

MARIE SKLODOWSKA-CURIE ACTIONS

**Individual Fellowships (IF)**  
**Call: H2020-MSCA-IF-2015**

**PROCEED - Milestone1.1: Delivery of datasets for analysis, model initialization and evaluation that will also serve WP2, WP3, WP4 and WP5. (Month 4)**

***PROcess-based sEamless development of useful Earth  
system predictions over lanD  
(PROCEED)  
Grant Agreement N. 704585***

Grantee: Andrea Alessandri

Beneficiary Institution: KNMI

Secondment Institution: ECMWF

Primary Advisor: Prof. Bart Van Den Hurk

Co-advisors (secondment): Gianpaolo Balsamo, Franco Molteni

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## Delivery of datasets for analysis, model initialization and evaluation that will also serve WP2, WP3, WP4 and WP5.

Gridded datasets from the latest developments being released by the Copernicus land monitoring service (<http://www.copernicus.eu/>) and the Global LAnd Surface Satellite product that is distributed by the Global Land Cover Facility at the University of Maryland (hereinafter GLASS-GLCF; <http://glcf.umd.edu>)<sup>1</sup> have been acquired to provide global description of the biophysical state of vegetation (e.g. leaf area index, fraction of green vegetation cover) and the coupling with the atmosphere and the energy/water budget (e.g. albedo, soil moisture, snow cover, land surface temperature, precipitation, circulation).

Variable	Dataset and Version	Reference	Spatial resolution	Time frequency	Units	Period	Policies for use
LAI	GLCF GLASS	<a href="http://glcf.umd.edu/data/lai/">http://glcf.umd.edu/data/lai/</a> (* Xiao Z., et al., (2013) Liang et al. (2014)	0.05° × 0.05°	8 days	$\frac{m^2}{m^2}$ (-)	1981-2014	Registration and acknowledgement required
LAI	Copernicus	<a href="http://land.copernicus.eu/global/products/lai">http://land.copernicus.eu/global/products/lai</a> <i>http://land.copernicus.eu/global/sites/default/files/products/GIO_GL1_PUM_LAI1km-V2_II.21.pdf</i>	1 Km × 1 Km	10 days	$\frac{m^2}{m^2}$ (-)	1999-present	Licence and acknowledgement required
Albedo	GLCF GLASS	<a href="http://glcf.umd.edu/data/abd">http://glcf.umd.edu/data/abd</a> (* Liu et al., (2013) Liang et al. (2014)	0.05° × 0.05°	8 days	(-)	1982-2014	Registration and acknowledgement required
Albedo	Copernicus	<a href="http://land.copernicus.eu/global/products/albedo">http://land.copernicus.eu/global/products/albedo</a>	1 Km × 1 Km	10 days	(-)	1999-present	Licence and acknowledgement required
Snow Cover	NSIDC DAAC	<a href="https://earthdata.nasa.gov/about/daacs/daac-nsidc">https://earthdata.nasa.gov/about/daacs/daac-nsidc</a>	Irregular: 180 x 180 (lat x lon grid points)	7 days	fract (-)	1979-2012	Registration and acknowledgement
Green Veget. Fraction	FCOVER Copernicus	<a href="http://land.copernicus.eu/global/products/fcover">http://land.copernicus.eu/global/products/fcover</a> <i>http://land.copernicus.eu/global/sites/default/files/products/GIO_GL1_PUM_FCOVER1km-V2_II.21.pdf</i>	1 Km × 1 Km	10 days	fract (-)	1999-present day	Licence and acknowledgement

<sup>1</sup> GLCF server (<http://glcf.umd.edu>) is being discontinued in 2019. At the same time the data will be migrated to other servers such as mirror site at Beijing Normal University: <http://glass-product.bnu.edu.cn>

<b>Veget, Continuous Fields</b>	LP DAAC (Land Processes Distributed Active Archive Center)	<a href="http://glcf.umd.edu/data/vcf/">http://glcf.umd.edu/data/vcf/</a> (*) DiMiceli, et al., (2011) Liang et al. (2014)	250 m × 250 m (geotiff mosaics)	1yr	fract (-)	2000-2010	Registration and acknowledgment required
<b>Modis land cover</b>	GLCF Global Land Cover	<a href="http://glcf.umd.edu/data/lc/">http://glcf.umd.edu/data/lc/</a> (*) Channan, S., K. Collins, and W. R. Emanuel. 2014.	0.5°×0.5°	1yr	fract (-)	2001-2012	Registration and acknowledgment required
<b>Soil Moisture</b>	ESA CCI v3.2	<a href="http://www.esa-soilmoisture-cci.org/">http://www.esa-soilmoisture-cci.org/</a> Dorigo and De Jeu (2016)	0.25° × 0.25°	daily	$\frac{m^3}{m^3}$ (-)	1979-2015	Registration and acknowledgment required

**Table 1: Satellite-derived Land-Vegetation datasets characteristics. (\*) Please, note that GLCF server will be discontinued in 2019. Data migrating to mirror: <http://glass-product.bnu.edu.cn>**

Satellite-derived Leaf Area Index (LAI), Surface Albedo (ALB), Snow Cover (SNC), Fraction of Green Vegetation cover (VegF), Vegetation Continuous Fields (VCF), Land Cover Types (LCT) and Soil Moisture (SM) have been collected. See Table 1 for a summary of each dataset characteristics.

