

# Probabilistic maize yield simulation over East Africa using ensemble seasonal climate forecasts

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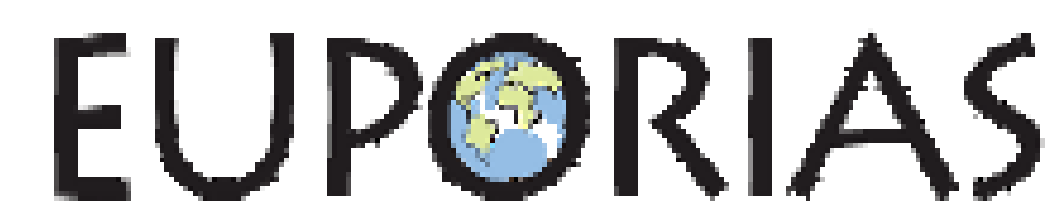
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## 1. Background

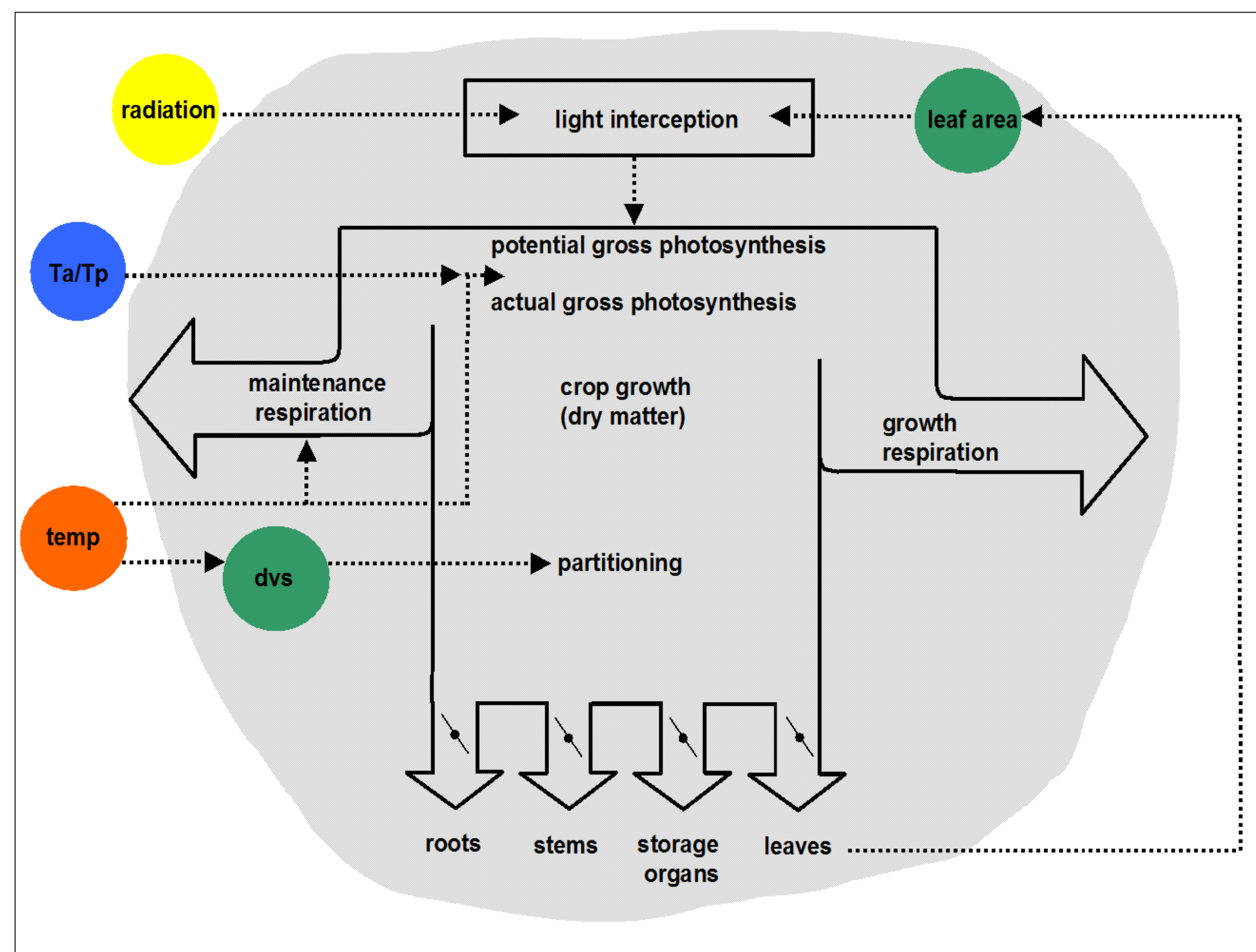
- Pre-season skillful yield predictions are useful to address food security and associated farm management practices
- contribute to provision of climate services to farmers, governments, humanitarian agencies, and enhance related adaptation policy formulations.

