Stress Deciduous Phenology in the CLM

Kyla Dahlin & Rosie Fisher

February 25, 2014

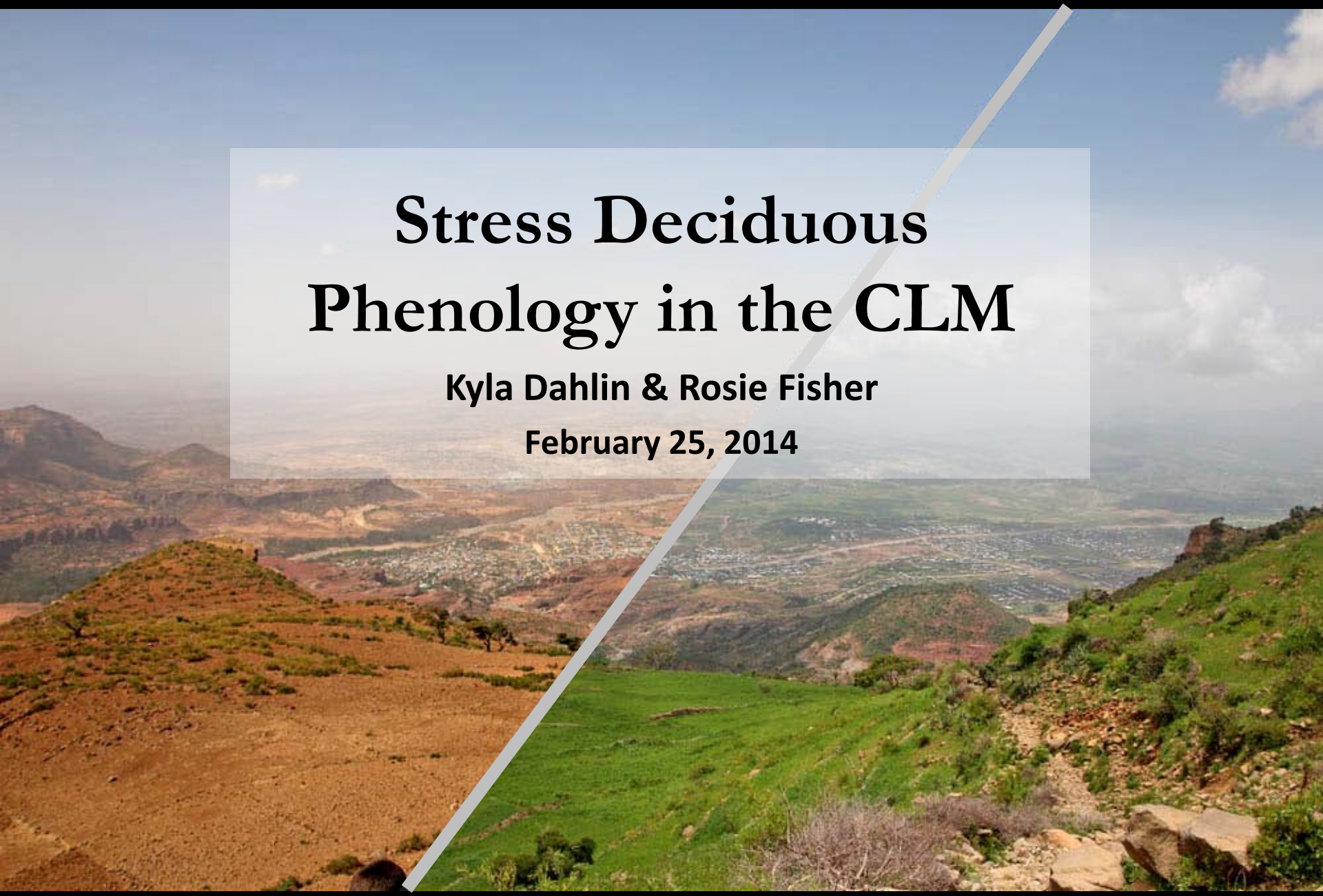

image credit: Forrest Copeland
talesfromthebigcountry.wordpress.com

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Phenology in CLM

- **15** non-crop **plant functional types**
- **3** phenology algorithms
  - evergreen
  - cold deciduous
  - stress (= drought) deciduous

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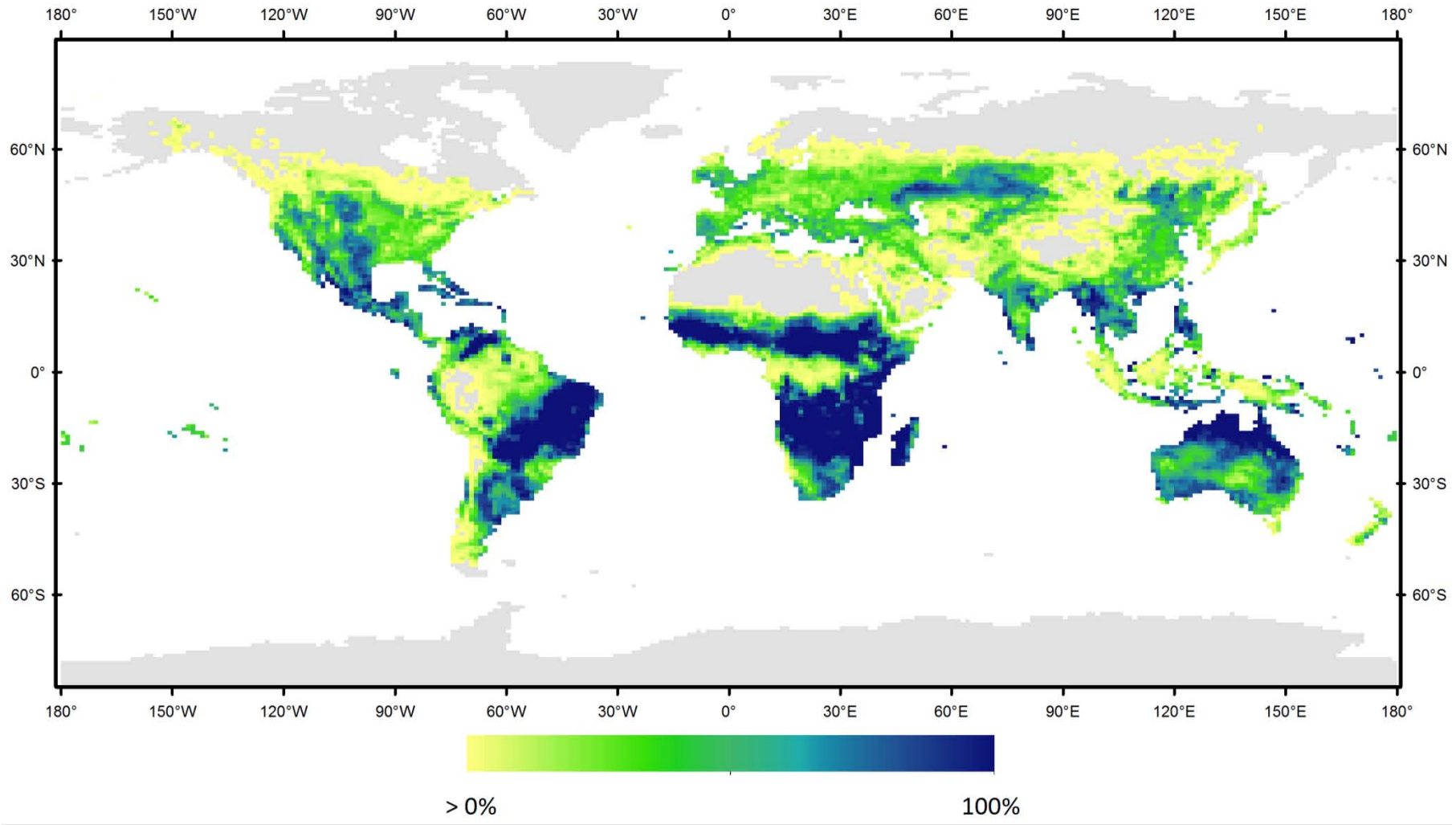
  - **stress (= drought) deciduous**

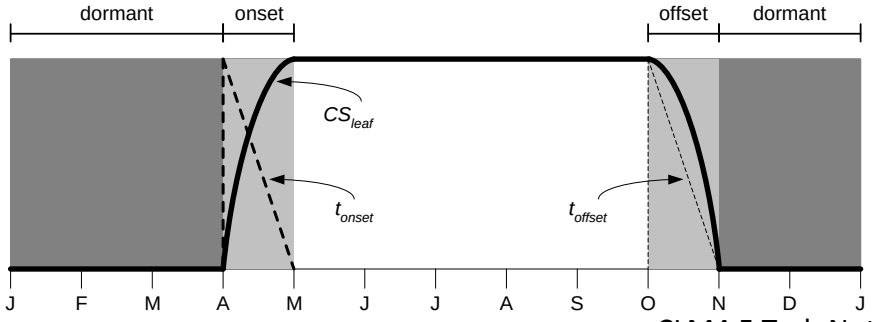
Where is CLM Stress Deciduous?



How does stress/drought decidousness work in CLM?

