



LDAS-Monde: global scale land surface data assimilation system using SURFEX

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Monitor vegetation and the terrestrial water cycle

→ LDAS-Monde: <https://www.umr-cnrm.fr/spip.php?article1022>

→ LDAS-Monde involves

Land surface model: **ISBA (NIT)** [Calvet et al. 1998, Gibelin et al. 2008]

Multilayer soil: **ISBA (DIF)** [Boone et al. 2000, Decharme et al. 2013]

Multilayer snow: 12 layers [Boone and Etchevers 2001, Decharme et al. 2016]

River routing system: **CTRIP** [Decharme et al. 2019]

Data assimilation routines (SEKF, EnKF) [Barbu et al. 2014, Bonan et al. 2020]

Satellite derived observations

- **Copernicus Global Land Service** (SSM, LAI)
- **ESA-CCI** (SSM, snow water equivalent)

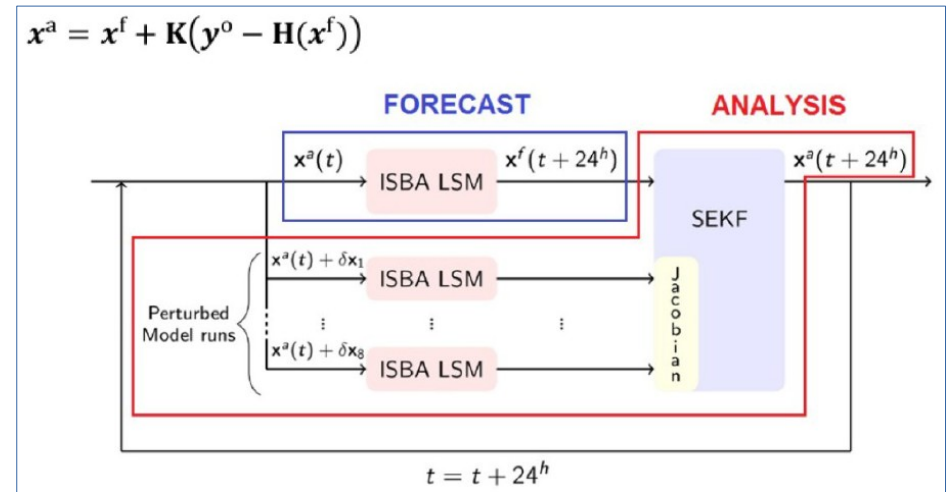
Sequential assimilation of LAI

Root-zone soil moisture analysis from assimilation of LAI (a unique capability)

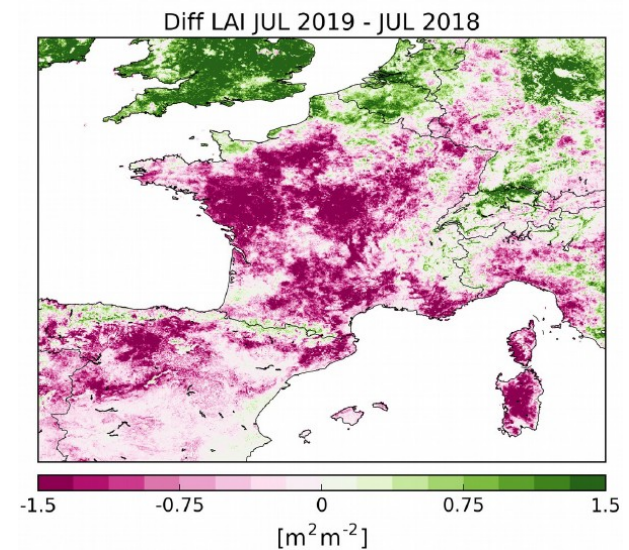
Assimilation of snow water equivalent

Sequential data assimilation of LAI

- **Thanks to photosynthesis-driven phenology**
 - based on Goudriaan approach
 - plant water stress: tolerant vs. avoiding
 - flexible LAI
 - LAI can be assimilated
 - rapid response to rains in semi-arid environments