Station-based global gridded datasets of precipitation (PRE) and 2 meter Temperature (T2M) have been collected. See Table 2 for a summary of each dataset characteristics.

Surface climate and atmospheric variables at daily frequency have been collected from ERA-Interim Reanalysis (Berrisford et al., 2007; Dee et al., 2011; see Table 3 for a summary of variables and dataset characteristics). The ERA-Interim variables at original horizontal resolution (T255 spectral horizontal resolution, approximately 80km) are obtained from the data available on the KNMI climateexplorer (<https://climexp.knmi.nl/>; courtesy of Dr. Van den Oldenborg).

At a later stage in the project, the same surface climate variables have been collected from the new ECMWF ERA-5 reanalysis (Hersbach et al., 2018) released in the second half of 2018. The ERA-5 variables at original horizontal resolution (T639 spectral horizontal resolution, approximately 30km) are obtained via mars archive (<https://www.ecmwf.int/en/forecasts/datasets/archive-datasets>) accessible from the computing facilities at ECMWF.

Various sampling frequencies have been considered, ranging from monthly mean values for station-based gridded variables, to subseasonal frequency (i.e. weakly or sub-weekly) for satellite-derived data and to daily frequency for reanalysis. The time period covered by each variable vary depending on the availability of the source datasets. Tables 1-4 summarize the characteristics of the retrieved datasets.

A preprocessing of the data have been accomplished, including preliminary quality check, analysis of the spatial and time coverage in order to maximize overlap between the different data sources and to minimize the effect of undefined values (hereinafter NaN).

Variable	Dataset and version	reference	spatial resolution	Time-frequency	units	period	policies for use
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<b>PRE</b>	CMAP v1701 (update 03/2017)	<a href="https://www.esrl.noaa.gov/psd/data/gridded/data.cmap.html">https://www.esrl.noaa.gov/psd/data/gridded/data.cmap.html</a>	2.5°x2.5°	pentads	mm d <sup>-1</sup>	1979-2016	acknowledgement
<b>PRE</b>	GPCP v2.2	<a href="https://precip.gsfc.nasa.gov/gpcp_v2.2_comb_new.html">https://precip.gsfc.nasa.gov/gpcp_v2.2_comb_new.html</a>	2.5°x2.5°	pentads	mm d <sup>-1</sup>	1979-2016	acknowledgement
<b>T2M</b>	CRU TS v4.00	<a href="https://crudata.uea.ac.uk/cru/data/hrg/">https://crudata.uea.ac.uk/cru/data/hrg/</a>  Harris et al. (2014)	0.5°x0.5°	monthly	mm month <sup>-1</sup>	1901-2015	registration and acknowledgement (share alike)
<b>PRE</b>	CRU TS v4.00	<a href="https://crudata.uea.ac.uk/cru/data/hrg/">https://crudata.uea.ac.uk/cru/data/hrg/</a>  Harris et al. (2014) <a href="https://doi.org/10.1002/joc.3711">doi:10.1002/joc.3711</a>	0.5°x0.5°	monthly	mm month <sup>-1</sup>	1901-2015	registration and acknowledgement (share alike)

**Table 2: Station-based gridded datasets characteristics.**

Reference	Spatial resolution	Time frequency	period	policies for use	Variables	Units
Berrisford et al., 2007; Dee et al., 2011  Data obtained from KNMI climate explorer, courtesy of Geert Jan Van den Oldenborg.	T255, ~80kmx80 km	daily	1979-present	acknowledgement	T2m	Kelvin
					Geopotential Height (Z500)	m <sup>2</sup> /s <sup>2</sup>
					Zonal wind (U850)	m/s
					Meridional wind (V850)	m/s
					Surf Solar Radiation (SSR)	W/m <sup>2</sup>

**Table 3: ERA-Interim datasets characteristics.**

Reference	Spatial resolution	Time frequency	period	Policy for use	Variables	Units
Hersbach et al., 2018	T639, ~30kmx30km	daily	1979-present	Licence and acknowledgement	T2m	Kelvin
					Geopotential Height (Z500)	m <sup>2</sup> /s <sup>2</sup>
					Zonal wind (U850)	m/s

					Meridional wind (V850)	m/s
					Surf Solar Radiation (SSR)	W/m <sup>2</sup>

**Table 4: ERA-5 datasets characteristics.**

## References:

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