(in warm, long-day regions*)

CLM4.5 Tech Note
from White et al 1997



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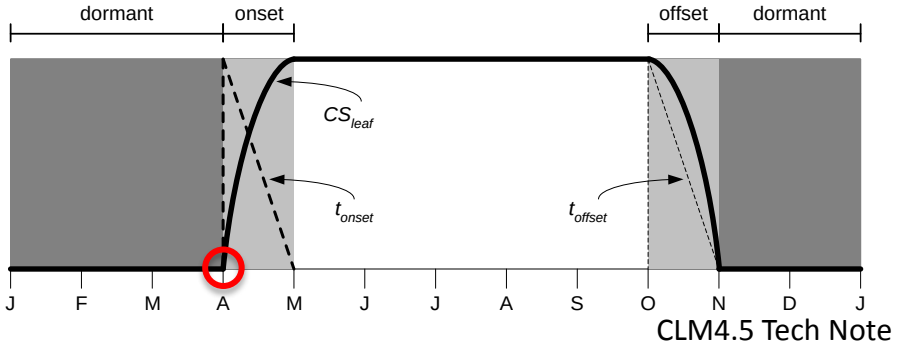

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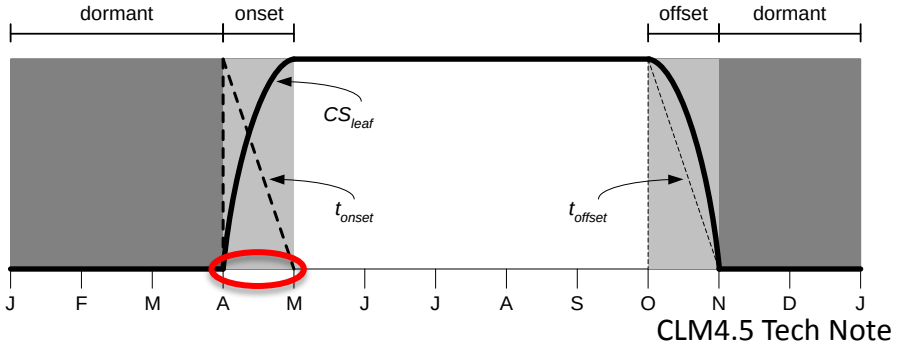

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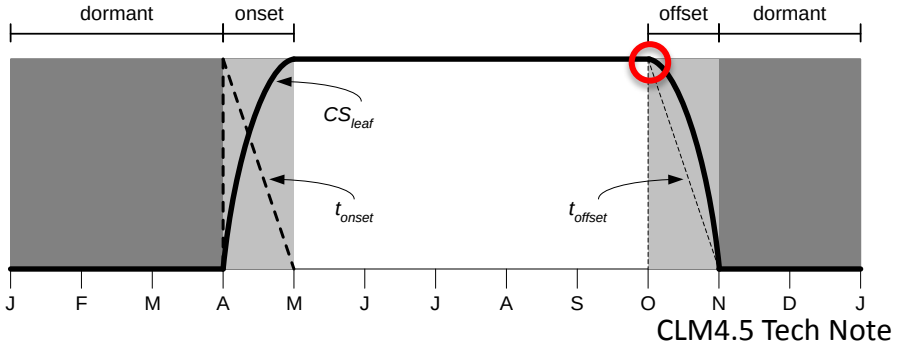

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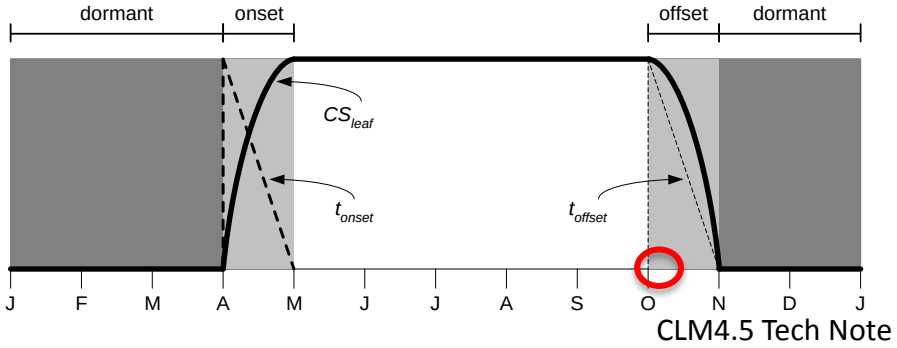

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Questions

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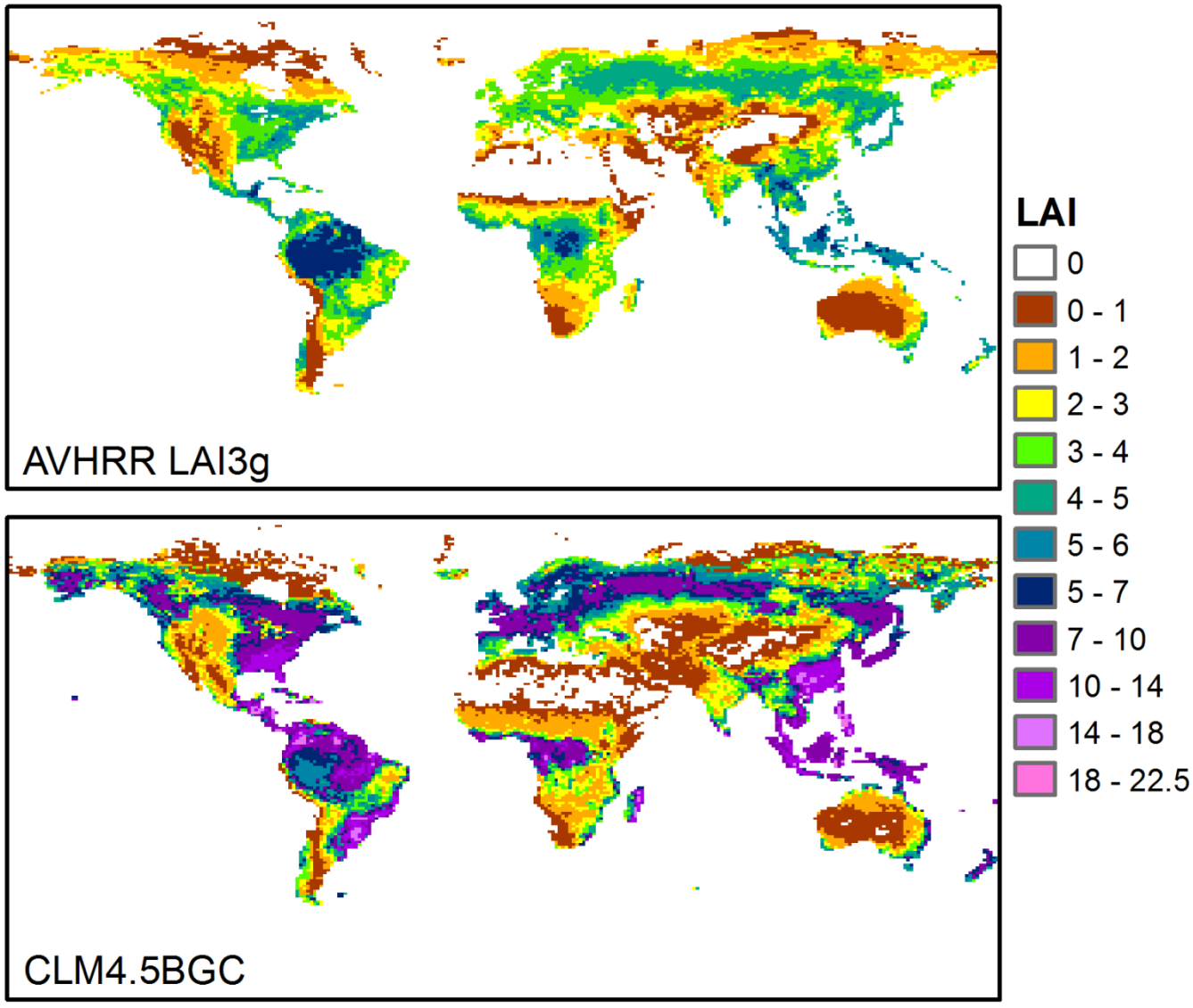
- Can we make it work better? (with relatively simple changes)

Obs v. CLM4.5BGC LAI



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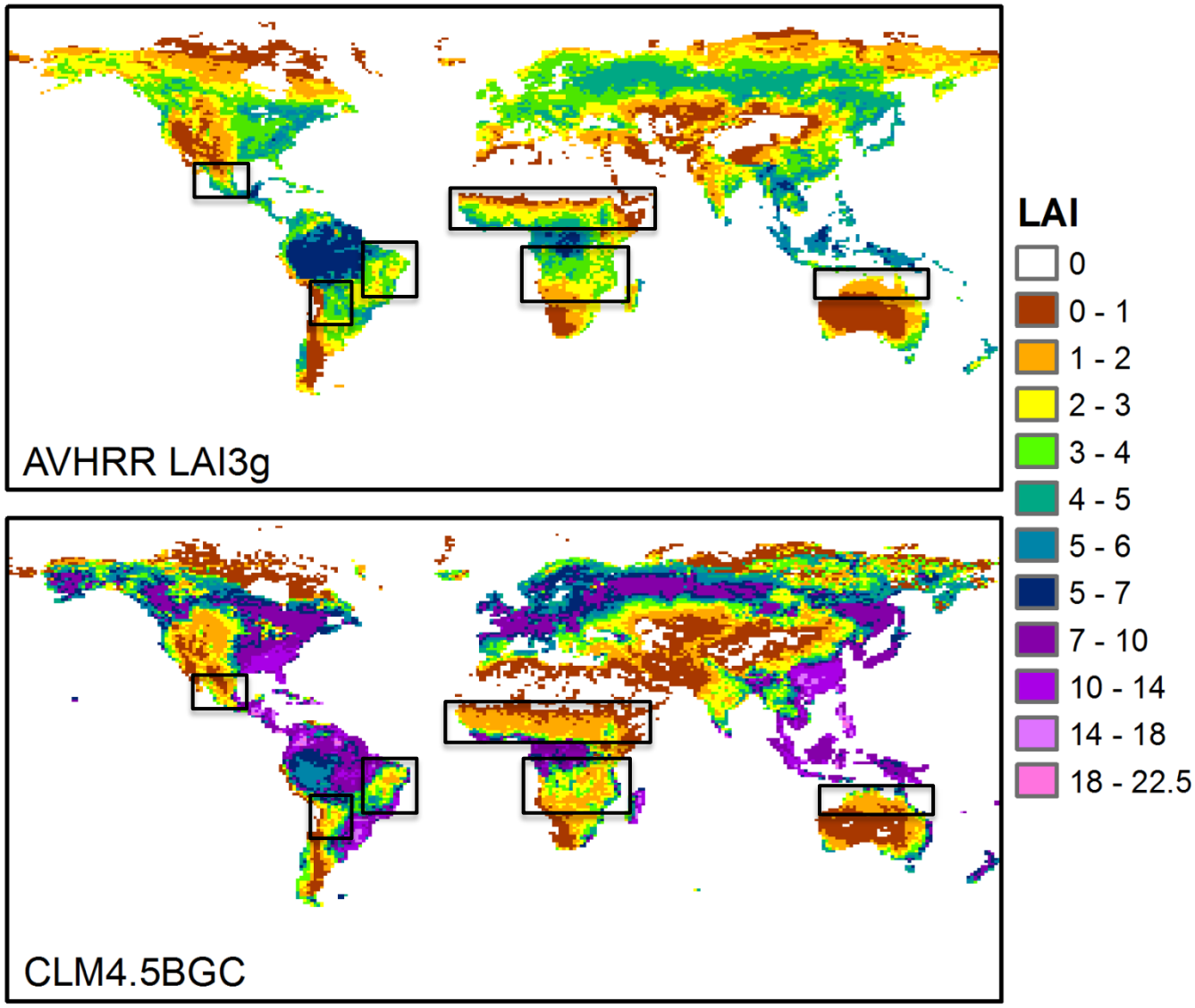
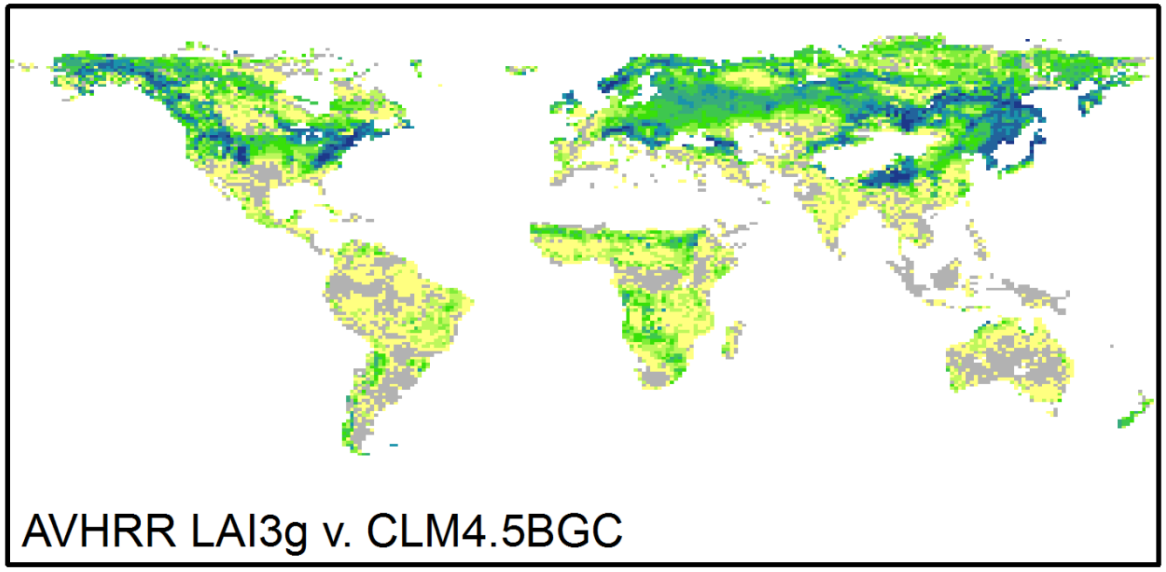