## 2. Objective

- Assess the maize yield predictive skill of agricultural impacts model through hindcast validation for the period 1981 – 2010 to identify suitable lead-times.

## 3. Methodology

### (a) Simulation model (WOFOST) processes



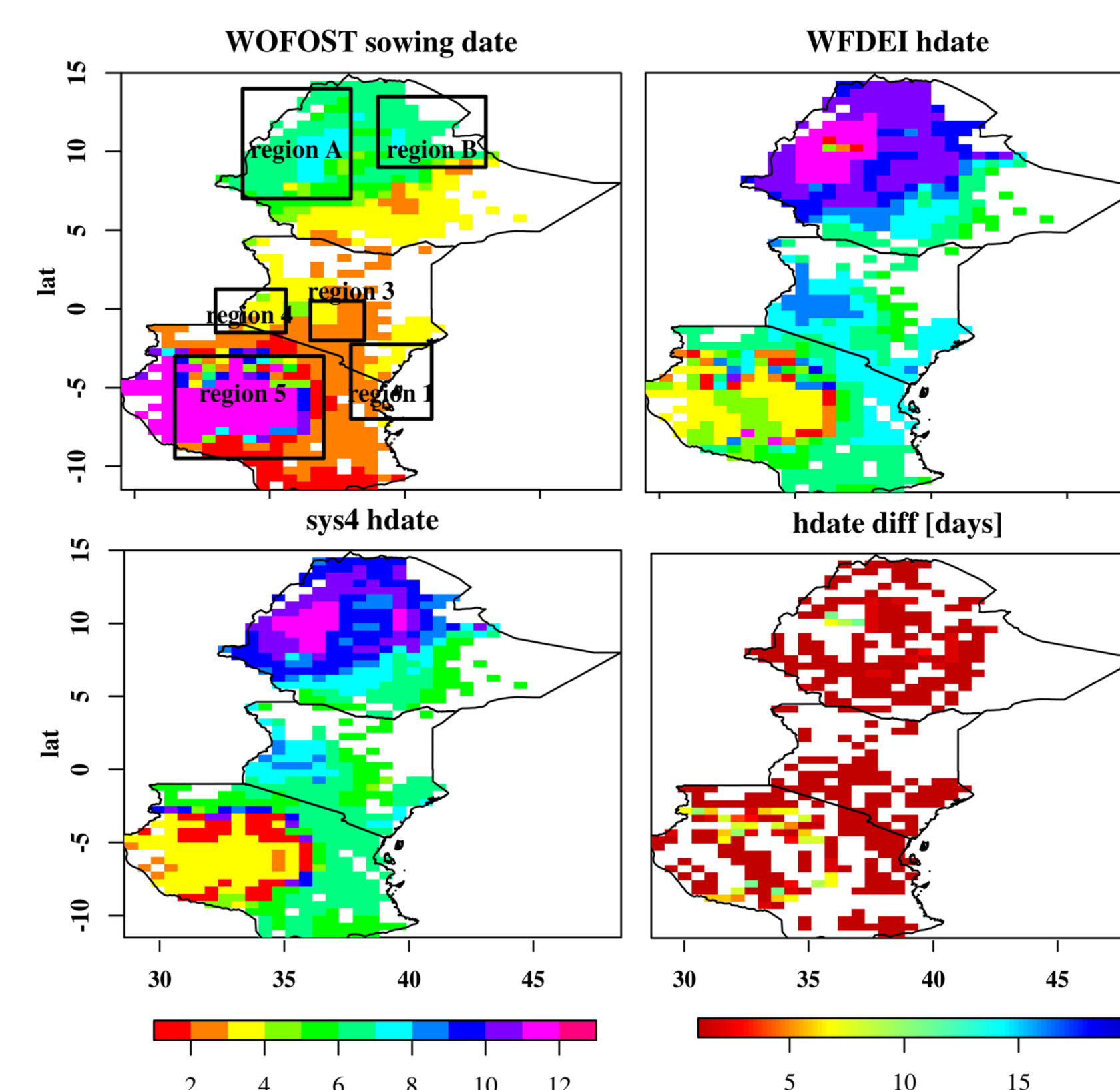
**Figure 1.** Showing crop model simulated processes (de Koning et al., 1993).