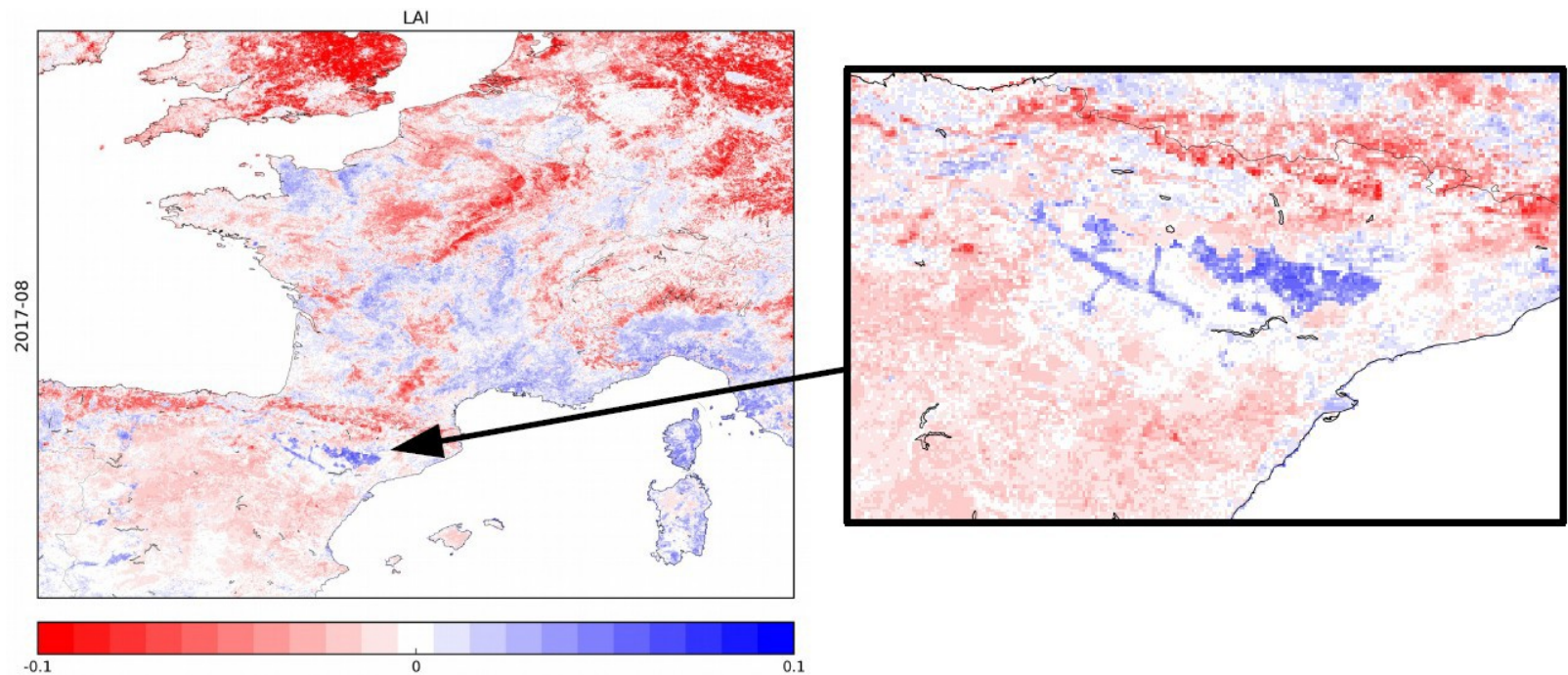


- **Towards higher spatial resolution**
 - Global: 25 km x 25 km
 - ERA-5
 - Western Europe
 - AROME NWP atmospheric variables interpolated on a ~ 2.5 km grid



