

# Soil moisture and vegetation water content based on the Land Data Assimilation Methodology

## Developer:

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## Product Overview:

- Soil moisture content at five depths and the vegetation water content based on the land data assimilation methodology is extracted from the land reanalysis data (ECHLA: ECoHydrological Land reAnalysis) using the land data assimilation system (CLVDAS: Coupled Land and Vegetation Data Assimilation System) .

## Validation method:

- Comparisons with in-situ data from Australian Yanco site.

## Goal accuracy:

- Soil moisture content: **8 vol.%** (by mean absolute error: MAE)
- Vegetation water content: **1 kg/m<sup>2</sup>** (by mean absolute error: MAE)

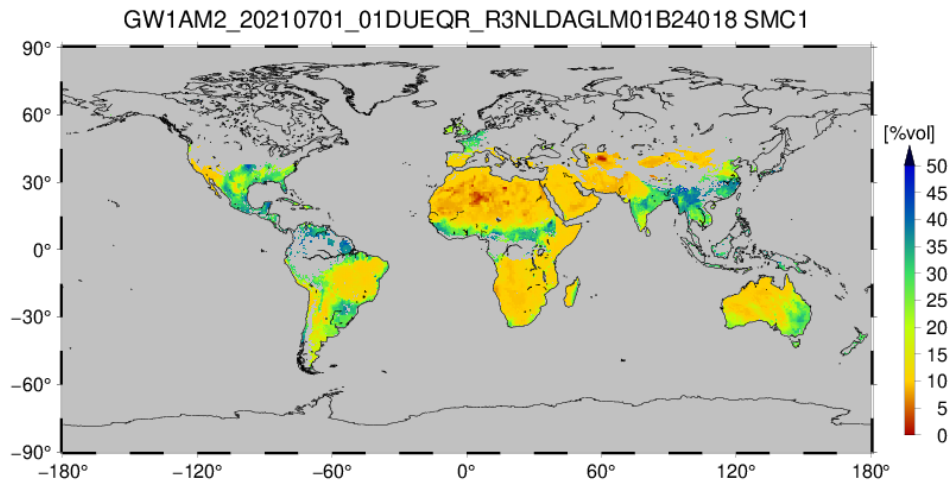


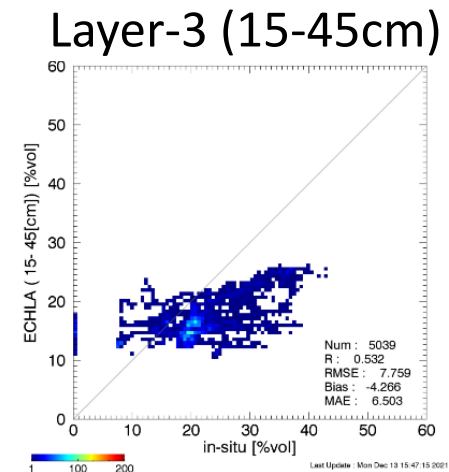
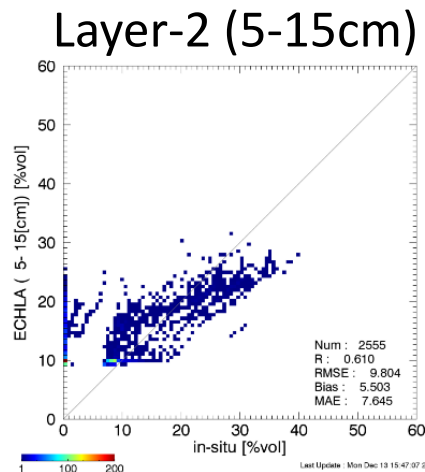
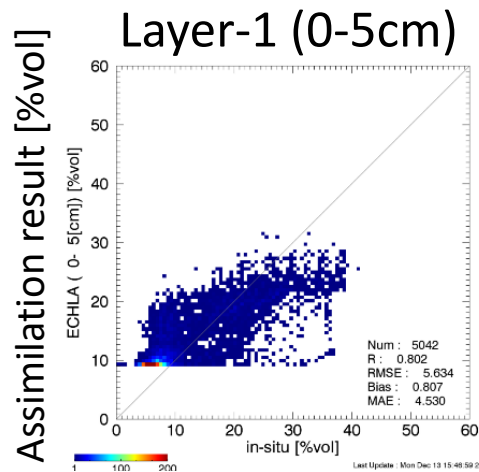
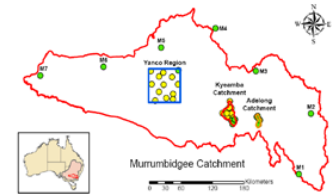
Fig.: SMC1 (soil moisture content [volumetric water content in %] (Layer-1: 0~5 cm in depth))

