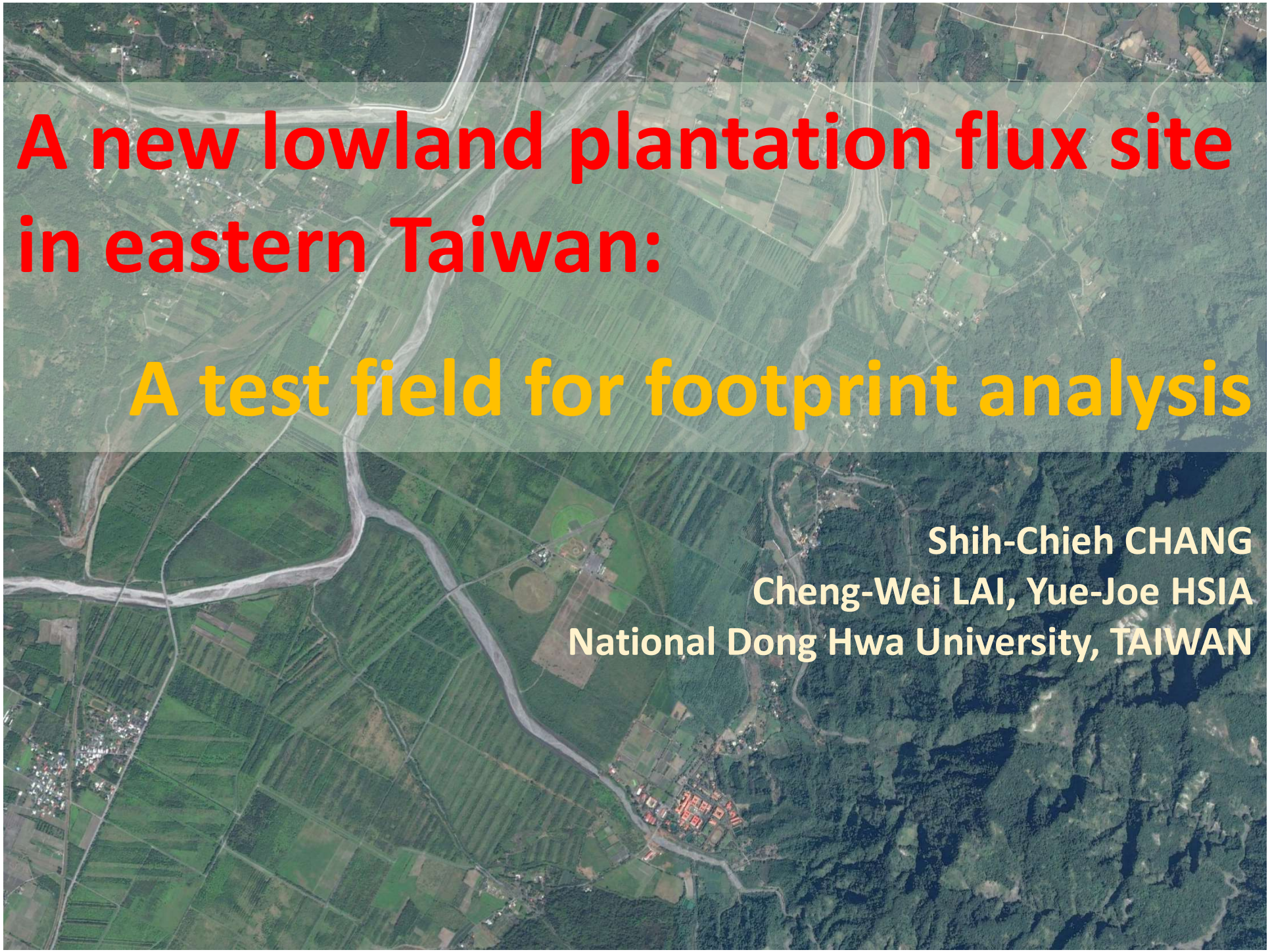

A new lowland plantation flux site in eastern Taiwan:

A test field for footprint analysis

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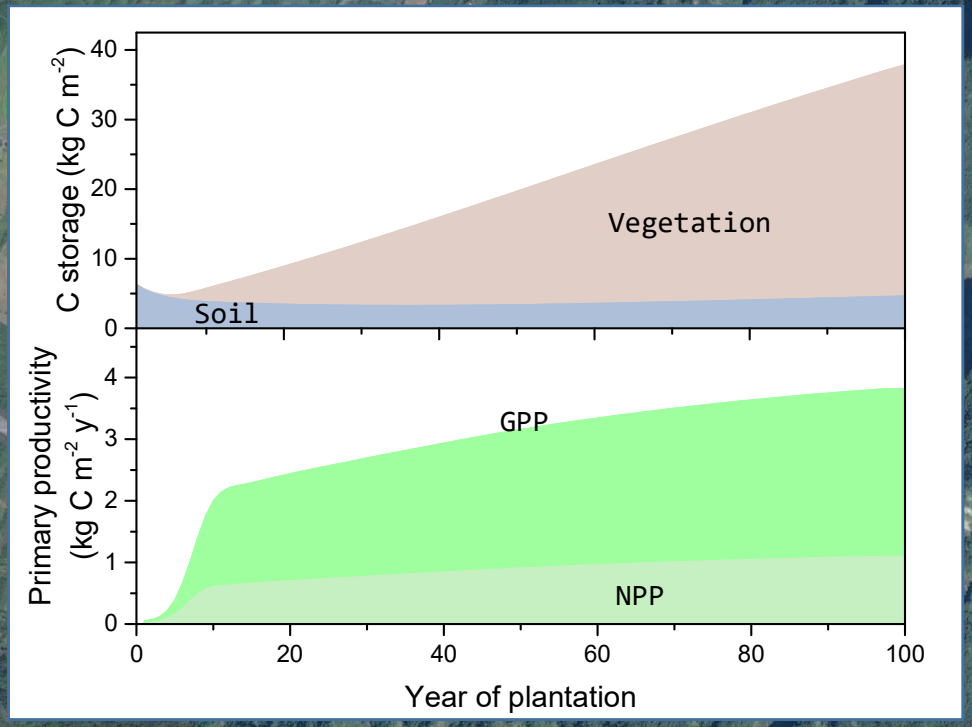
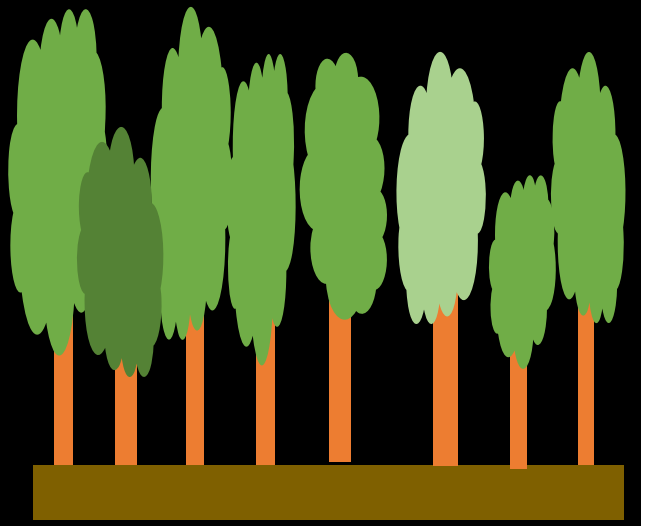
Cheng-Wei LAI, Yue-Joe HSIA
National Dong Hwa University, TAIWAN

