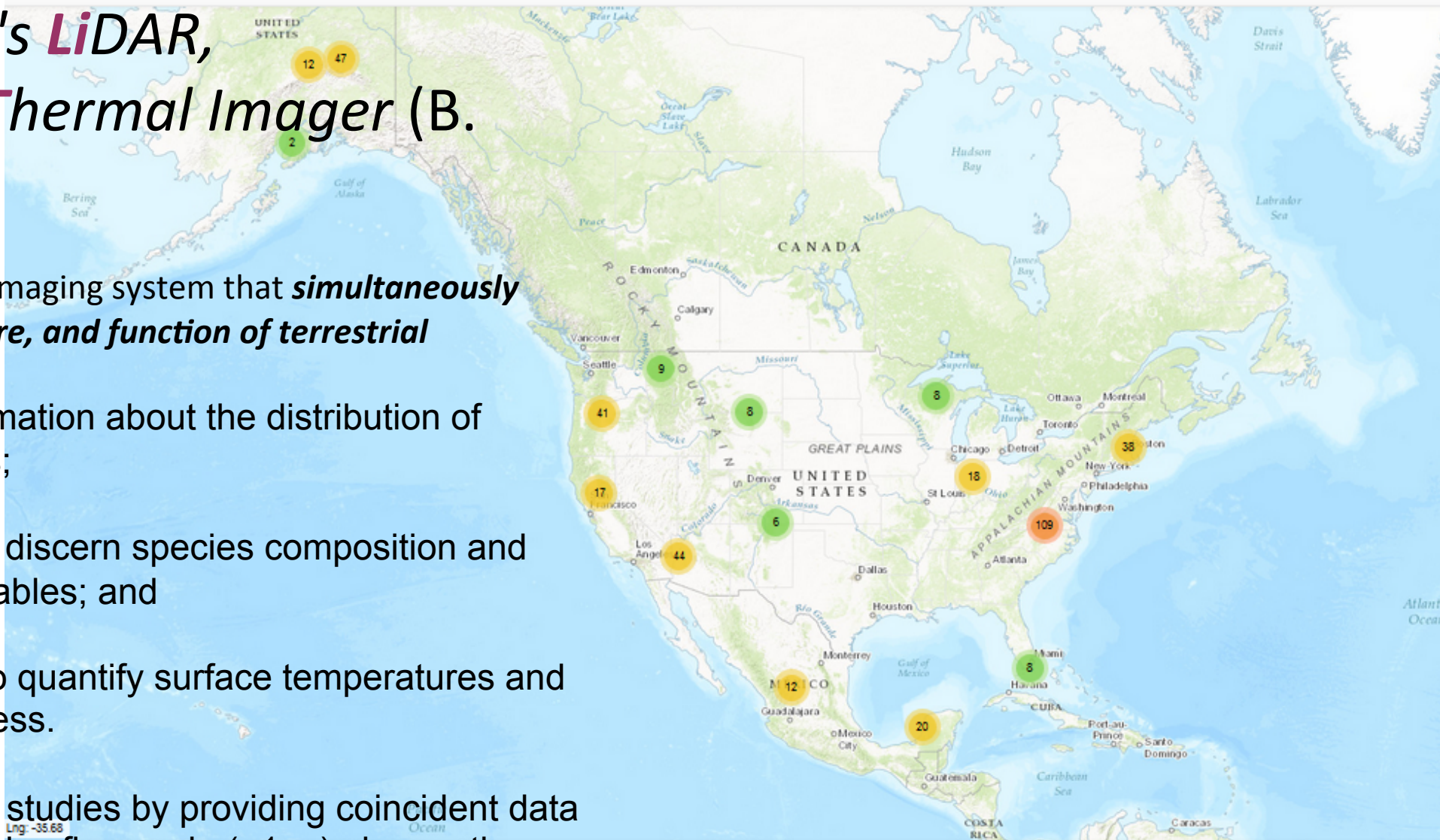


Figure 1: Location of stem inventory sites across Australia with allometric estimates of biomass



G-LiHT: Goddard's **LiDAR**, **Hyperspectral** & **Thermal Imager** (B. Cook)

G-LiHT is a portable, airborne imaging system that **simultaneously maps the composition, structure, and function of terrestrial ecosystems** using:

