

Welcome at METEOPOLE

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Copernicus Global Land User Conference Toulouse, 23-25 October 2018

Main technical center (~1000 persons) of Meteo-France





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Land-atmosphere interactions are key for:

- The hydrological cycle, the carbon cycle
- Representing lower boundary conditions of the atmosphere
- Numerical Weather Prediction (NWP) models and Earth System Models (ESMs)



Global LAI map

(adapted from Munier et al. Remote Sensing 2018)

Mean LAI over the 1999-2015 time period calculated using the GEOV1 product of the Copernicus Global Land service.



Land remote sensing at CNRM

- Land surface albedo
 - EUMETSAT LSA-SAF
 - Copernicus Global Land service
 - Copernicus Climate Change service
- Aerosol AOD from METEOSAT
 - AERUS-GEO (Carrer et al. AGU 2014)
- Integration into models
 - ECOCLIMAP (Faroux et al. GMD 2013)
 - LDAS-Monde (Albergel et al. GMD 2017)



Land surface modeling: the ISBA model

- Within the open-source SURFEX modeling platform
 - http://www.umr-cnrm.fr/surfex/
 - SURFEX makes several models work together
 - Ocean, soil-plant system, snow, ice, lakes, urban areas
 - SURFEX is used in operational applications:
 - Weather forecast, hydrology, IPCC simulations (CNRM-ARPEGE)
 - Used by many meteorological services in Europe and North Africa
- Geographic information is managed by **ECOCLIMAP**
 - https://opensource.umr-cnrm.fr/projects/ecoclimap-sg/wiki
 - Global, 300 m x 300 m
 - Needed to map model parameters
 - Vegetation types (e.g. crops, grasslands, forests, ...)
 - Soil types
 - Cities, ...
 - Needed to represent subgrid heterogeneity





Sequential data assimilation: LDAS-Monde

- Integration of satellite data into the ISBA model
- Sequential assimilation of vegetation products
 - Thanks to flexible LAI simulated by the ISBA model
 - Photosynthesis-driven phenology, no GDD phenology sub-model
 - Joint assimilation of LAI (or FAPAR) and surface soil moisture (SWI-001) (http://land.copernicus.eu/global)
- Disaggregation of satellite-derived LAI (Munier et al. Remote Sensing 2018)
 - Kalman filter based on SURFEX static proxy (following method by Carrer el al. RSE 2014)



Sequential data assimilation: LDAS-Monde

Produces

- Surface fluxes (evapotranspiration, sensible heat, CO₂)
- Land surface temperature
- Soil moisture and soil temperature profiles
- Surface runoff, drainage and river dicharge
- Vegetation variables (LAI, biomass)
- Snow variables, soil freezing/thawing
- ...

SEE PRESENTATION OF CLEMENT ALBERGEL



Example: wheat yields over France (1999-2013)





Example: wheat yields over France (1999-2013)



Dewaele et al. PhD 2017



Summary: current use of CGLS products

- ECOCLIMAP Second Generation (ECOCLIMAP-SG)
 - LAI 10-day climatology (CGLS, PROBA-V 2014-2016) 300 m x 300 m
 - Soil and vegetation albedo derived from the baseline CGLS surface albedo product (SPOT-VGT 1998-2014) 1 km x 1 km using the Carrer et al. RSE 2014 method

LDAS-Monde

- LAI (GEOV1 1 km x 1 km)
- Surface soil moisture (SWI-001 0.1° x 0.1°)



Practical information

BUS 18 to METRO LIGNE A

- LOOPING AT METEO-FRANCE
- From Meteo-France to Metro : Direction « Metro Basso Cambo »
- Ticket (including metro trip) from the driver: 2 €





Enjoy your stay in Toulouse !





CNRM - October 2018

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