- How to interpret EC data in the mosaic plantation?
- Could EC data be used for verifying ecosystem models?



Land use history of the site



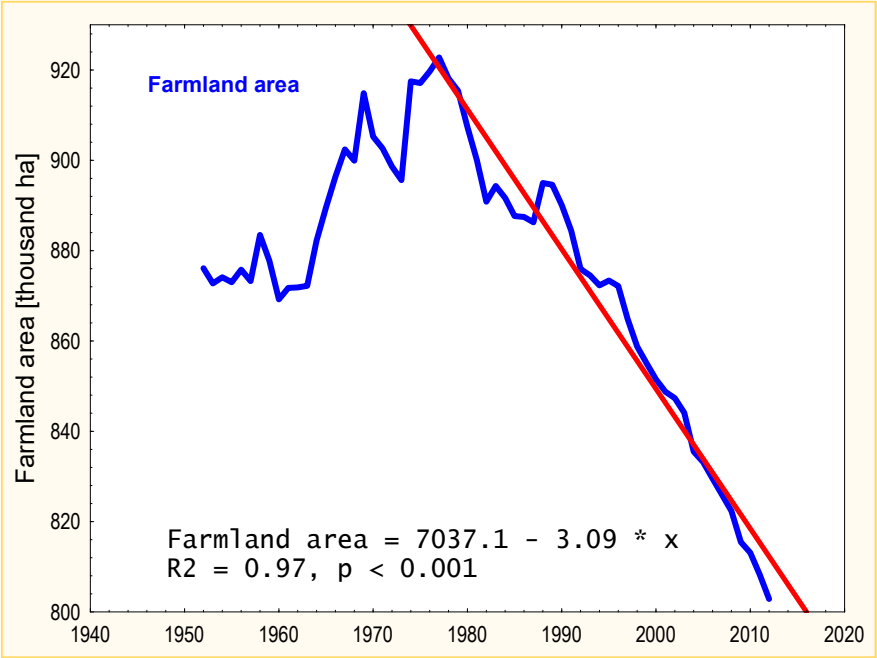
Natural forest

Sugarcane

Plantation

1921

2002



Since 1977, yearly lost of farmland accounts for **3.09 thousand ha**