1. LiDAR to provide 3D information about the distribution of foliage and canopy elements;

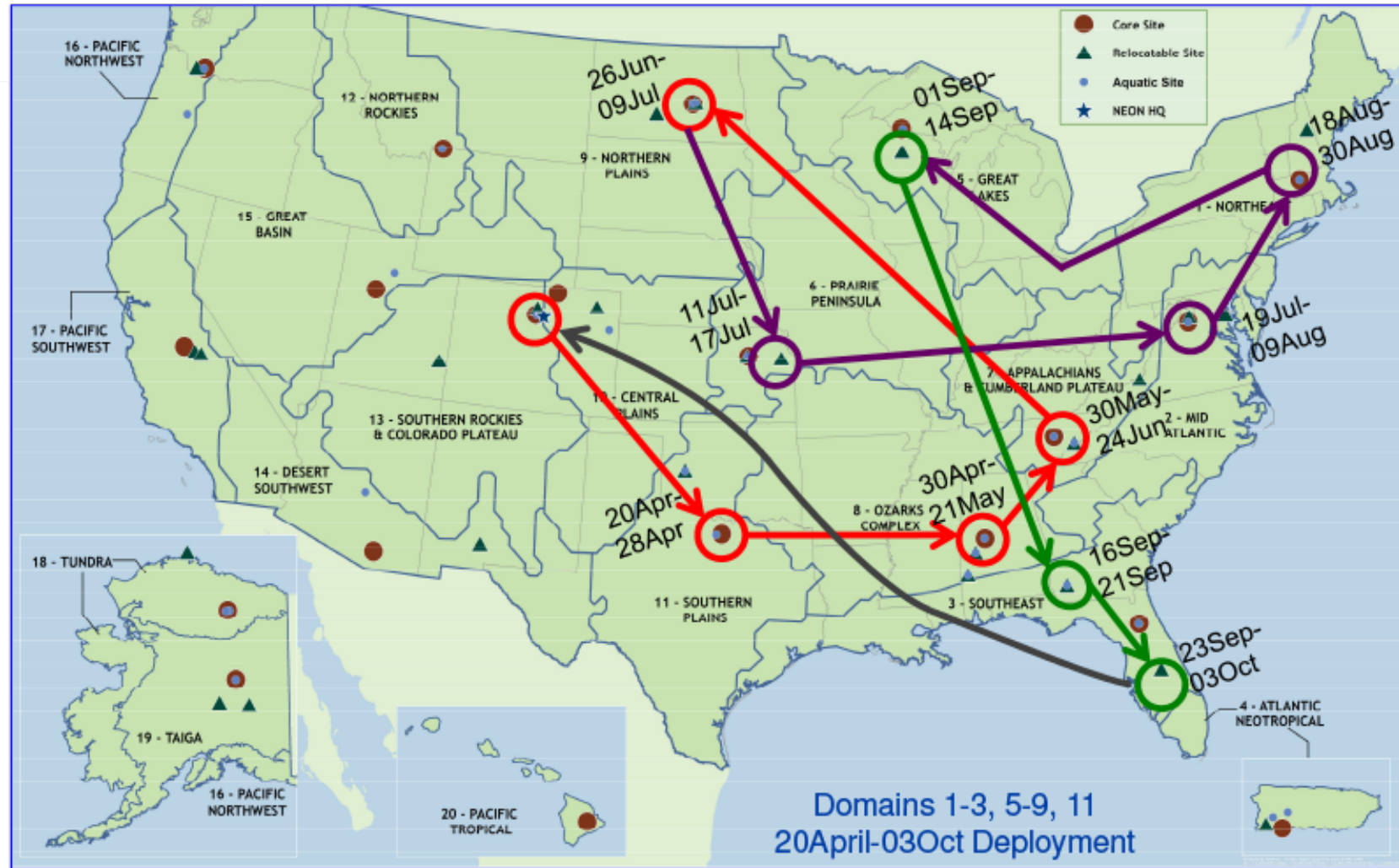
2. imaging spectroscopy to discern species composition and variations in biophysical variables; and

3. thermal measurements to quantify surface temperatures and detect heat and moisture stress.

G-LiHT enables **data fusion** studies by providing coincident data in time and space, and provides **fine-scale (<1 m)** observations

2016 NEON AOP Flight Campaign

Boulder -> Wichita Falls -> Birmingham -> Knoxville -> Bismarck -> Topeka -> Manassas -> Nashua -> Rhinelander -> Albany -> Kissimmee -> Boulder