Correlations



R^2

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- 0.9 - 1
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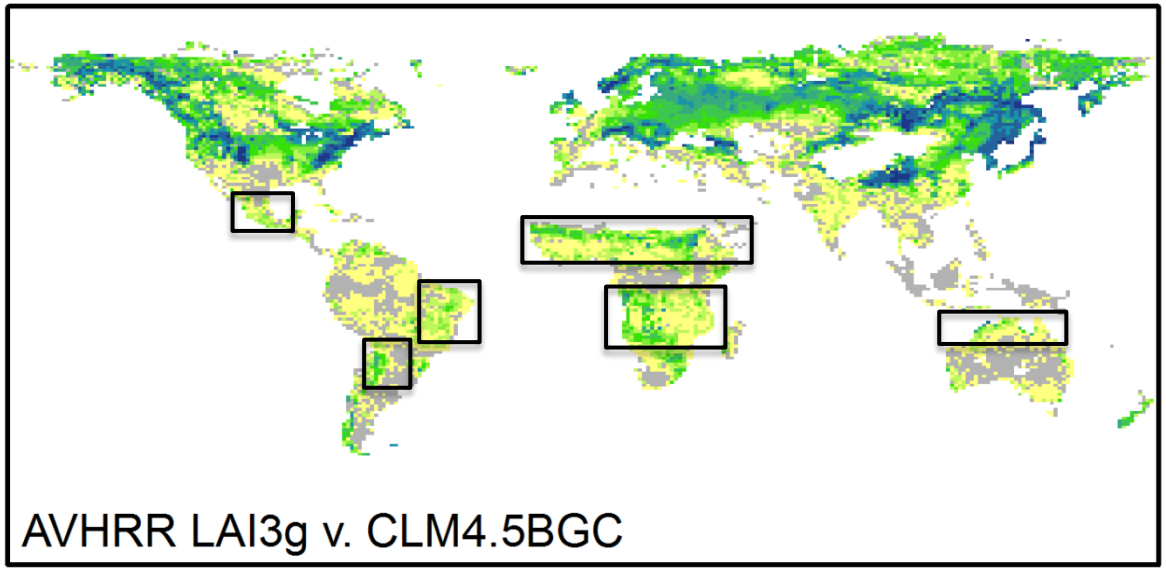

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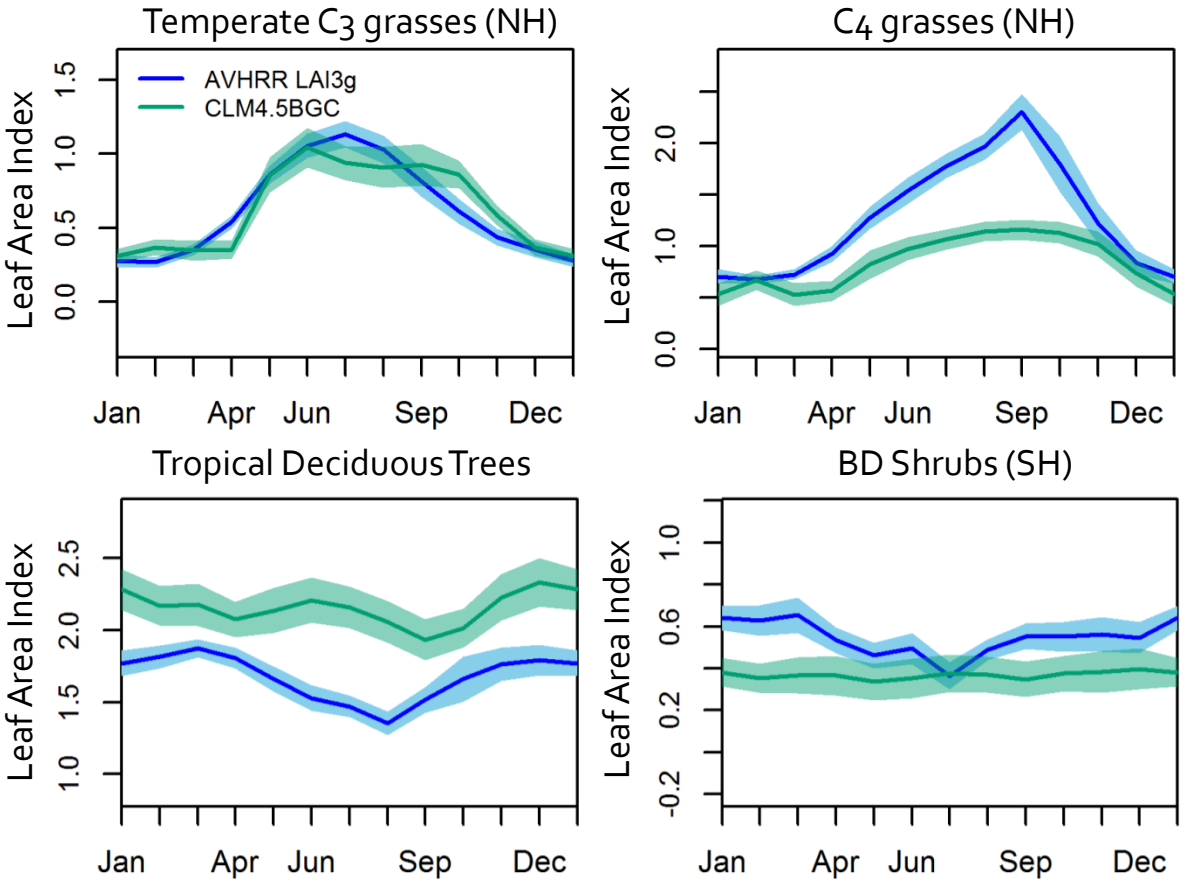