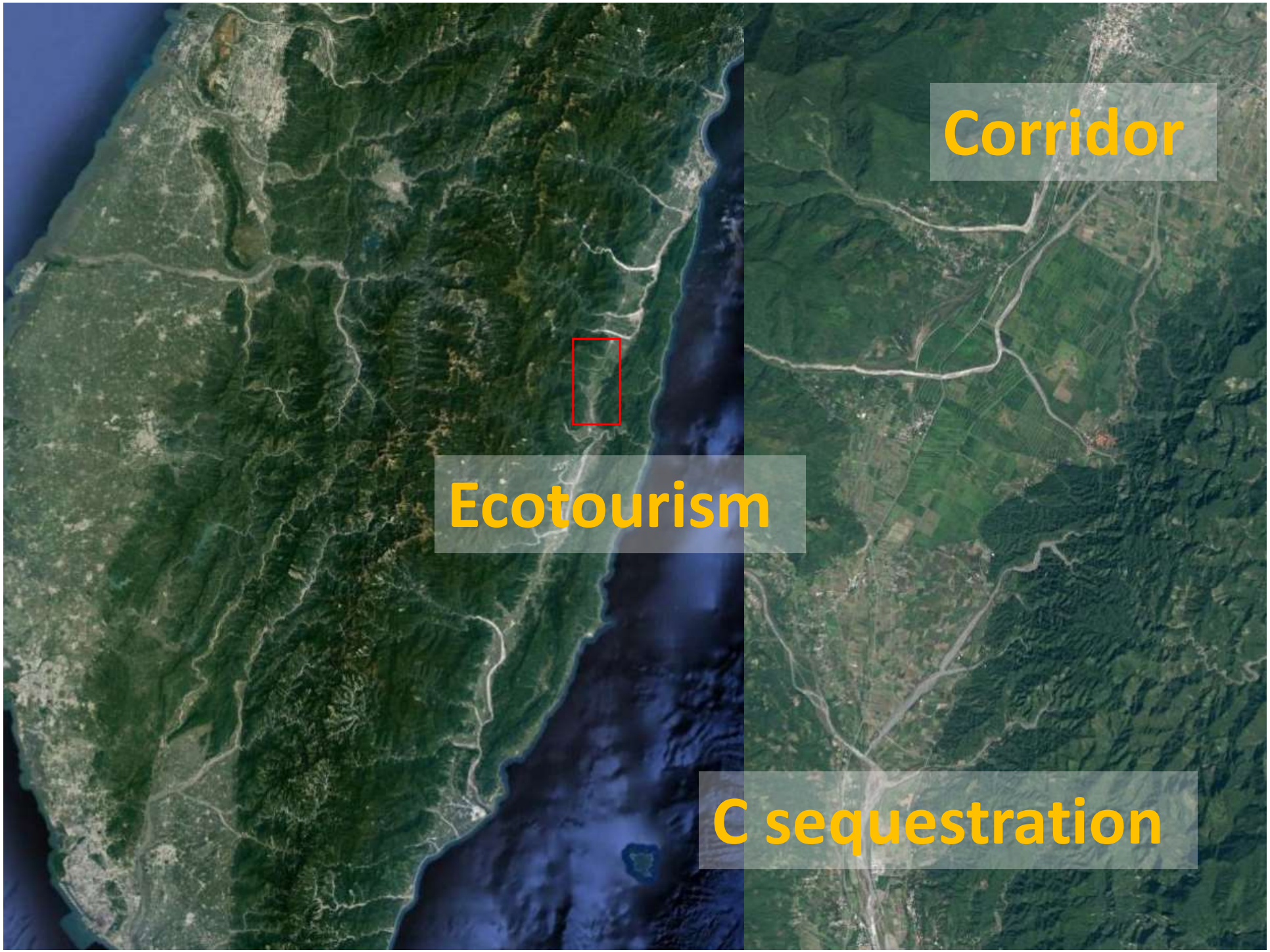
Plain Landscape Afforestation Program (PLAP):

- Government strategy to convert retired farmlands into forests, beginning in 2002
- 20-year-subsidy of NTD 1.6 Million ha^{-1}

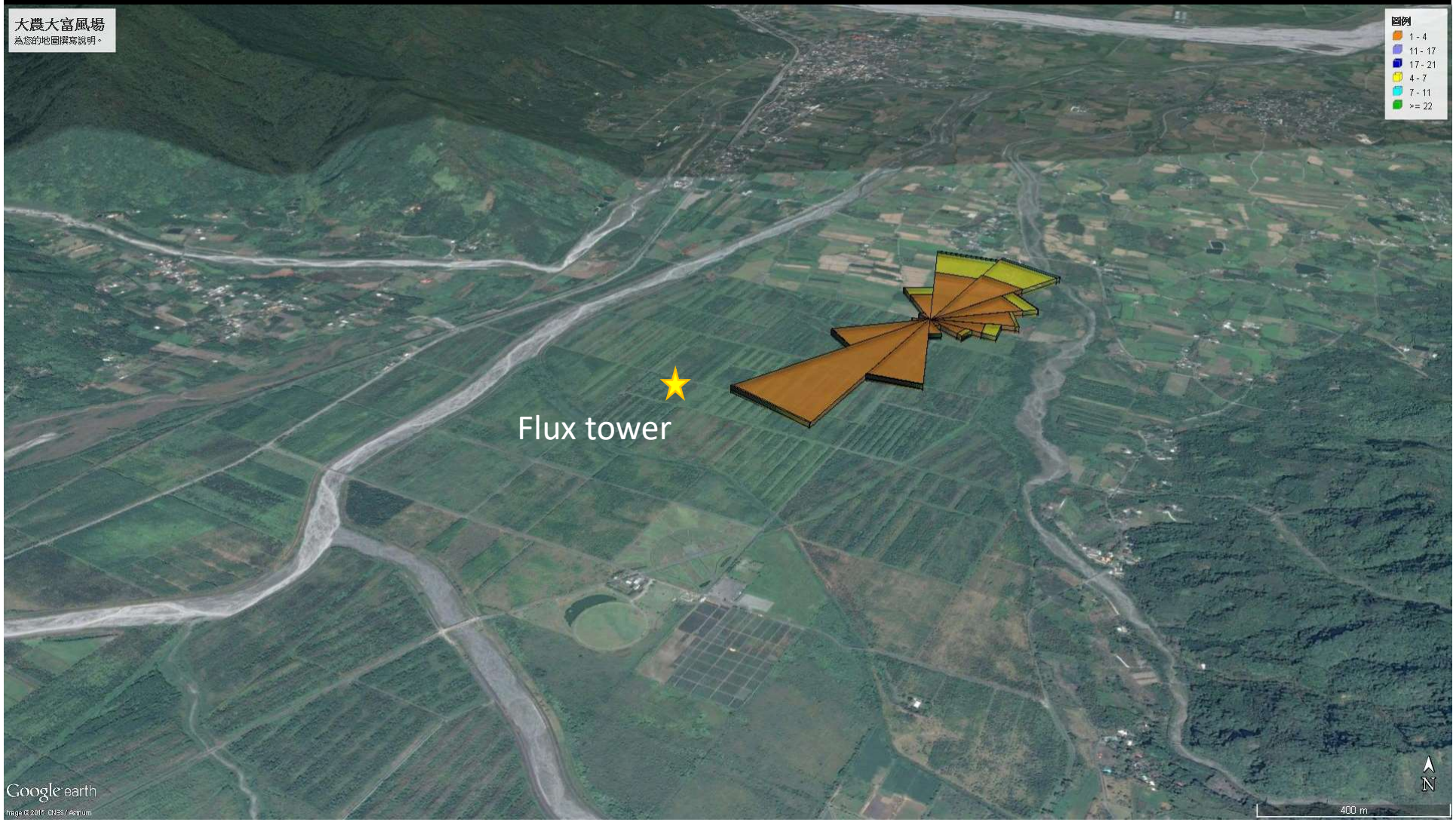
(Lo, 2005)