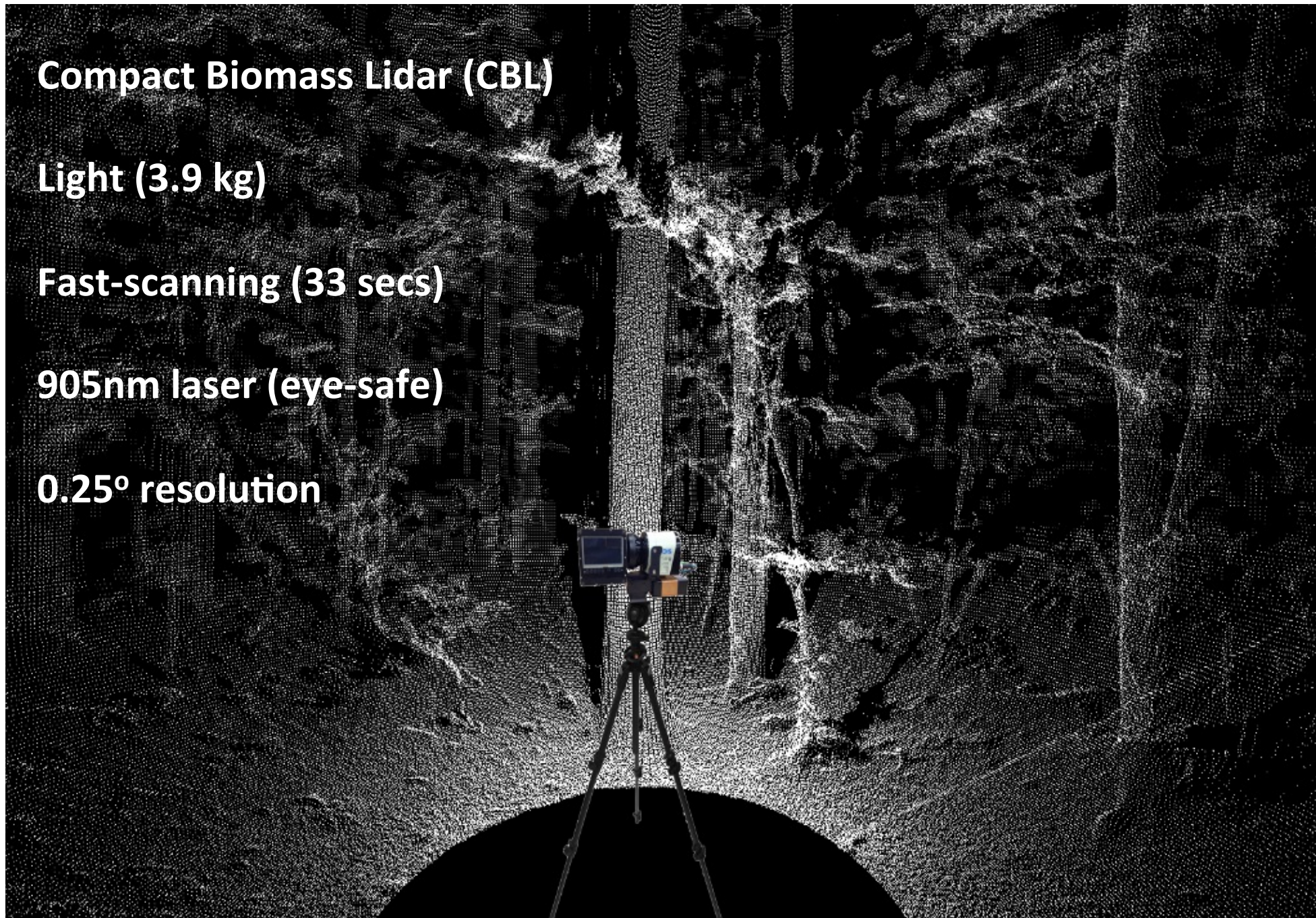
Compact Biomass Lidar (CBL)

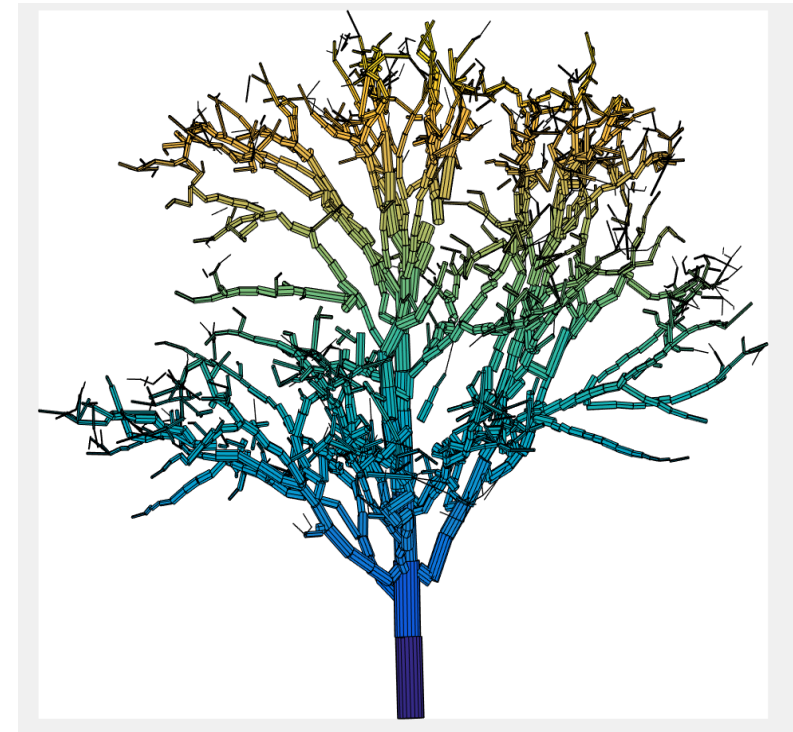
Light (3.9 kg)

Fast-scanning (33 secs)

905nm laser (eye-safe)

0.25° resolution





Quantitative Structure Model - QSM (Raumonen et al. 2013).

Saltmarsh Dynamism: Tidal State



Horizontal cross-section of 3D creeks