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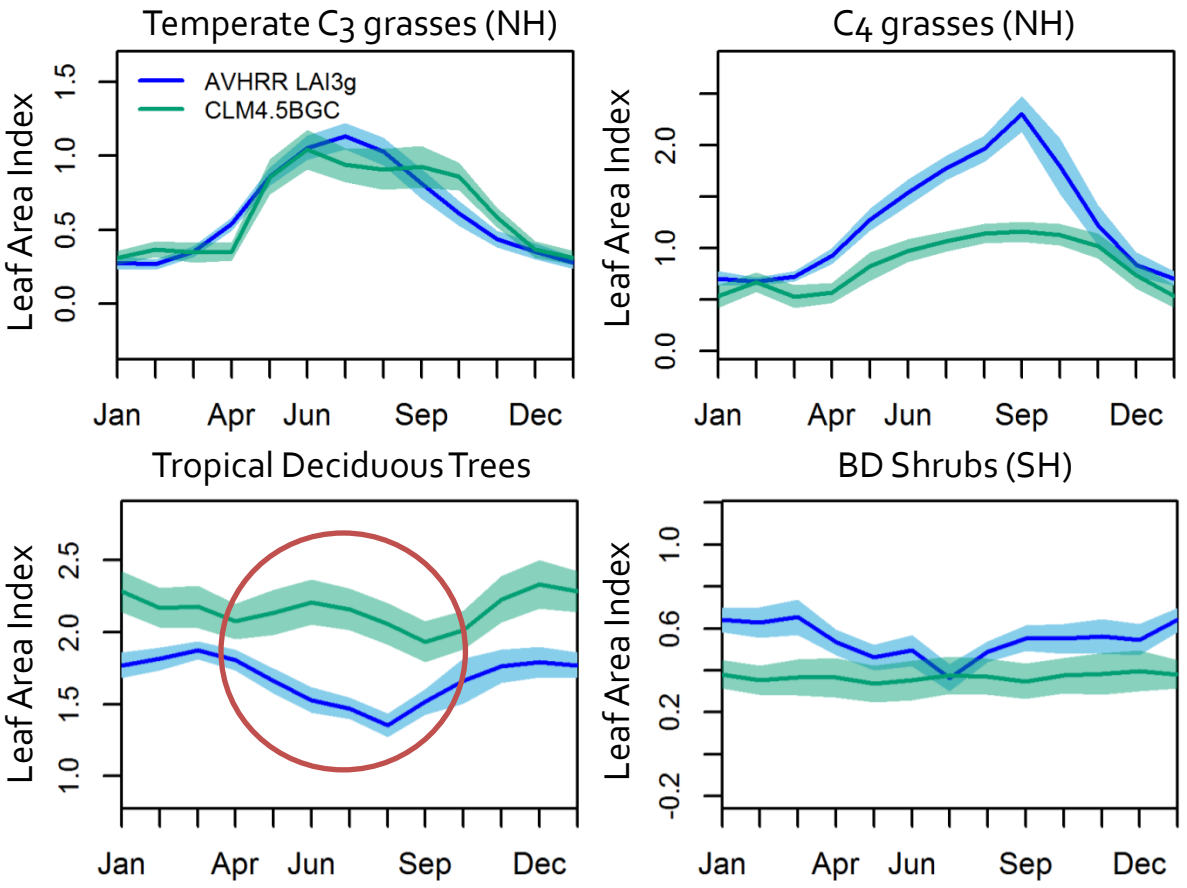
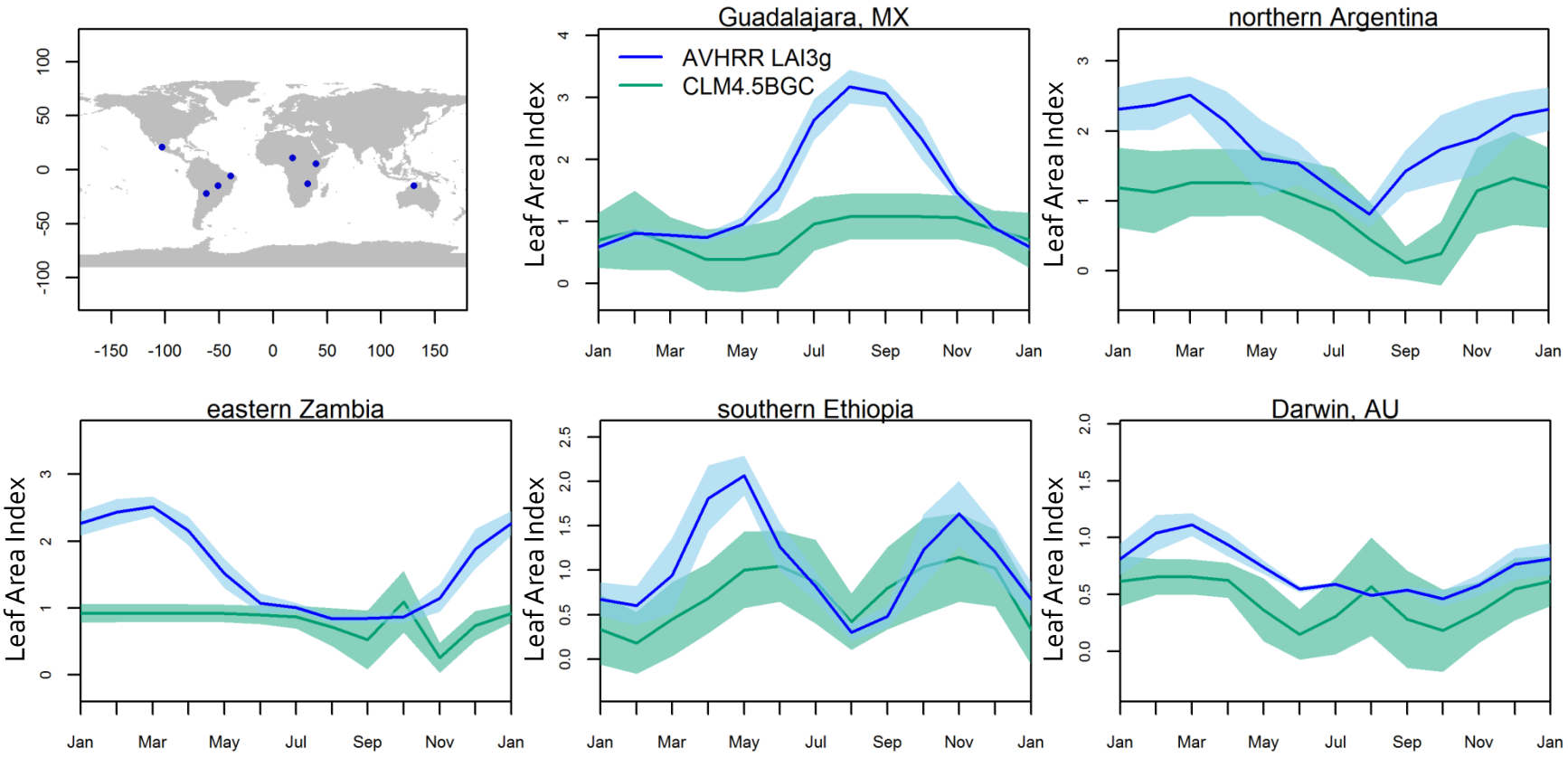


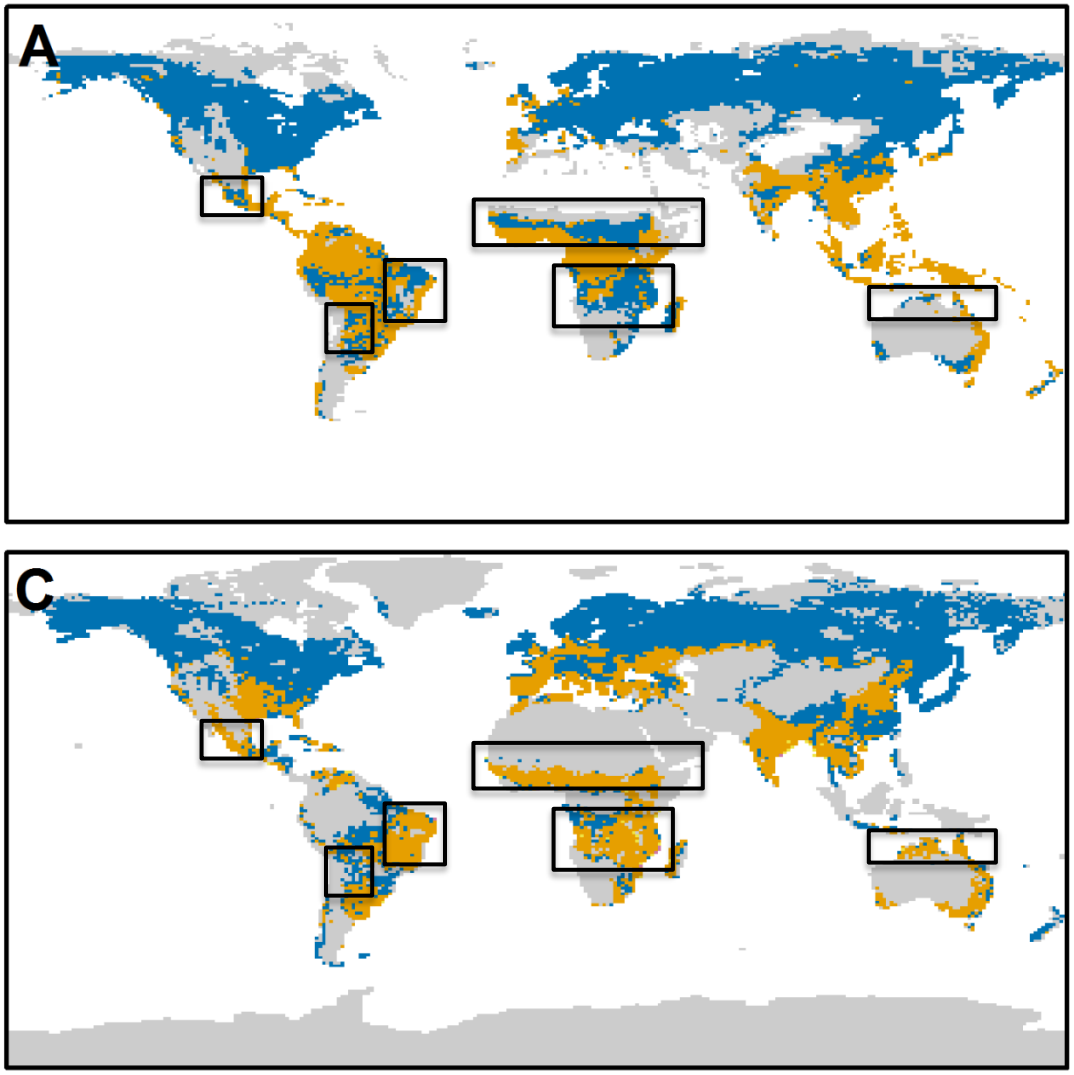
What about at single points?



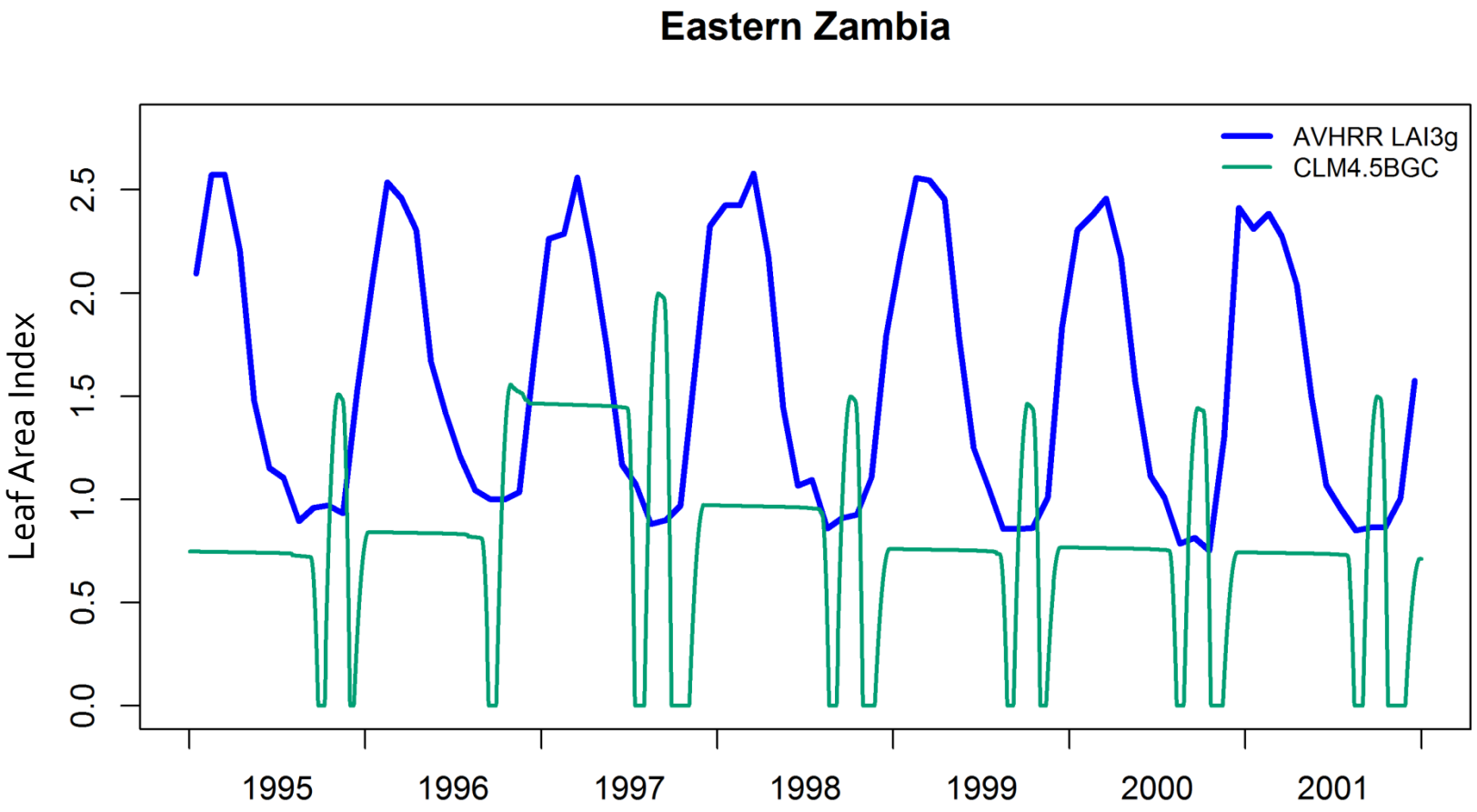
Counting Peaks

AVHRR LAI3g

CLM4.5BGC



What about daily model output?