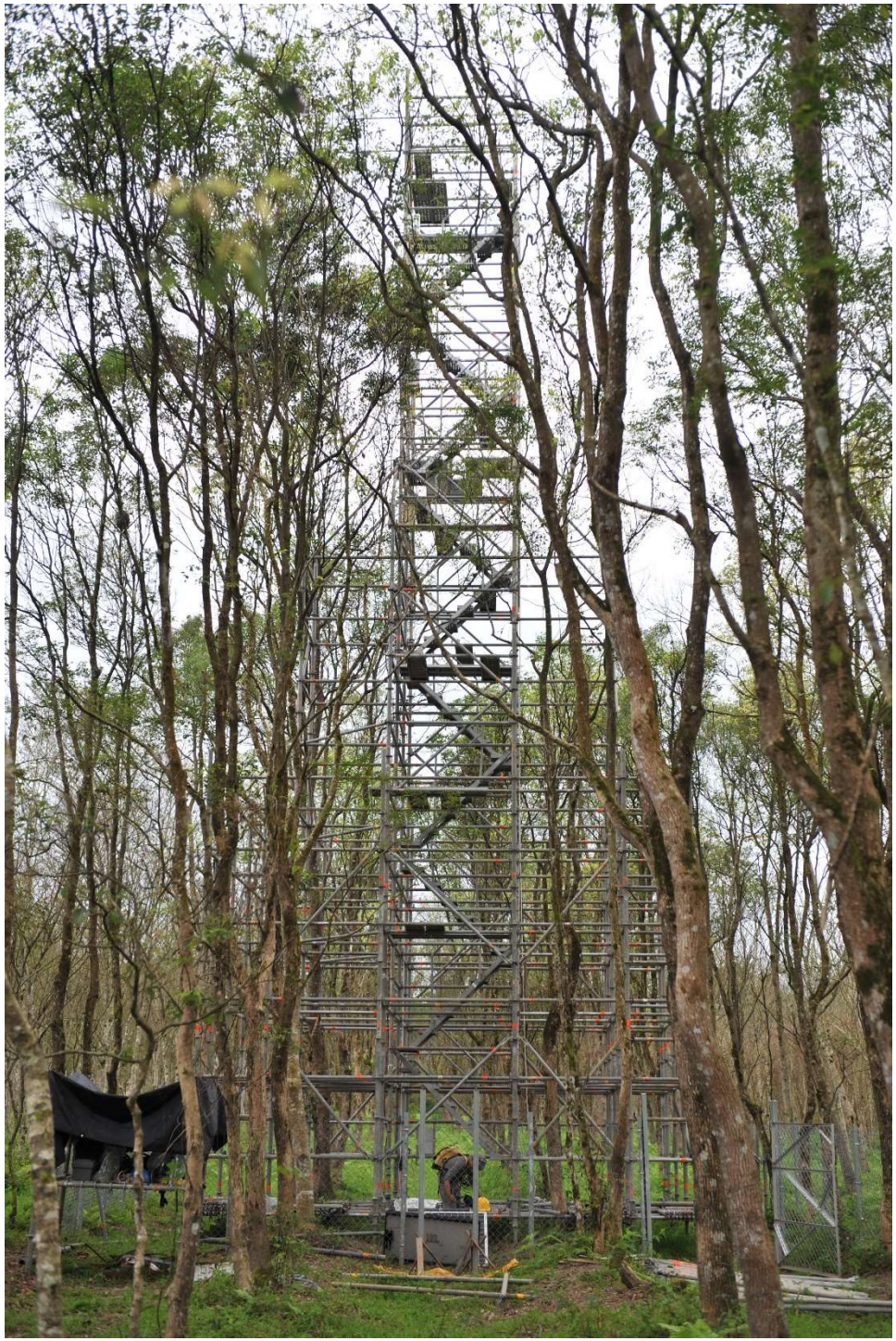
PLAP by Taiwan Sugar Corporation in Hualien:

