

# Monitoring forest management and tree growth at field level in southern China

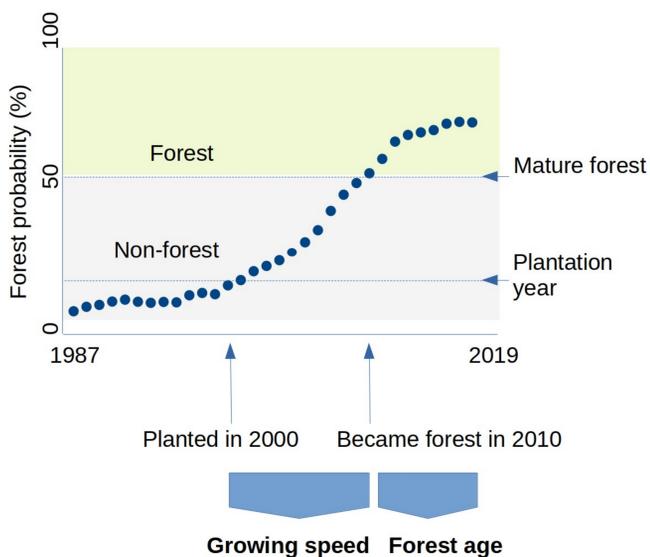


## Motivation:

- Southern China had been largely deforested before the 1980s, but tree cover has been expanded over the last decades. While this is well known, the local patterns are unknown.
- Current data showing forest dynamics cannot capture forest plantations. While regional patterns are largely captured, the quality at local scale is poor.

## Data and Method

- We downloaded annual Landsat composites 1986-2018.
- We carefully filtered and smoothed the time series.
- We manually labeled thousands of points with mature forests.
- We trained a Random Forest model and predicted the forest probability for each 30x30 m pixel.
- Again we smoothed the forest probability time series.
- Forest age and growth speed were derived from the forest probability time series.
- We used LandTrendr to derive disturbances (not shown here).
- MSPA (Morphological Spatial Pattern Analysis) was used to derive forest fragmentation.

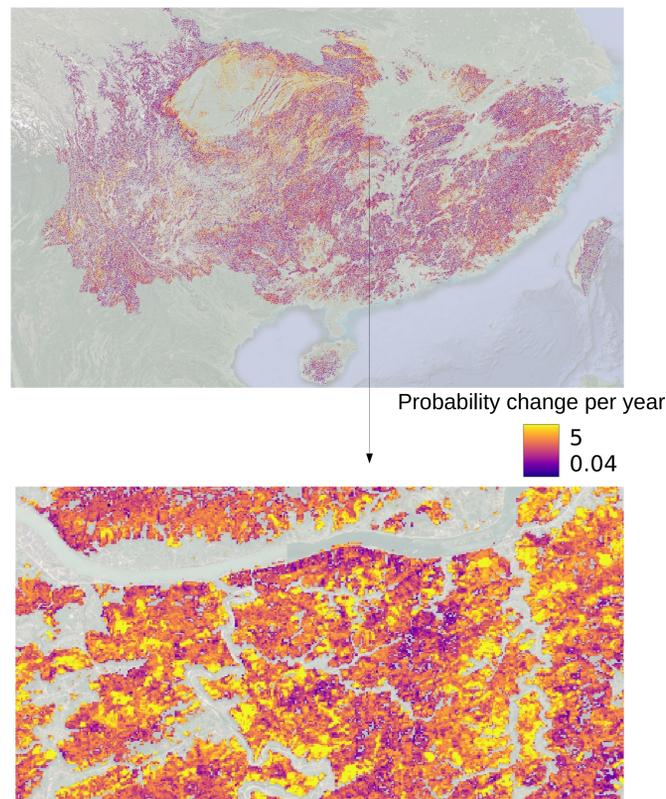


## Aims:

- A high spatial resolution and high quality annual forest cover product from 1986-2018 for all southern China.
- Apply this product to study forest age, growing speed, disturbances and forest fragmentation at a high level of details for large areas.
- Methods are highly accurate and reproducible, we aim at new standards in forest management monitoring

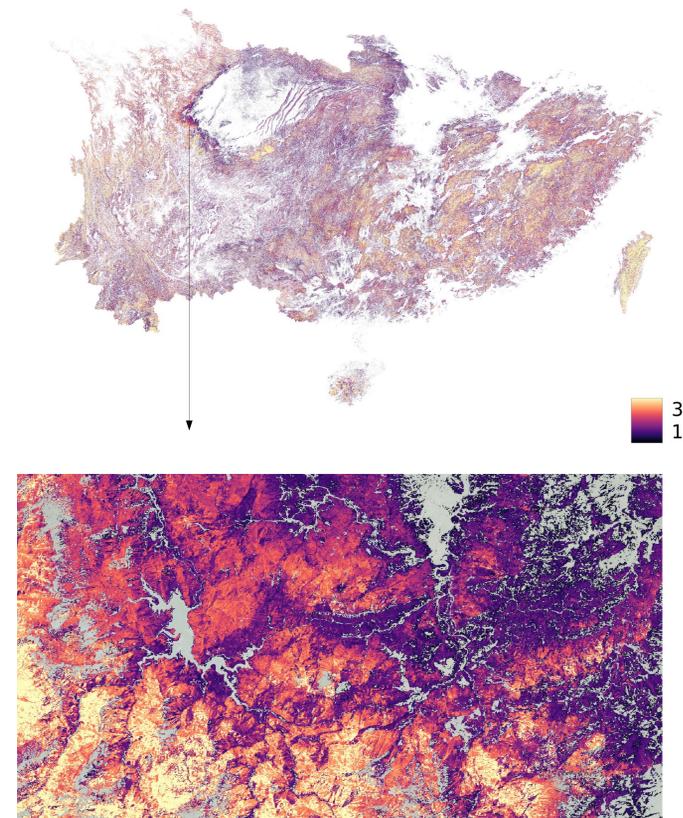
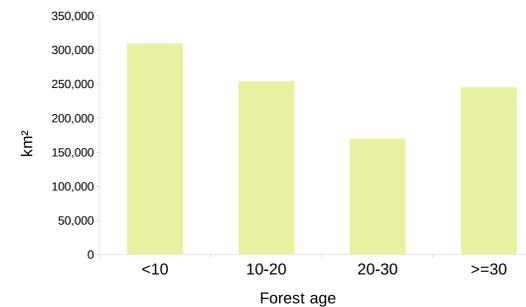
## Forest growing speed

- The growing speed of a new forest was determined by the number of years a forest area needed from plantation (crossing forest probability of 10%) to become a mature forest (crossing forest probability of 50%).
- The growing speed gives indications on the species and growing conditions.



## Forest age

- Forest age was determined by the number of years after a forest has crossed a forest probability of 50%, and remained above this value until 2018.



## Fragmentation

- We used MSPA to segment forest areas for each year. Different classes show if a forest area is isolated (island) or surrounded by other forest areas (core). Border pixels are non-core forests.