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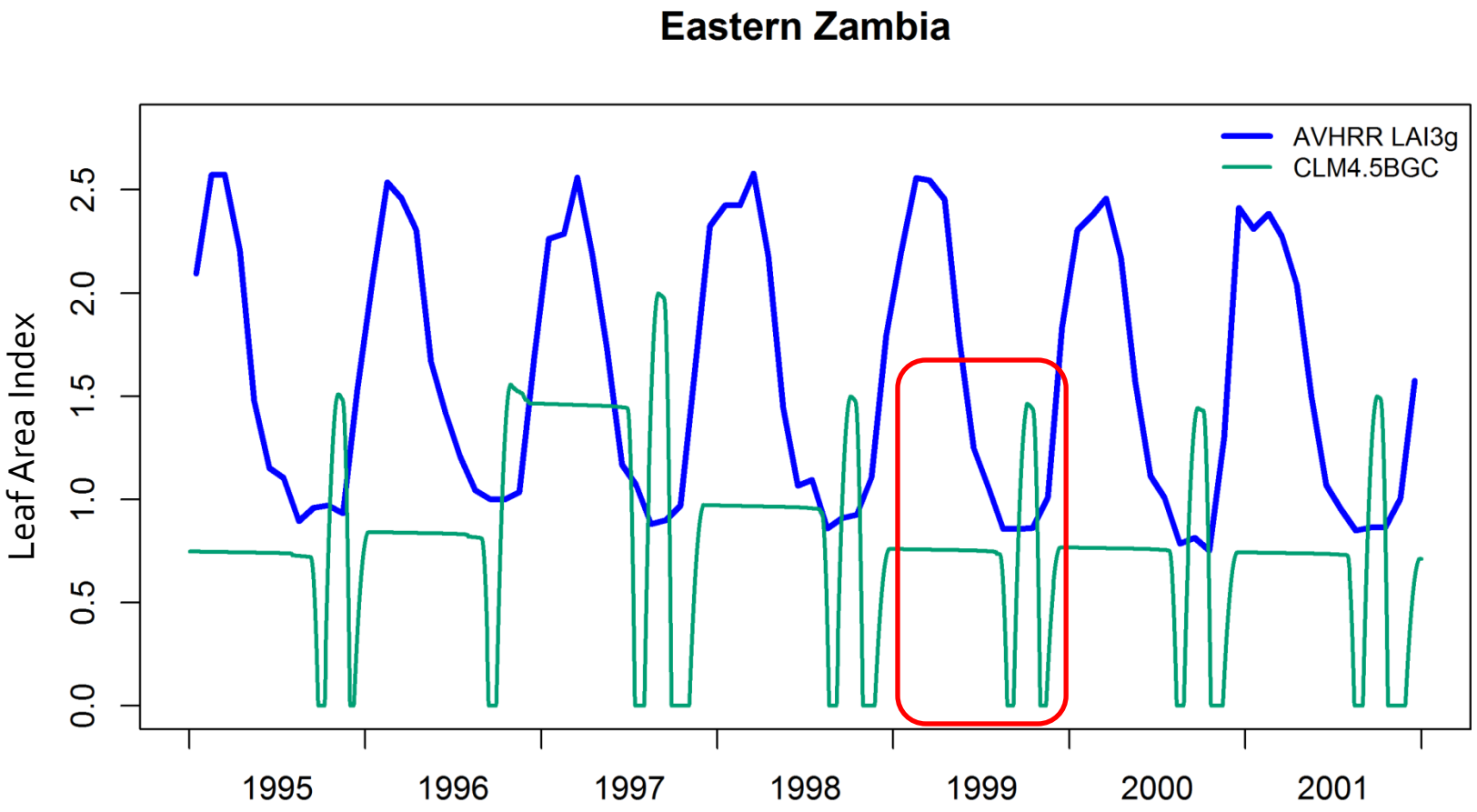
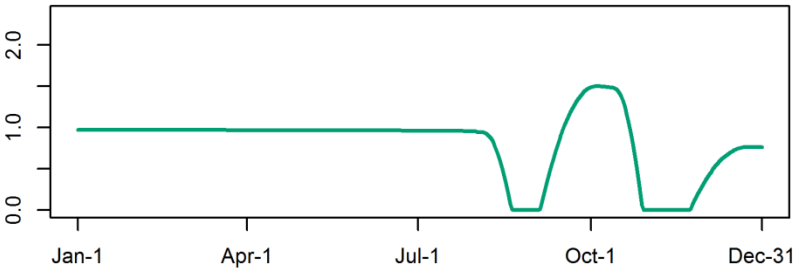


What's going on?

Leaf Area Index



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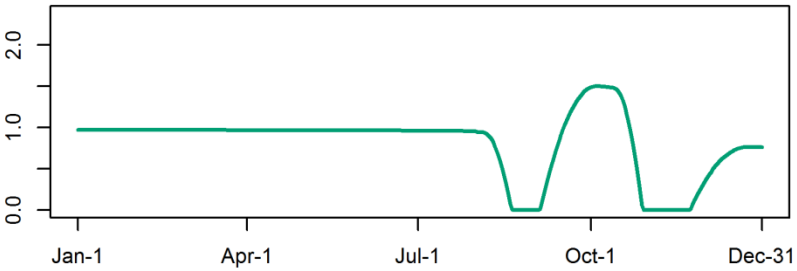
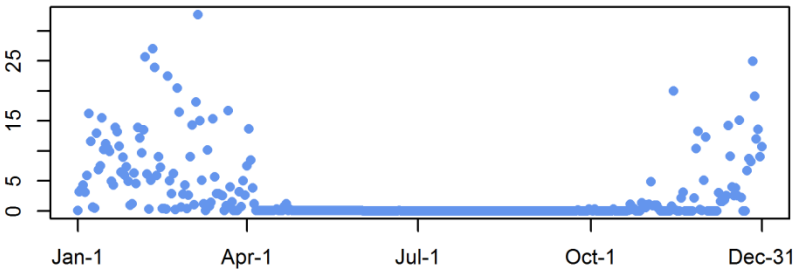


Rainfall (mm)



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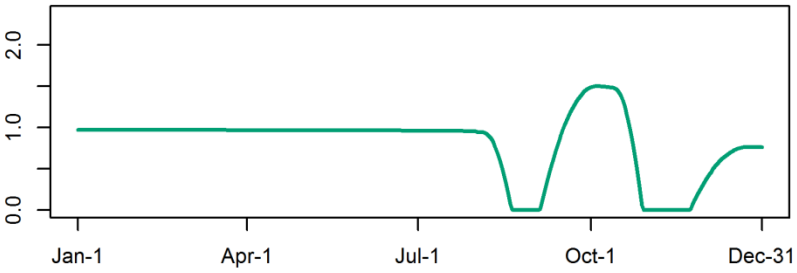

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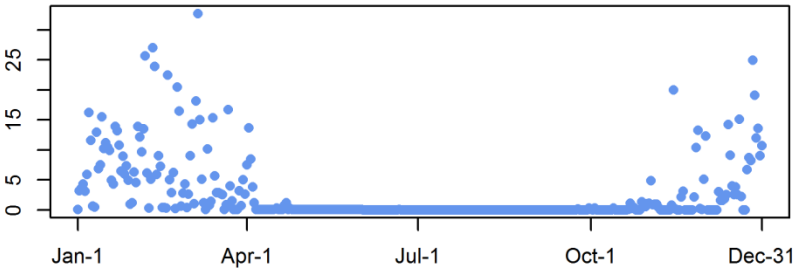
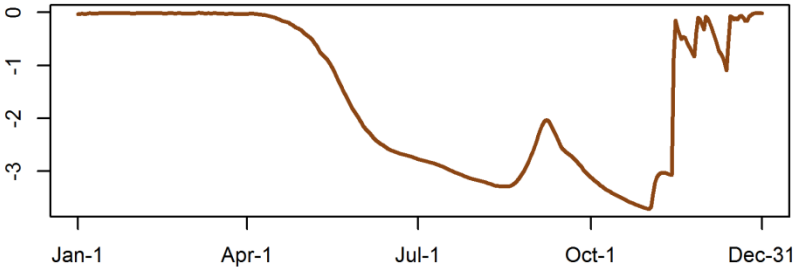


Soil Water Potential



How does stress decidousness currently work in CLM?