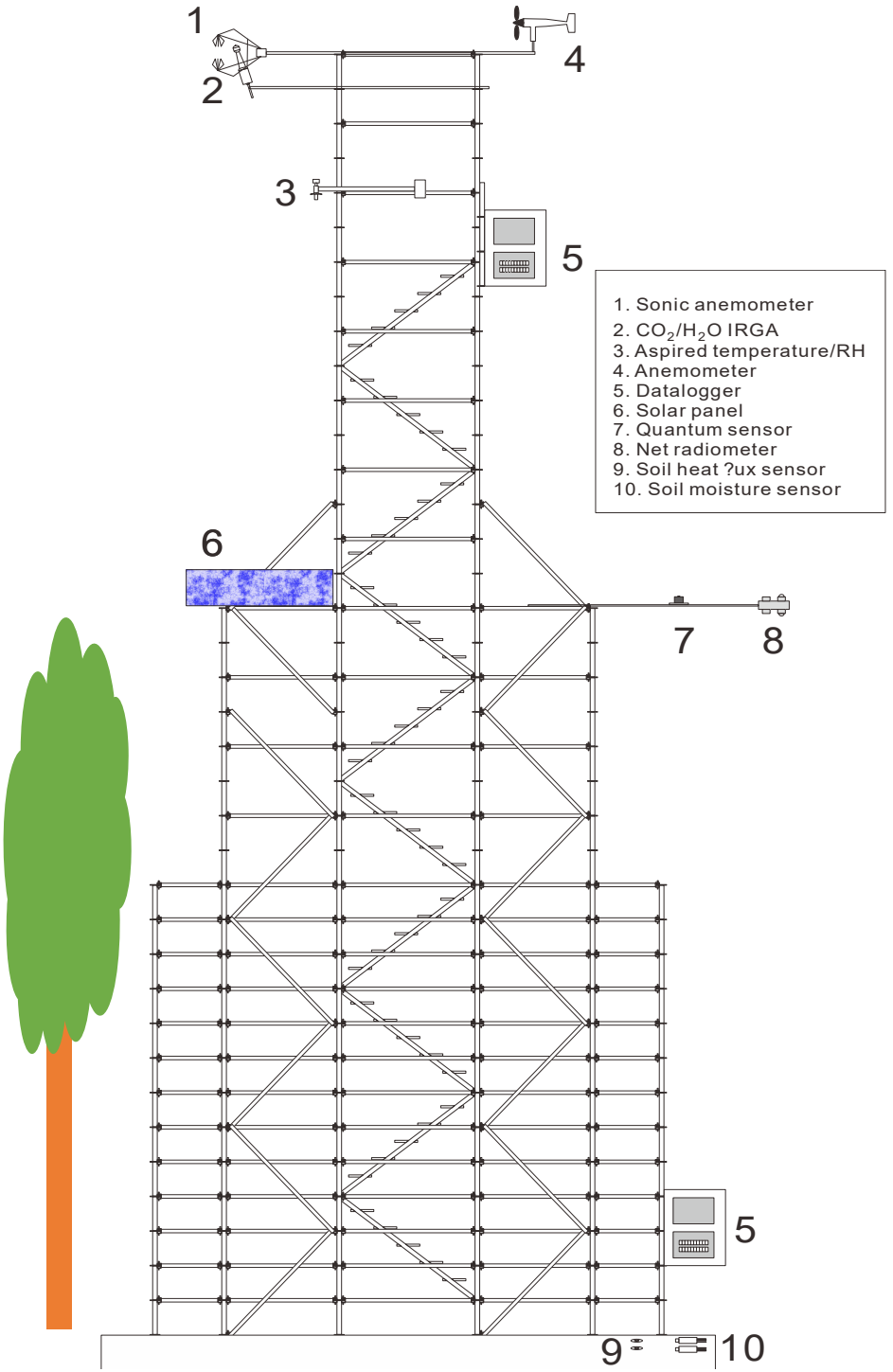
- 2,112 ha afforestation since 2002
- 30 broad-leaved endemic tree species
- Small stands of monoculture in size of 0.1 to 15 ha
- Stand density: 1,500 ha^{-1}

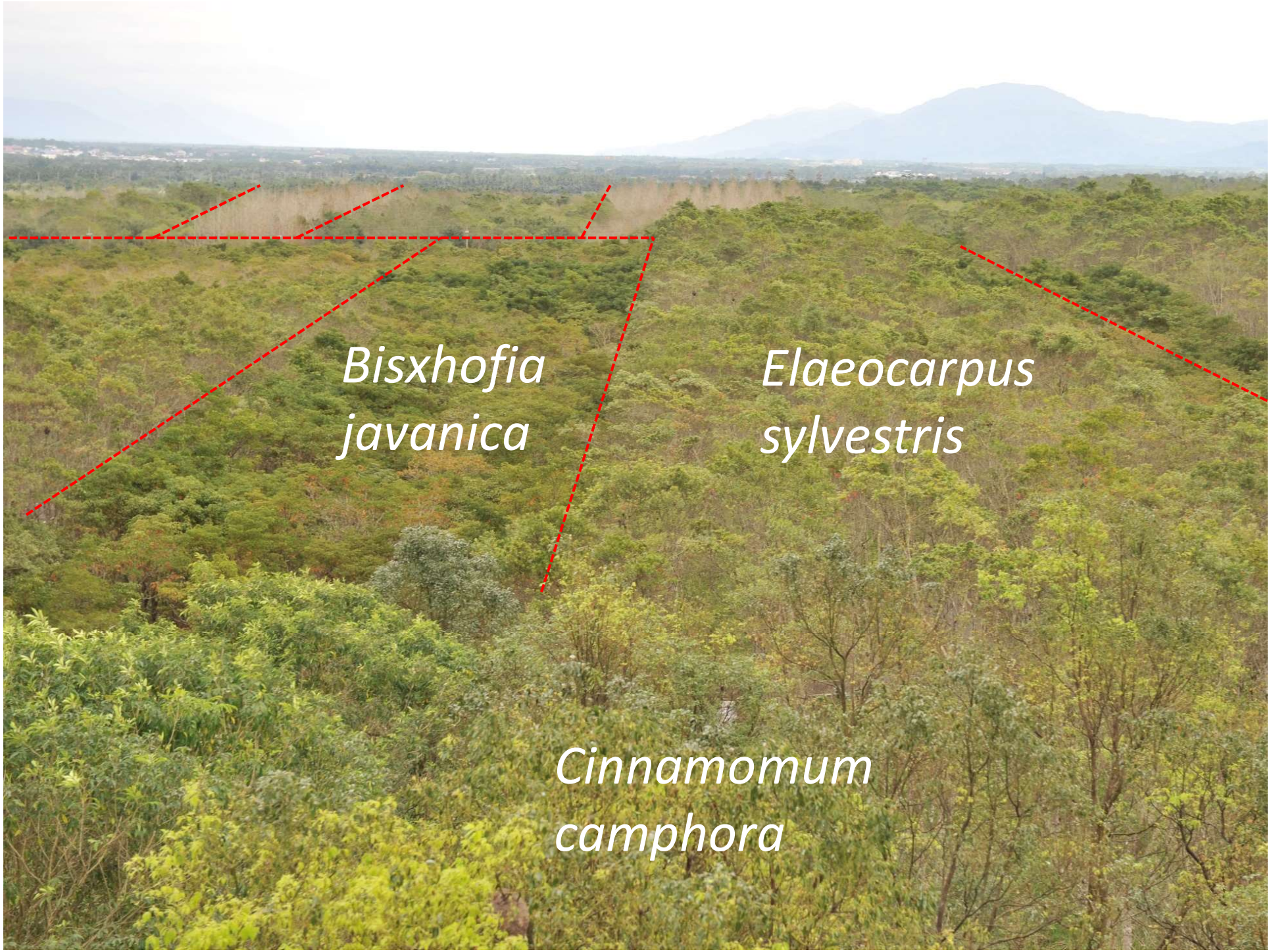

Corridor
Ecotourism
C sequestration

Wind regime of the study site
(2014/2 – 2015/4)