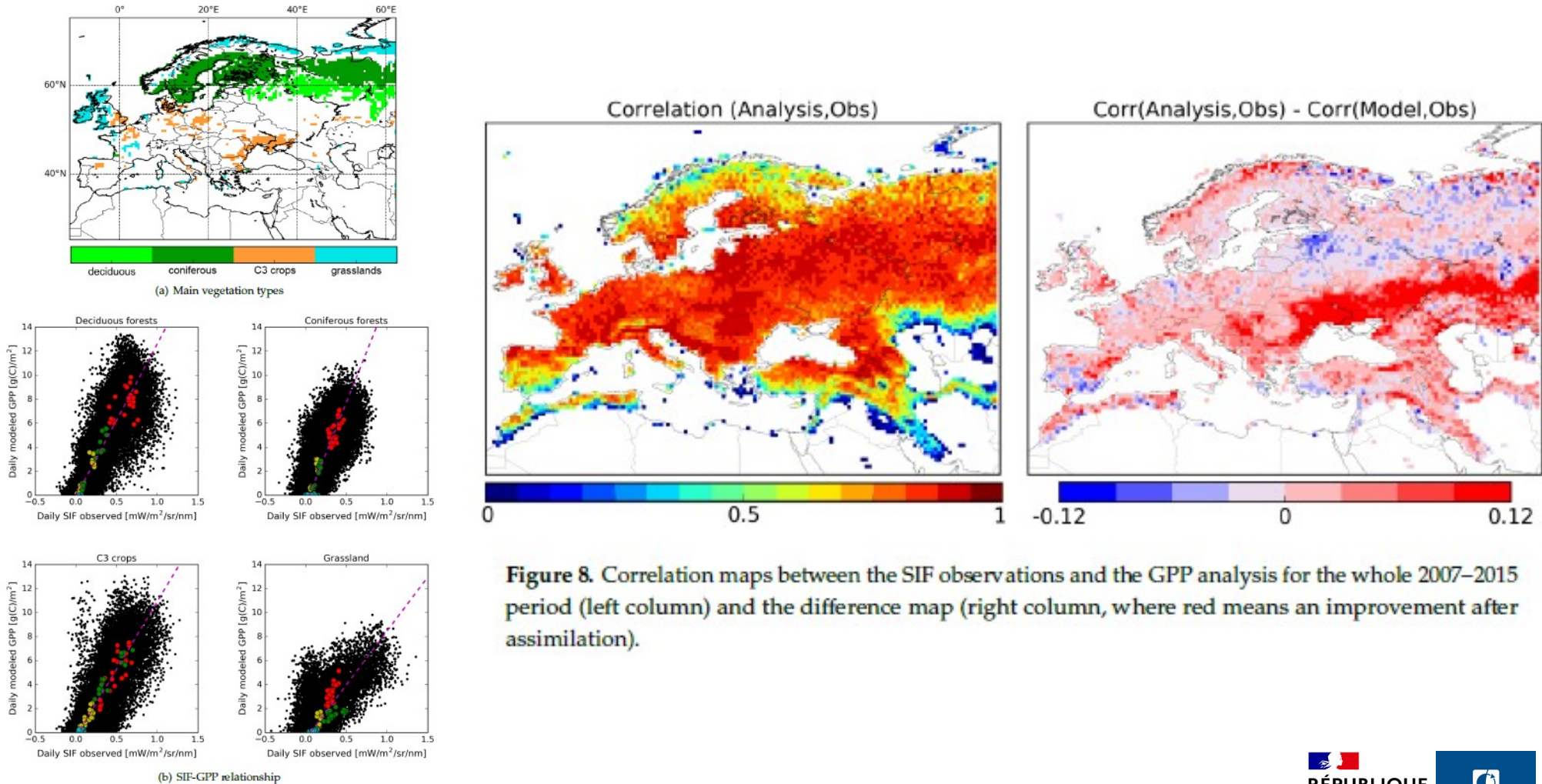
Integration of geographical info into SURFEX

- **ECOCLIMAP** (using satellite-derived land cover info)
- **LDAS-Monde**
 - Another way of integrating satellite data in ISBA
 - e.g. LAI increments highlighting irrigated areas in Spain (August 2017)



Use of SIF

- Assess the added value of assimilating LAI in ISBA
 - Leroux et al. 2018 (<https://doi.org/10.3390/rs10081199>)



Thank you for your attention :)

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