(in warm, long-day regions)

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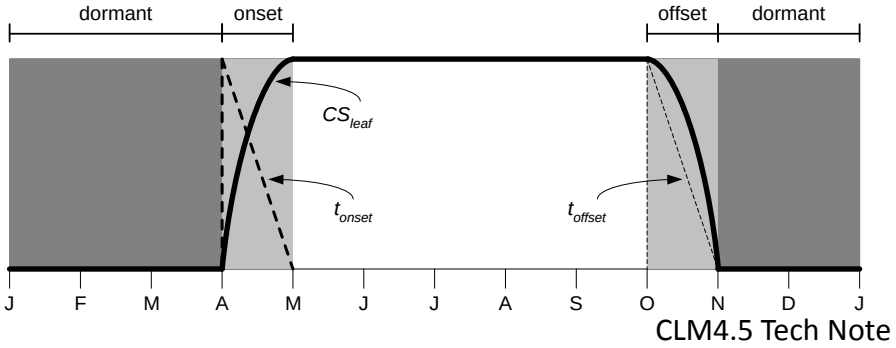

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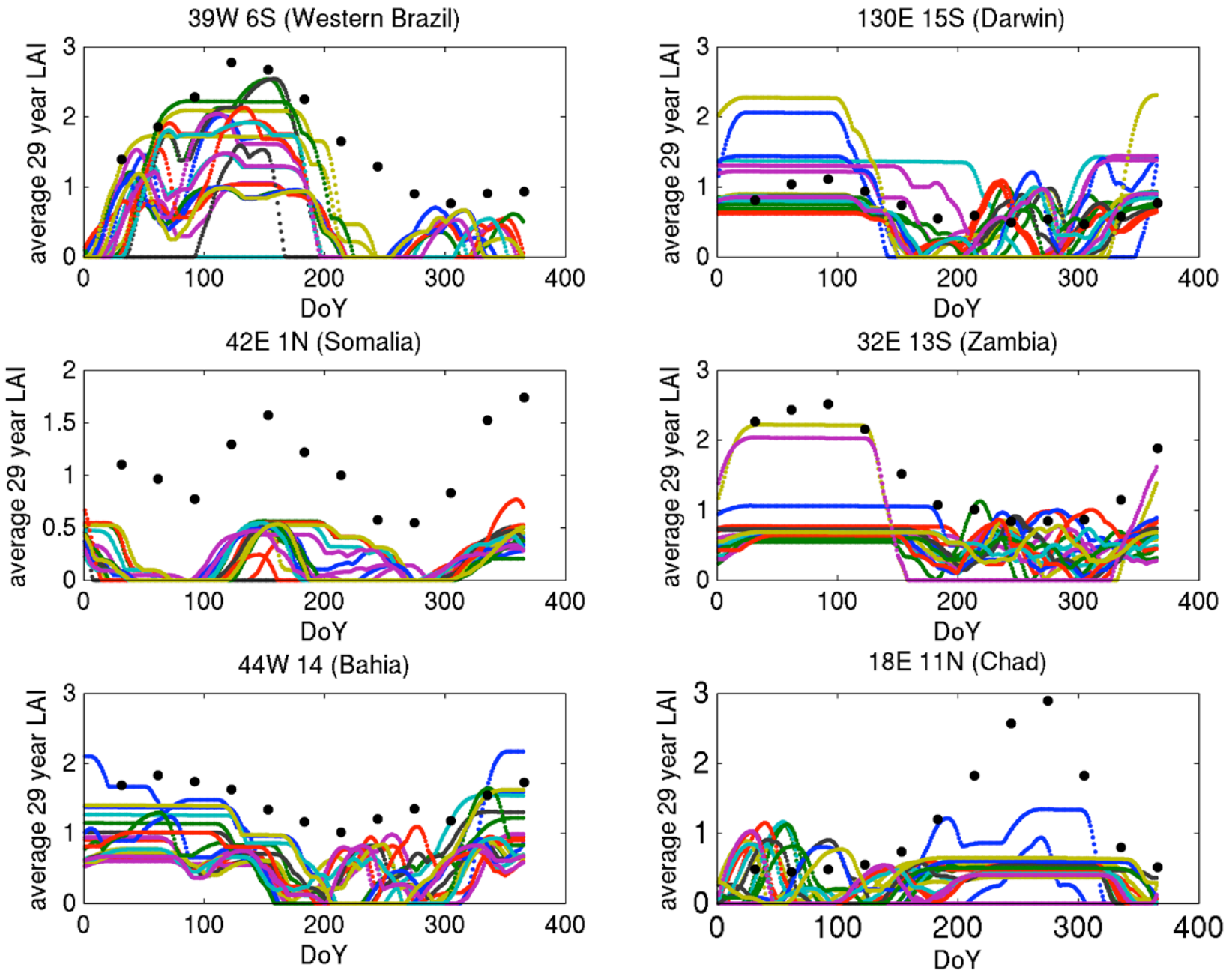
3 dimensional sensitivity analysis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44W 14 (Bahia)
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average 29 year LAI
DoY
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200
300
400
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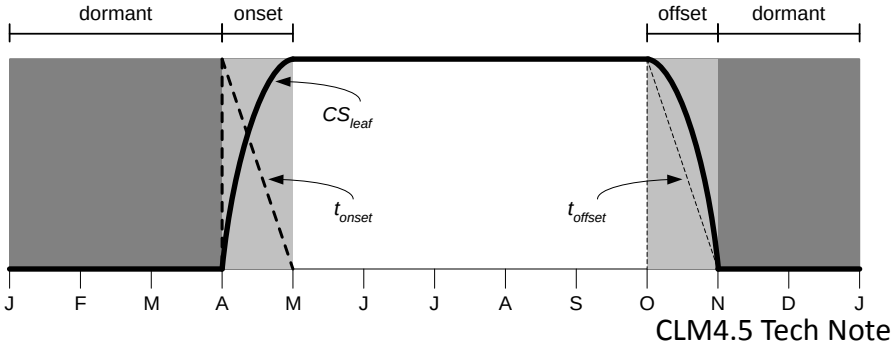

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- Start growing leaves if…
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  - **It RAINS?**
- Onset period fixed at 30 days
- Start dropping leaves if…
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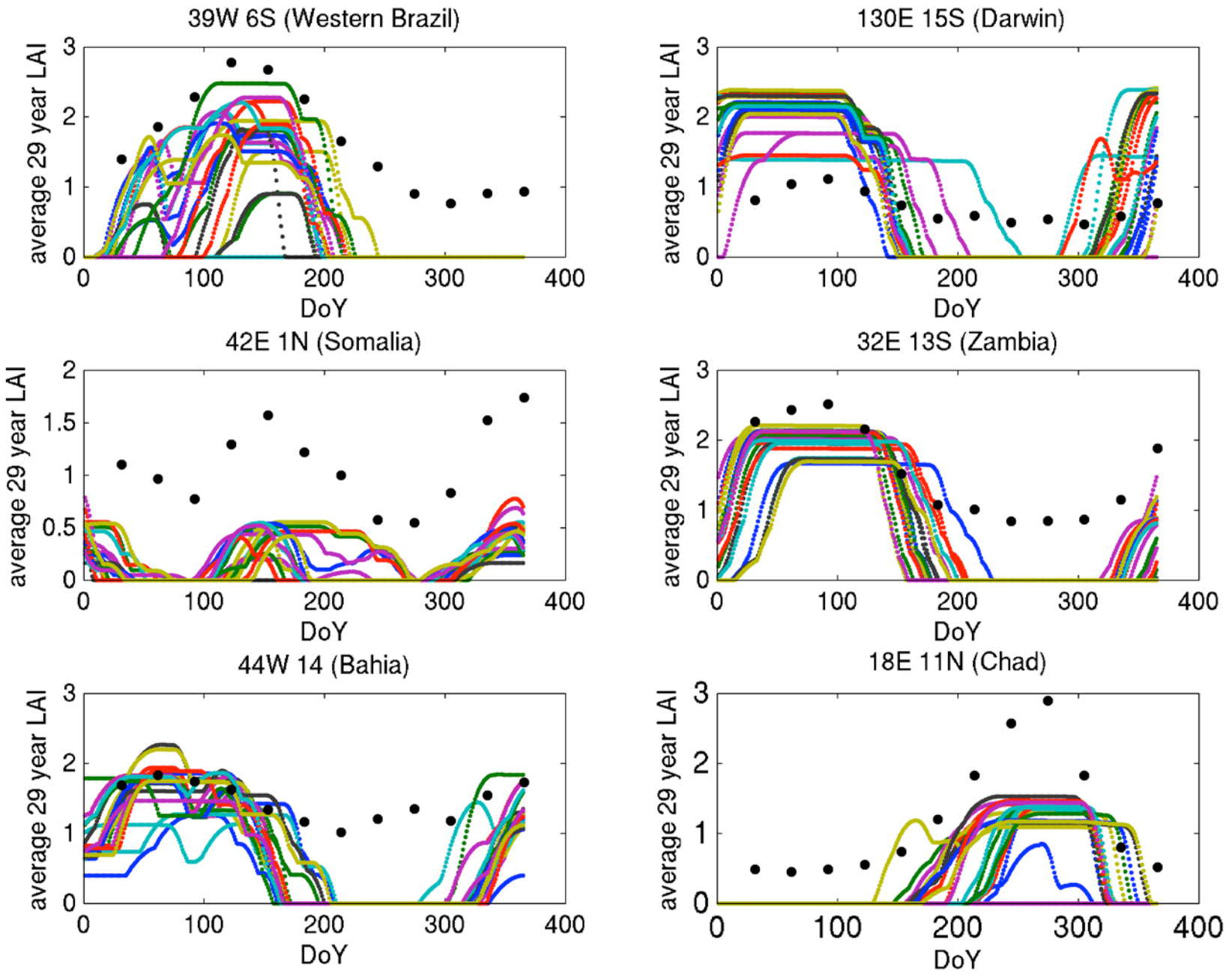
- Leaf drop period fixed at 15 days

Does adding a rainfall trigger help?

4 dimensional sensitivity analysis with point simulations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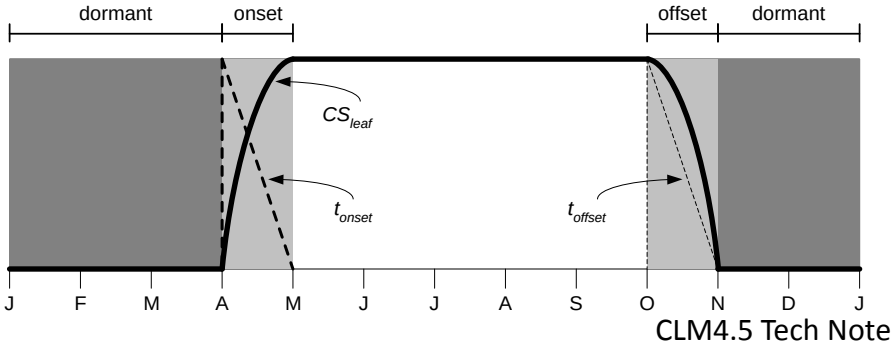