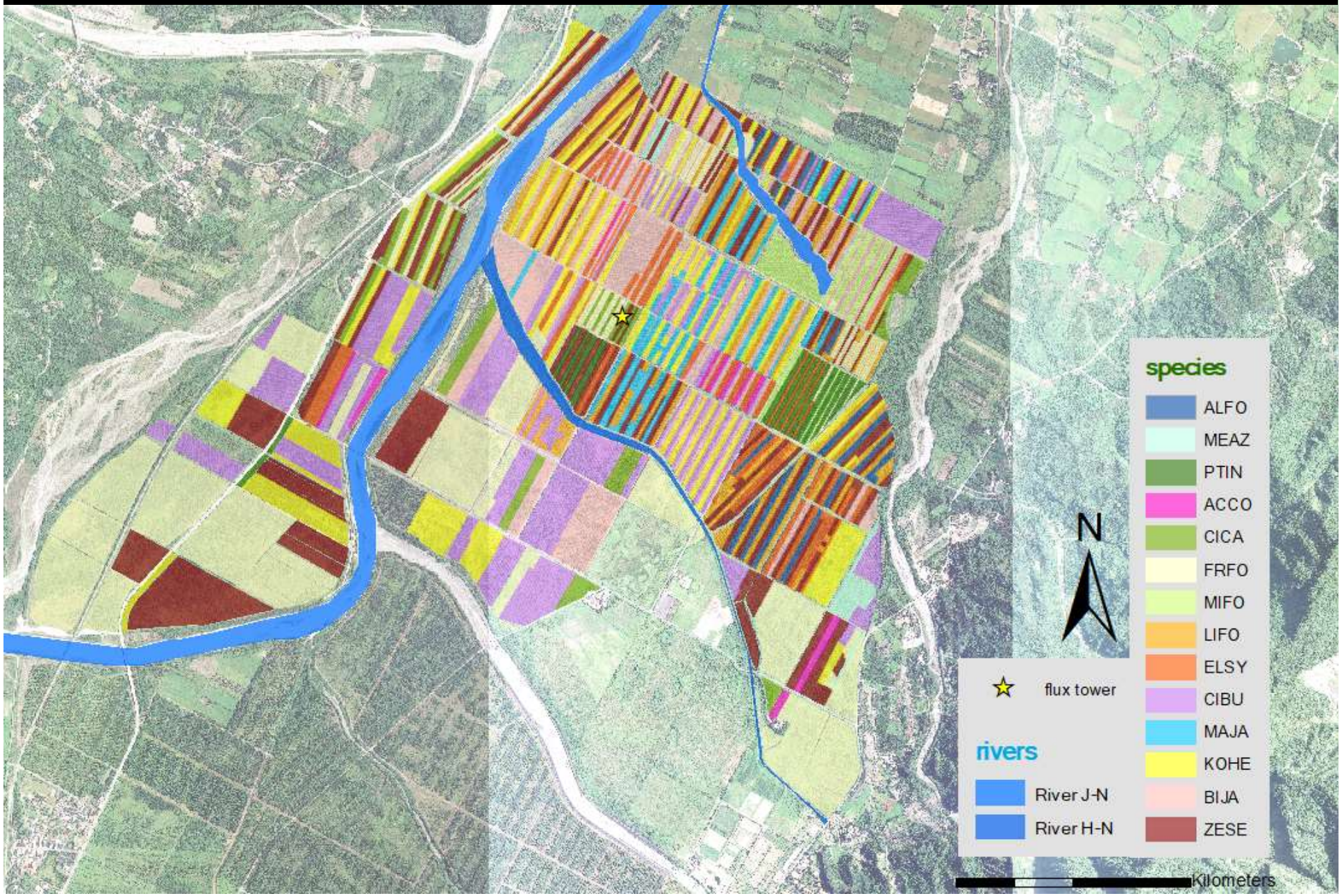





1
2
3
4
5
6
7
8
9
10
1. Sonic anemometer
2. CO_2/H_2O IRGA
3. Aspired temperature/RH
4. Anemometer
5. Datalogger
6. Solar panel
7. Quantum sensor
8. Net radiometer
9. Soil heat ?ux sensor
10. Soil moisture sensor


