

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

Start date of the Project: January 1 2017

## Delivery of datasets for analysis, model initialization and evaluation that will also serve WP2, WP3, WP4 and WP5. (Month 4)

Gridded datasets from the latest developments being released by the Copernicus land monitoring service (<http://www.copernicus.eu/>), the Earth2Observe online portal (<http://www.earth2observe.eu/>) and the Global Land Cover Facility (GLCF; <http://glcf.umd.edu>) 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, land surface temperature, precipitation, circulation).

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 surface air 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 already on the KNMI climate explorer (<https://climexp.knmi.nl/>; courtesy of Van den Oldenboroug).

Various sampling frequencies have been considered, ranging from monthly mean values for station-based gridded variables, to subseasonal frequency (i.e. weakly or sub-weakly) 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 1-3 summarize the characteristics of the retrieved datasets.

The datasets have been stored in the server bhw443 ([bhw443@knmi.nl](mailto:bhw443@knmi.nl)) located at KNMI in De Bilt (Netherlands). 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
LAI	GLCF GLASS	<a href="http://glcf.umd.edu/data/lai/">http://glcf.umd.edu/data/lai/</a> Xiao Z., et al., (2013)	0.05°x0.05°	8 days	m <sup>2</sup> m <sup>-2</sup>	1981-2014	Free acknowledgement required
LAI	Copernicus	<a href="http://land.copernicus.eu/global/products/lai">http://land.copernicus.eu/global/products/lai</a> <a href="http://land.copernicus.eu/global/sites/default/files/products/GLI_PUM_LAI1km-V2_11.21.pdf">http://land.copernicus.eu/global/sites/default/files/products/GLI_PUM_LAI1km-V2_11.21.pdf</a>	1kmx1km	10 days	m <sup>2</sup> m <sup>-2</sup>	1999-present	registration and acknowledgement

<b>ALB</b> Expected delivery Q2 2017.	Copernicus	<a href="http://land.copernicus.eu/global/products/albedo">http://land.copernicus.eu/global/products/albedo</a>	1km x 1km	10 days	-	1999-present	registration and acknowledgement
<b>ALB</b>	GLCF GLASS 1.0	<a href="http://glcf.umd.edu/data/abd">http://glcf.umd.edu/data/abd</a> Liu et al., (2013).	0.05°x 0.05°	8 days	-	1982-2014	Free acknowledgement required
<b>SNC</b>	NSIDC DAAC	<a href="https://earthdata.asa.gov/about/daacs/daac-nsidc">https://earthdata.asa.gov/about/daacs/daac-nsidc</a>	Irregular: 180*180 lat*lon grid points	7 days	-	1979-2012	registration and acknowledgement
<b>VegF</b>	FCOVER Copernicus	<a href="http://land.copernicus.eu/global/products/fcover">http://land.copernicus.eu/global/products/fcover</a> <a href="http://land.copernicus.eu/global/sites/default/files/products/GIOGL1_PUM_FCOVER1km-V2_11.21.pdf">http://land.copernicus.eu/global/sites/default/files/products/GIOGL1_PUM_FCOVER1km-V2_11.21.pdf</a>	1km x 1km	10 days	-	1999-present day	registration and acknowledgement
<b>VCF</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)	250m x 250m (geotiff mosaics)	1yr	-	2000-2010	Free acknowledgement required
<b>LCT</b>	GLCF Global Land Cover Facility	<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°x0.5°	1yr	-	2001-2012	Free acknowledgement required
<b>SM</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°x 0.25°	daily	m <sup>3</sup> m <sup>-3</sup>	1979-2015	Registration and acknowledgement required

**Table 1. Satellite-derived Land-Vegetation datasets characteristics. Red color indicate the data variables not already available in final version together with expected delivery date.**

Variable	Dataset and version	reference	spatial resolution	Time-frequency	units	period	policies for use
<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> (click to access)	0.5°x0.5°	monthly	mm month <sup>-1</sup>	1901-2015	registration and acknowledgement (share alike)

<b>PRE</b>	CMAP v1701 (update 03/2017)	<a href="https://www.esrl.noaa.gov/p&lt;br/&gt;sd/data/gridded/data.cmap.h&lt;br/&gt;tml">https://www.esrl.noaa.gov/p sd/data/gridded/data.cmap.h tml</a>	2.5°x2.5°	pentads	mm d <sup>-1</sup>	1979- 2016	acknowled gement
<b>PRE</b>	GPCP v2.2	<a href="https://precip.gsfc.nasa.gov/&lt;br/&gt;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	acknowled gement

**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 Oldenboroug.	T255, ~80kmx80 km	daily	1979- present	acknow- ledgeme nt	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.**

## References:

*Berrisford, P., D. Dee, K. Fielding, M. Fuentes, P. Kallberg, S. Kobayashi, and S. Uppala, 2009: The ERA-Interim archive. ERA report series , 1.*

*Channan, S., K. Collins, and W. R. Emanuel. 2014. Global mosaics of the standard MODIS land cover type data. University of Maryland and the Pacific Northwest National Laboratory, College Park, Maryland, USA.*

*Dee, D., and Coauthors, 2011: The ERA-Interim reanalysis: Configuration and performance of the data assimilation system. Quart. J. Roy. Meteor. Soc., 137, 553–597, doi:10.1002/qj.828.*

*DiMiceli, C.M., M.L. Carroll, R.A. Sohlberg, C. Huang, M.C. Hansen, and J.R.G. Townshend (2011), Annual Global Automated MODIS Vegetation Continuous Fields (MOD44B) at 250 m Spatial Resolution for Data Years Beginning Day 65, 2000 - 2010, Collection 5 Percent Tree Cover, University of Maryland, College Park, MD, USA.*

*Harris, I., Jones, P.D., Osborn, T.J. and Lister, D.H. (2014), Updated high-resolution grids of monthly climatic observations – the CRU TS3.10 Dataset. Int. J. Climatol., 34: 623–642. doi:10.1002/joc.3711*

*International Journal of Applied Earth Observation and Geoinformation Volume 45, Part B, Pages 107-244 (March 2016) Advances in the Validation and Application*

*of Remotely Sensed Soil Moisture - Part 1 Edited by Wouter A. Dorigo and Richard A.M. de Jeu*

*Liu, N., Liu, Q., Wang, L., Liang, S., Wen, J., Qu, Y., & Liu, S. (2013). A statistics-based temporal filter algorithm to map spatiotemporally continuous shortwave albedo from MODIS data. Hydrology and Earth System Sciences, 17, 2121-2129, doi:2110.5194/hess-2117-2121-2013*

*Xiao Z., S. Liang, J. Wang, et al., Use of General Regression Neural Networks for Generating the GLASS Leaf Area Index Product from Time Series MODIS Surface Reflectance. IEEE Transactions on Geoscience and Remote Sensing, 2013,doi:10.1109/TGRS.2013.2237780.*