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  - **It RAINS! (20 mm in the past 10 days)**
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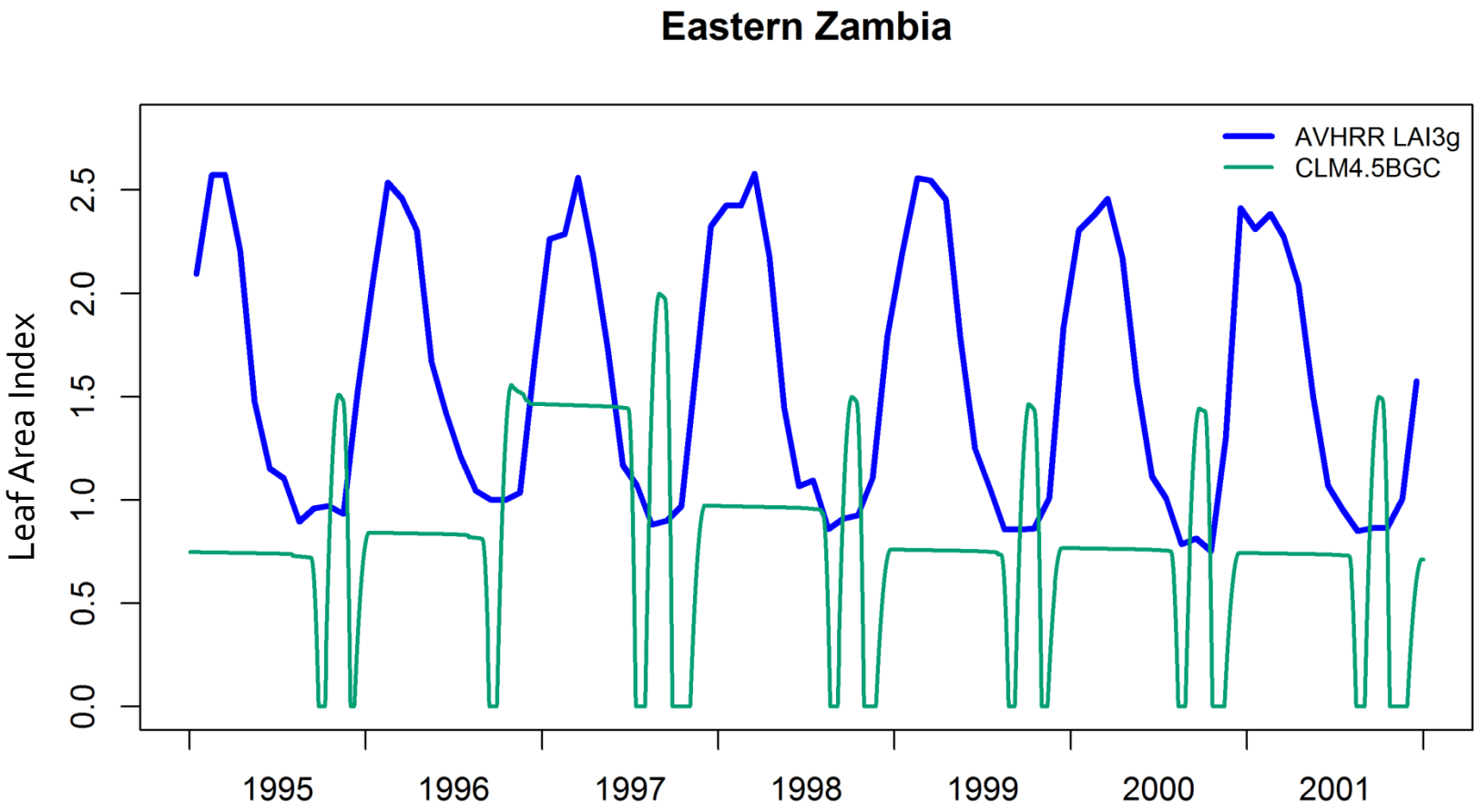
It works (better)!



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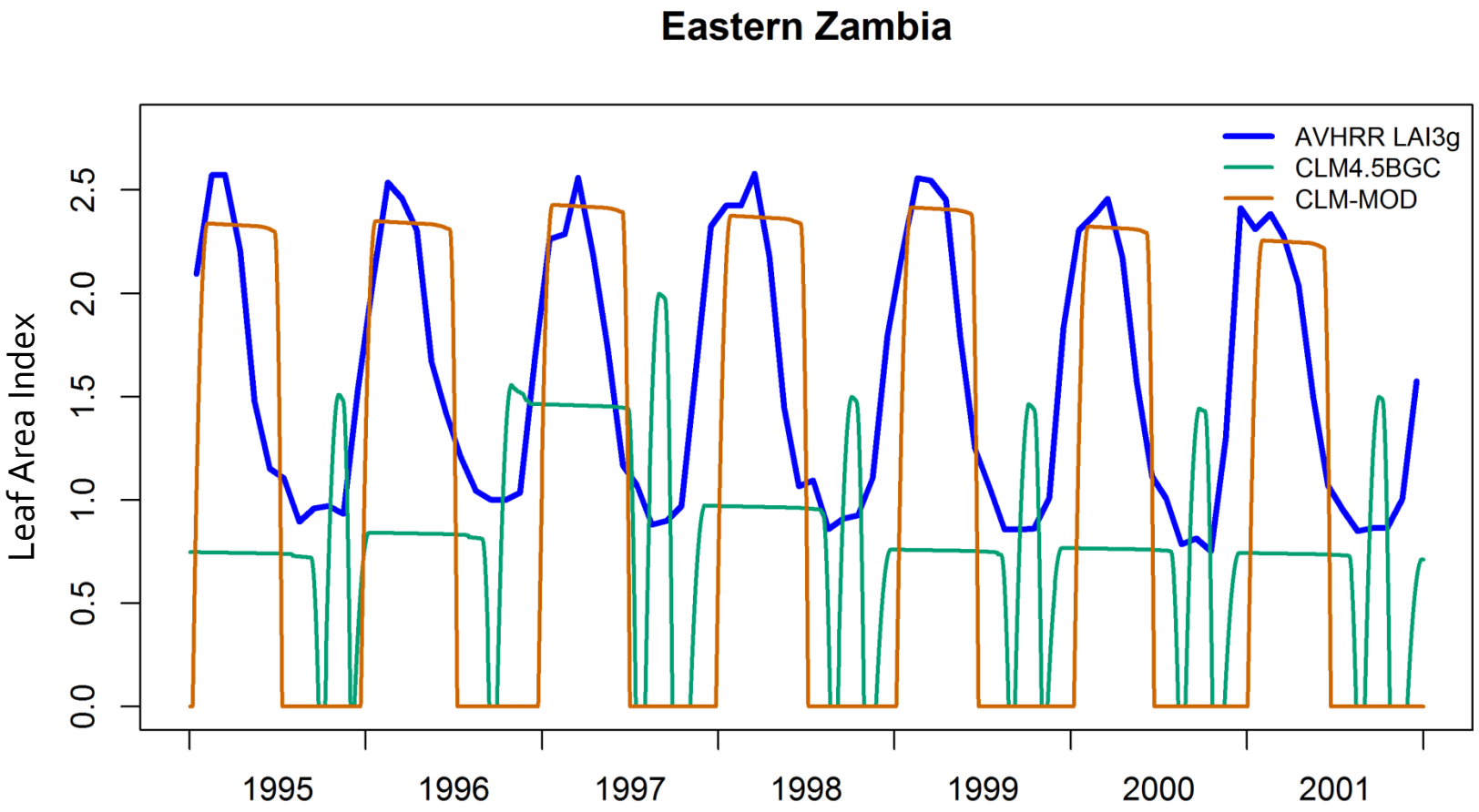
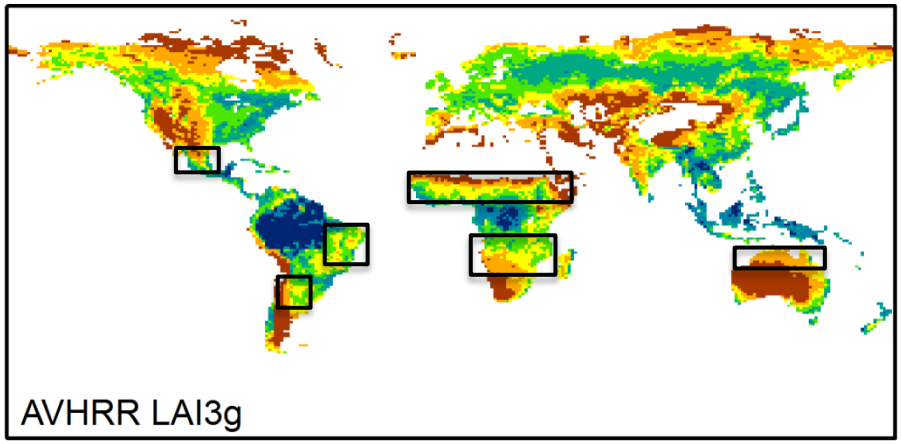
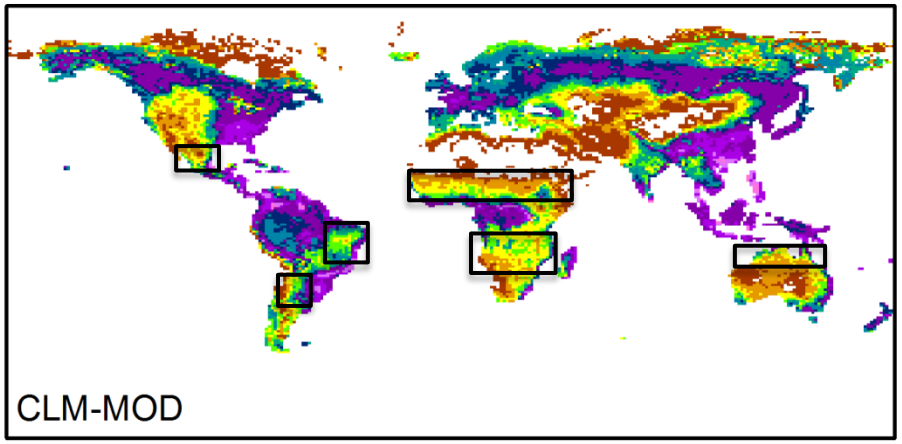
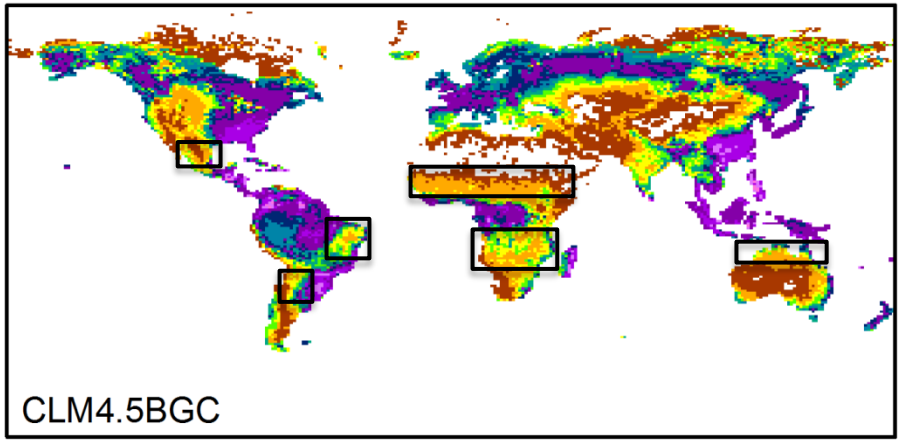