Bisxhofia javanica
Elaeocarpus sylvestris
Cinnamomum camphora

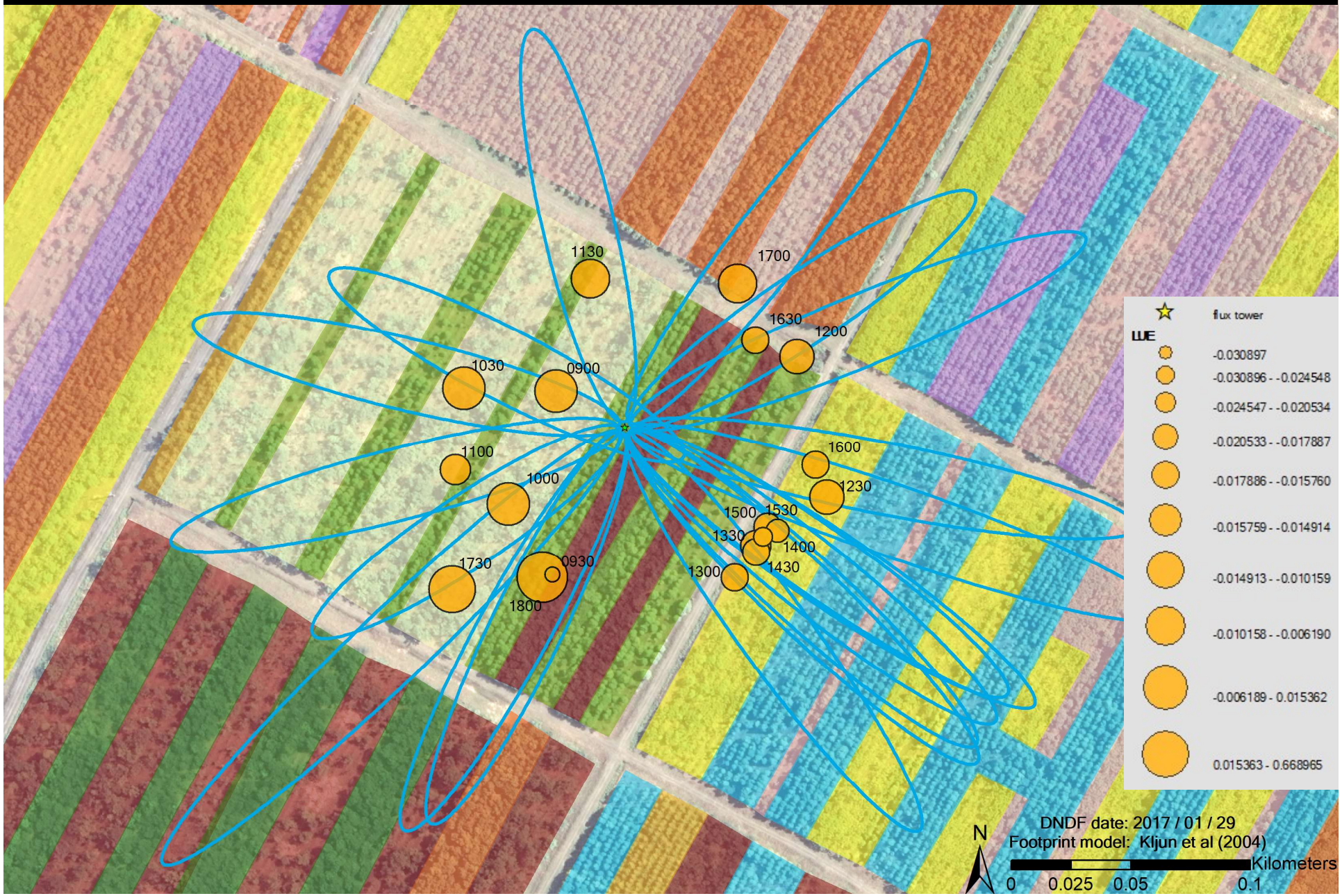
14 broadleaf tree species within fetch



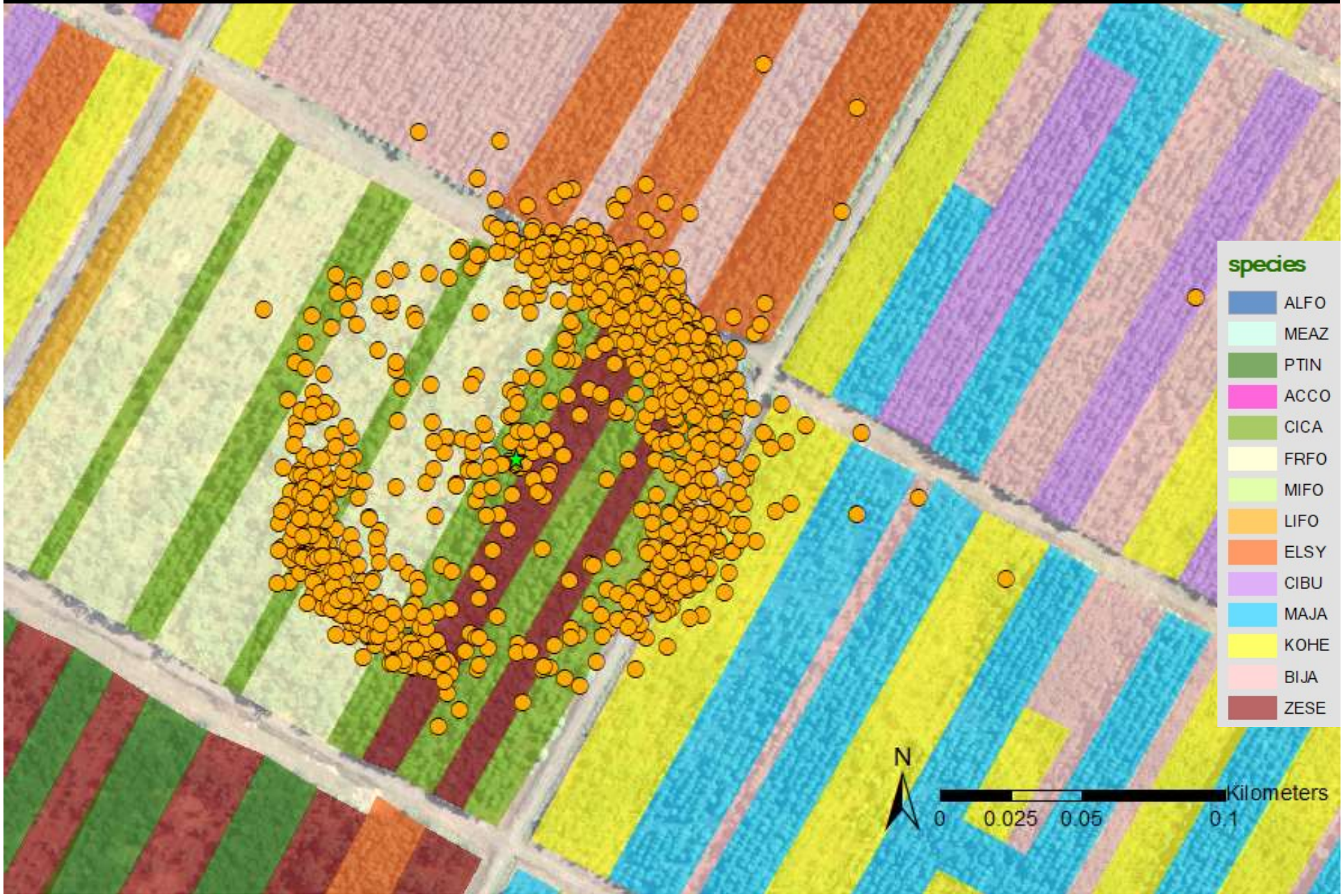
To identify NEE footprint, we

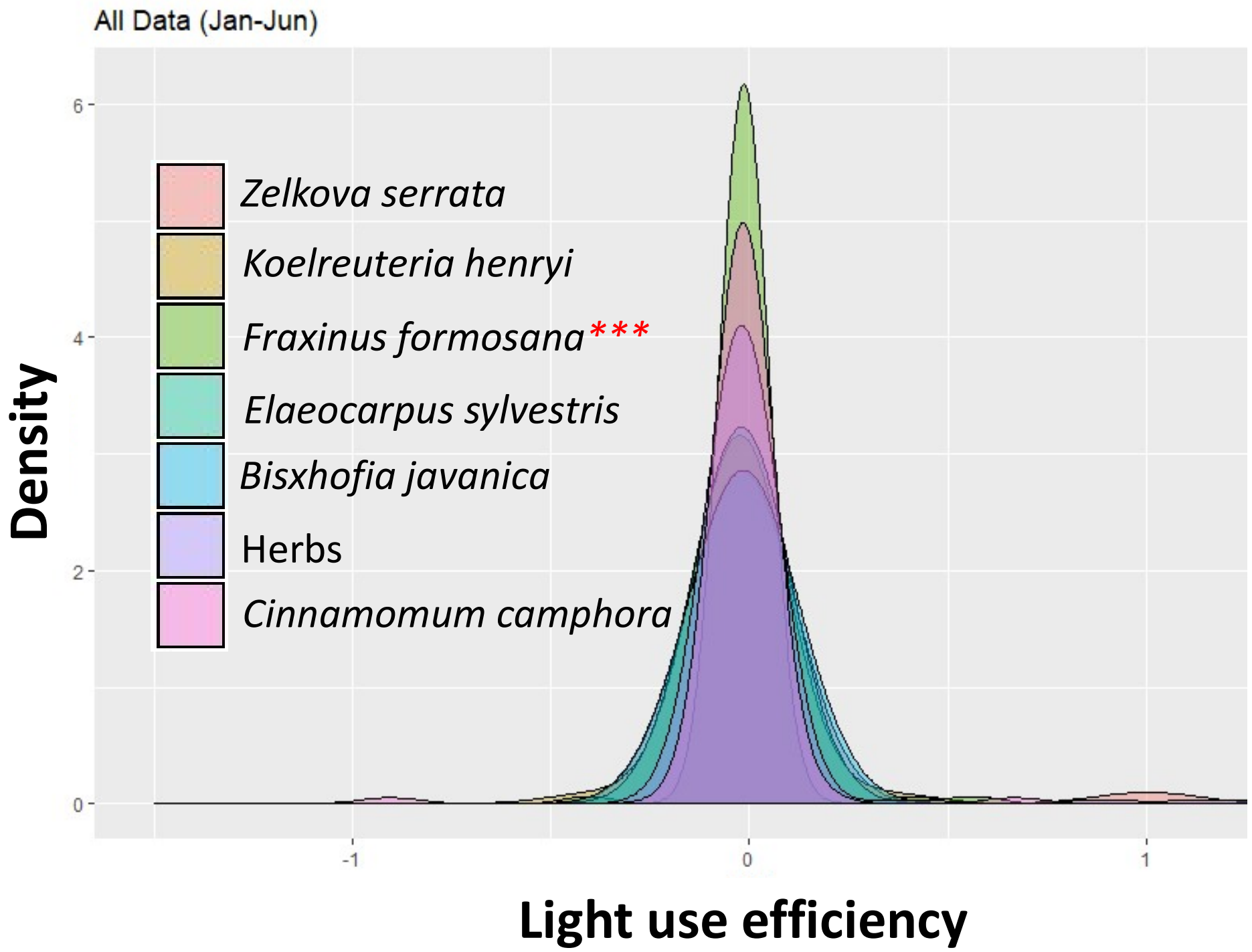
- **Selected 9 am to 4:30 pm data with flag 0** (Mauder and Foken, 2004)
- **Used footprint model** (Kljun et al., 2004)
- **Located the source areas in GIS with vegetation map**
- **Calculated light use efficiency (LUE) of the footprint species**

NEE footprint in a winter day (2017/1/29)



Locations of peak contribution




All Data (Jan-Jun)
Density
6
4
2
0
-1
0
1
Light use efficiency
Zelkova serrata
Koelreuteria henryi
Fraxinus formosana***
Elaeocarpus sylvestris
Bisxhofia javanica
Herbs
Cinnamomum camphora

Things to be done:

- Phenological and ecophysiological measurements for the species
- Spatial integration
- Footprint models
- …


Thanks for your attention