

# Calibrating drydowns

Identifying and optimising Soil Surface Moisture drydowns in the ORCHIDEE land-surface model

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EGU - HS6.3: Remote sensing of soil moisture - 6 May 2020

## Soil Moisture in ORCHIDEE



- 3 hydric budgets for soil columns associated to vegetation
- Weight average of the 3 SM variables
- 11 layer
  discretization for
  the soil column

#### In-situ sites



- ISMN sites within the footprint of FLUXNET tower
- FLUXNET provides accurate forcing data and flux data (GPP/LE) for evaluation.

# Definition of drydowns

Soil Moisture (**9**) Precipitation



- Due to large biases
  in SM, focus on
  temporal dynamics
- Measure of soil moisture memory
- τ is the metric of interest

#### Local example



## **Overall trends**



- Generally, the model dries out faster than the observation
- Too small sample of sites to draw conclusions about vegetation, soil texture or climate

# Calibration



- Using Opt\_τ, for all sites, at least half of the τ values improve
- Opt\_τ outperforms
  Opt\_fullSSM in
  improving
  drydowns

**Opt\_t** - calibration using  $\tau$  values **Opt\_fullSSM** - using whole bias-corrected SSM timeseries

Effect on other fluxes



- Little to no change
  when using Opt\_τ
- More significant deterioration of fit when using Opt\_fullSSM

## **Future Perspectives**

Submit manuscript by the end of the month:

Raoult, N., et al. (2020), *Evaluating and Optimising Surface Soil Moisture drydowns in the ORCHIDEE land-surface model,* Journal of Hydrometeorology

- Use satellite data
  - Investigate global trends
  - > Perform global calibration of soil moisture retrievals
- Simultaneous global calibration of soil moisture with other data streams
  - > NDVI or SIF in
  - Land surface temperature