### (b) Input data

- Climate Data: WFDEI (for reference yield simulation)
- ECMWF system-4 ensemble forecasts (for yield prediction)
- Soil data: Harmonized World Soil Database (HWSD)
- Applied to simulate water-limited yields

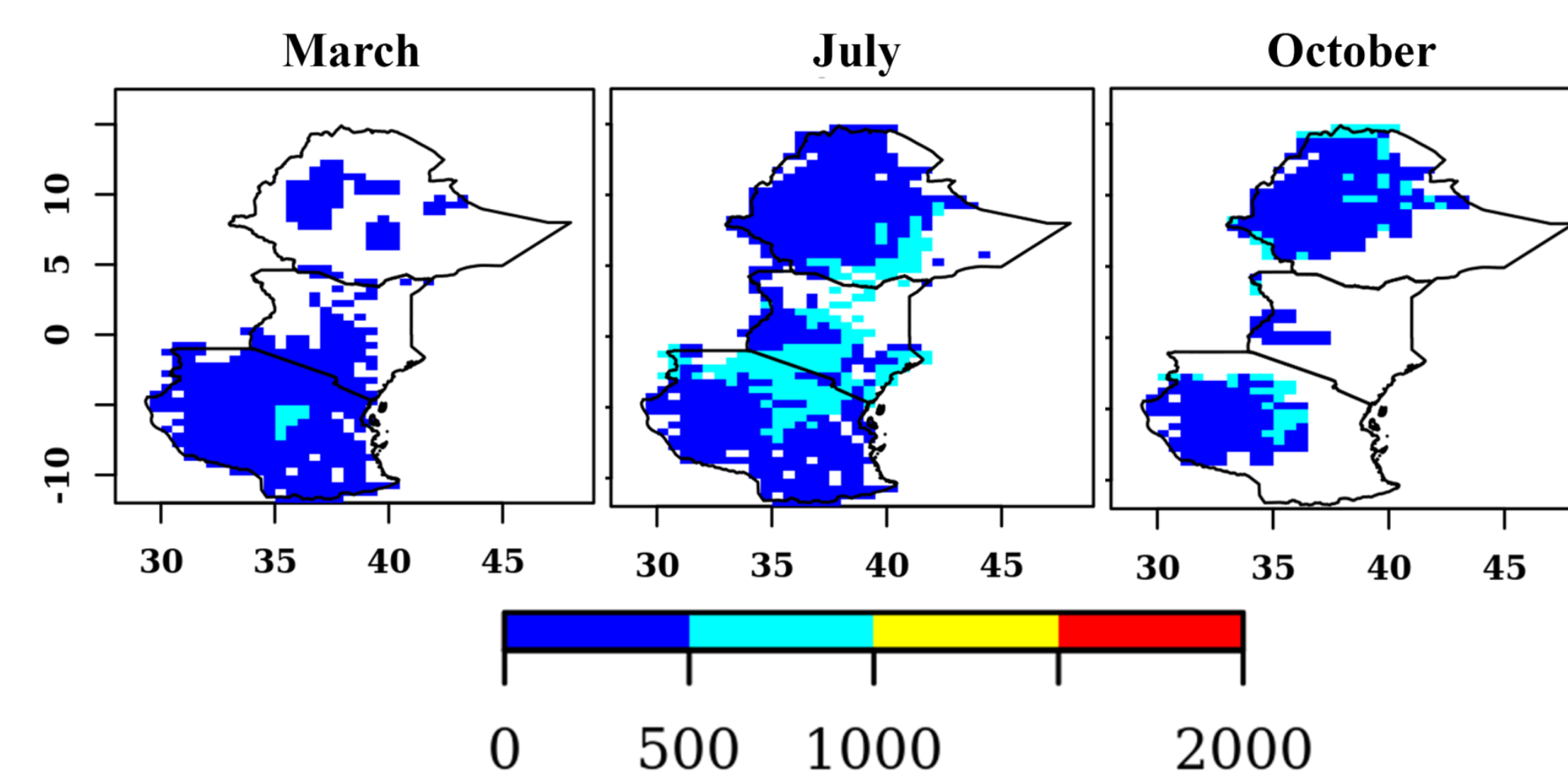
## 4. Results

### (a) Study area, sowing and simulated harvest dates



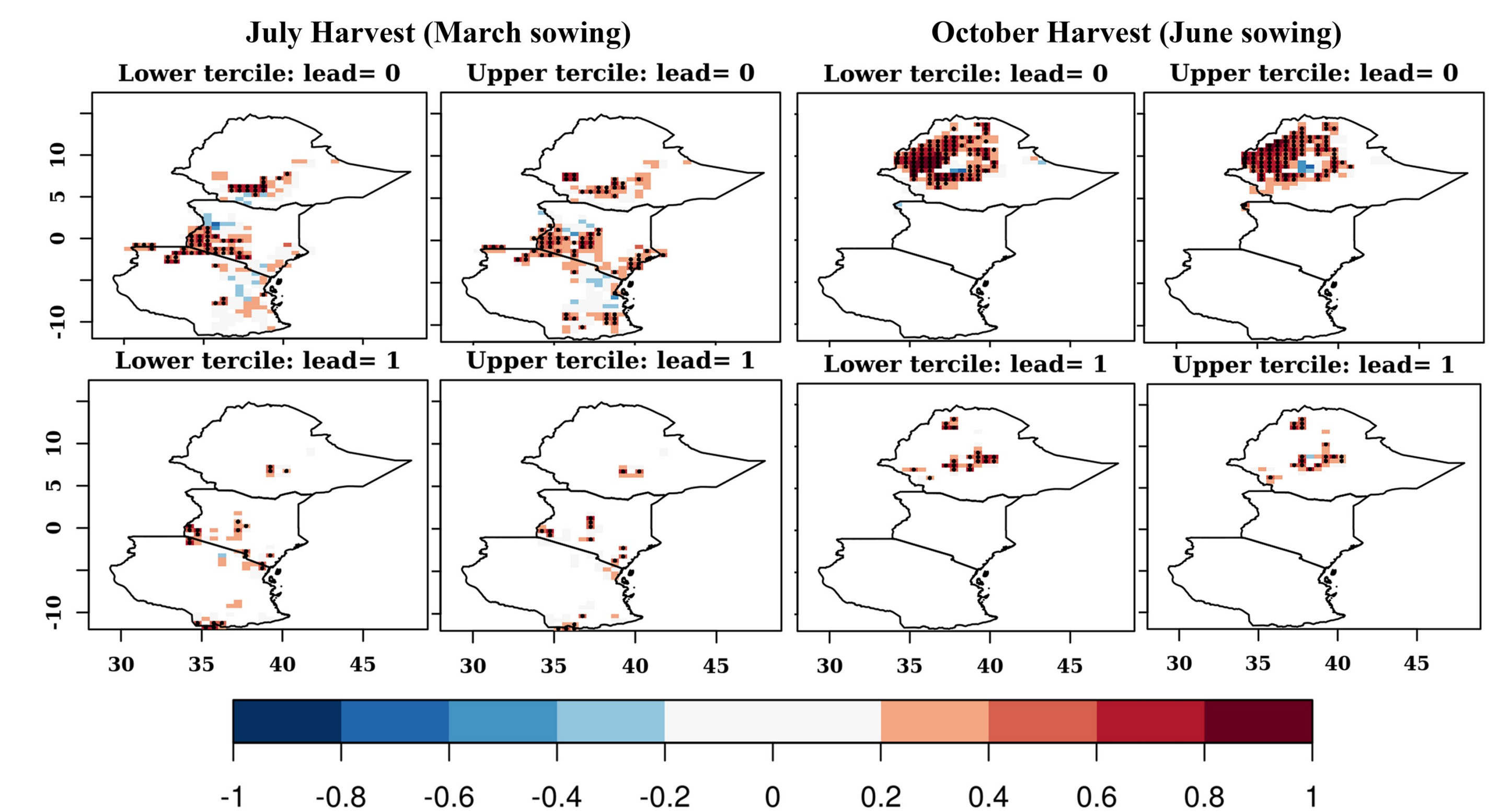
**Figure 2.** Showing dominant sowing and harvest dates over East Africa

### (b) Mean harvest deviation (Kg/Ha)



**Figure 3.** showing regions of high yield variability (three harvest dates shown).

### (c) Probabilistic verification: Relative operating curve skill score (ROCSS)



**Figure 4.** ROCSS for sub-region dominant sowing & harvest dates

## 5. Conclusions

- Simulated harvest dates reasonably agree with observed
- Probabilistic yield forecast is potentially useful in equatorial and coastal regions (where mean deviation  $\geq 500$  Kg/Ha) as opposed to the northern and southern parts
- Good ROCSS prediction skill is achievable at lead-0 before sowing
- Pre-season upper and lower terciles forecasts are more predictable than the middle terciles.
- March harvests are only marginally predictable
- Pre-season skill achieved show a potential to improve the forecasts.