Max LAI



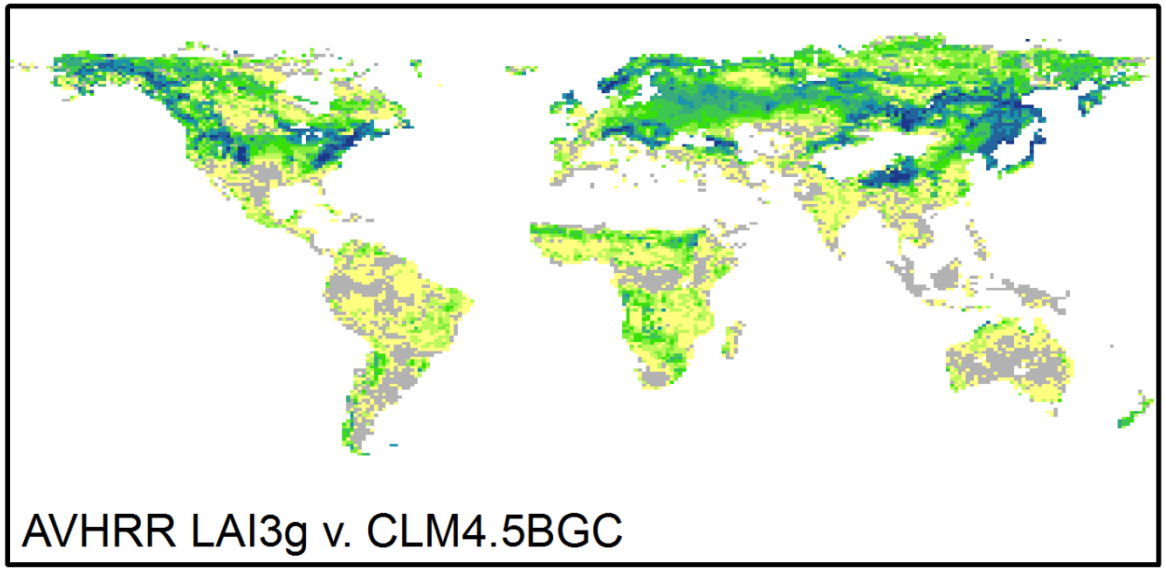




LAI

- 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 5 - 7
- 7 - 10
- 10 - 14
- 14 - 18
- 18 - 22.5

Correlations



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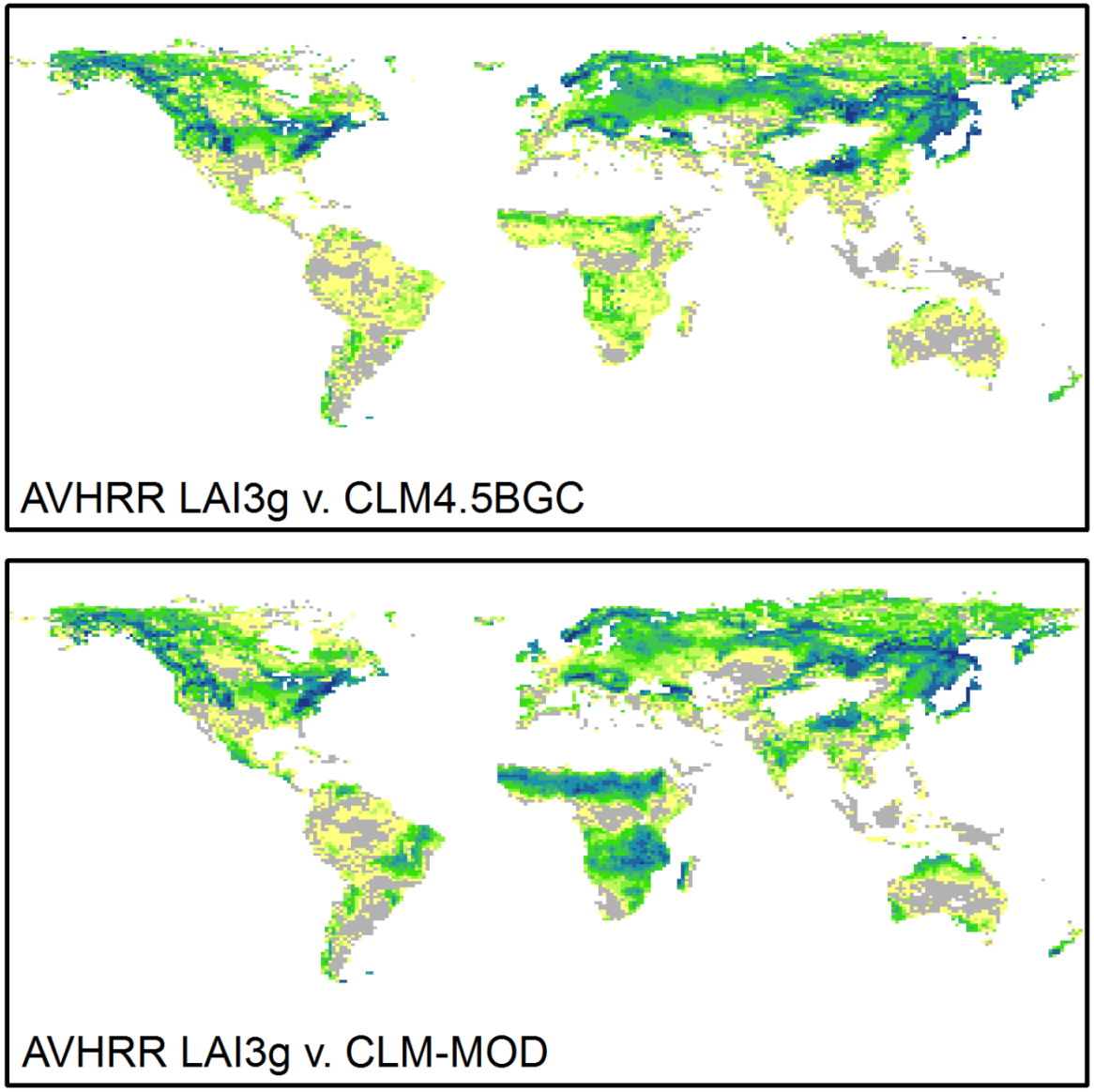

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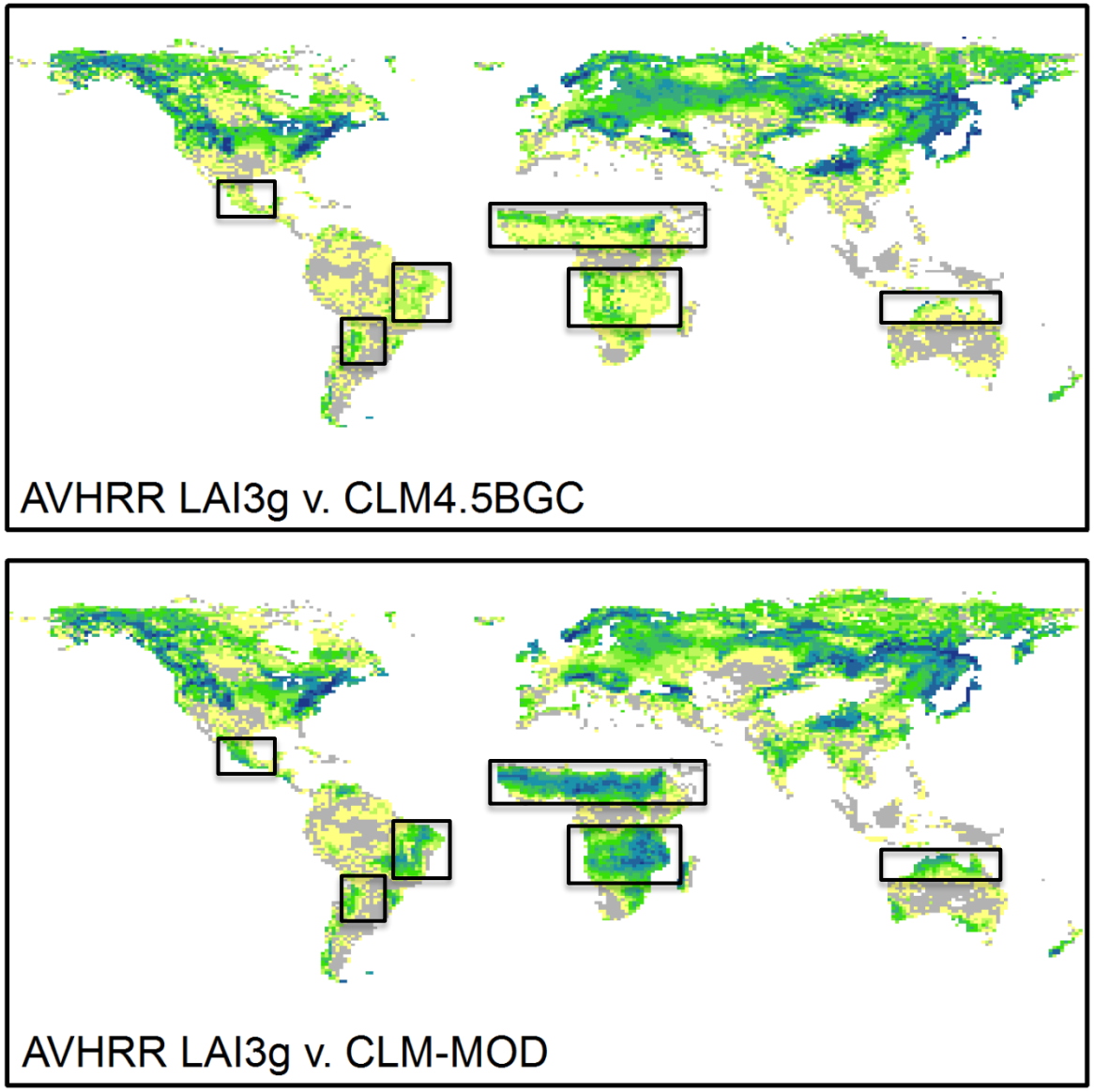

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- Delaying budburst until some **rain has fallen gives better agreement with the data**, both for magnitude and seasonal cycle of LAI in savanna regions

Next Steps

- What happens to **productivity**?

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- What happens to the **fire cycle**?

Next Steps

- What happens to **productivity**?
- What happens to the **fire cycle**?
- Does this change matter to the **atmosphere**?

Thanks!

Questions?

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@bristleweed