# Validation results of Soil Moisture Content based on the Land Data Assimilation Methodology

Validation point: Australian Yanco validation site

Validation period: Jan. 2013 – Dec. 2019

Using the daily average of each site observation data (acquisition rate of 80 % or more)



Ground observation [%vol]

Unit: Volumetric water content %

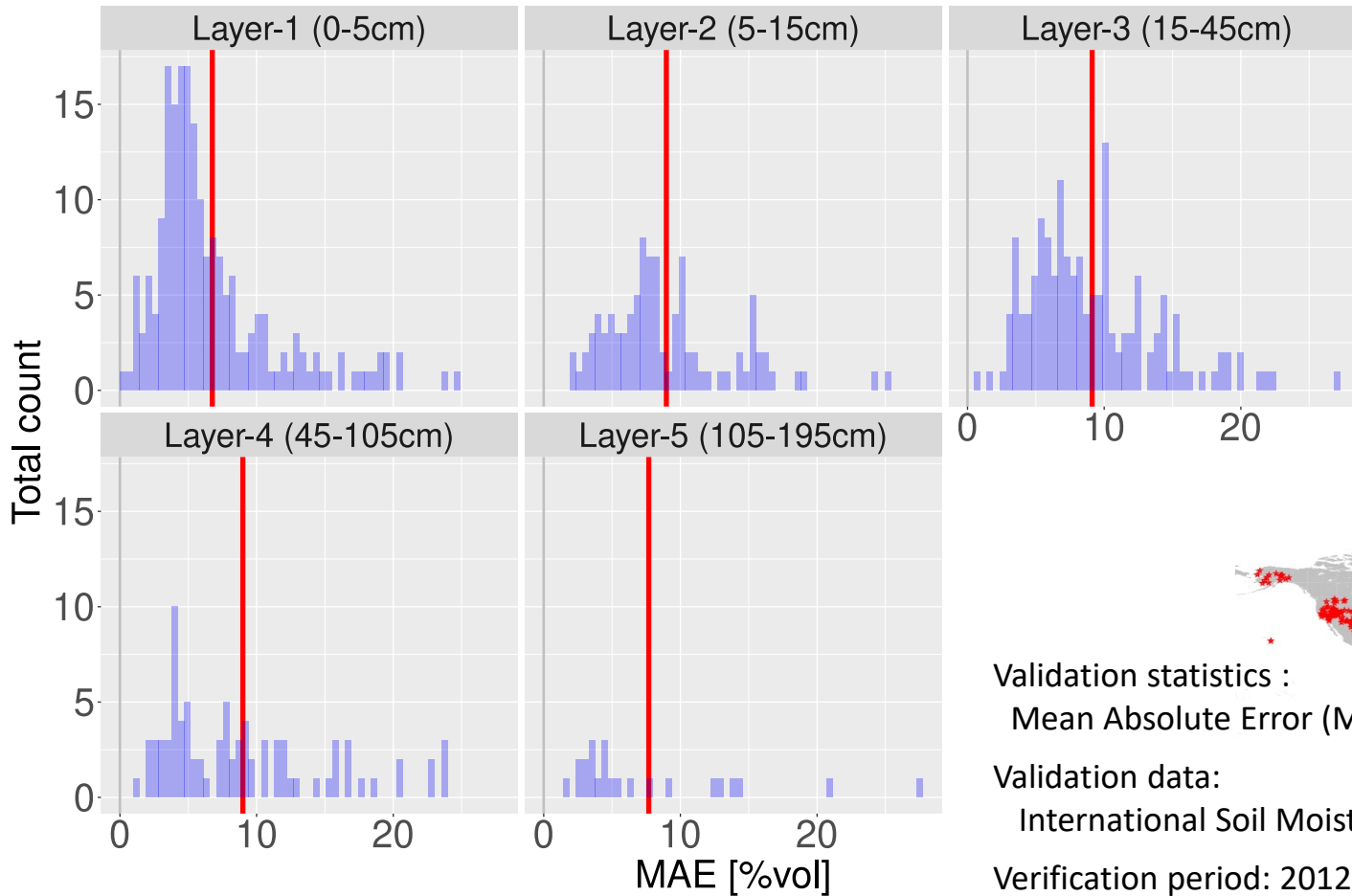
	Num.	R	RMSE	Bias	MAE
Layer-1 (0-5cm)	5042	0.802	5.634	0.807	4.530
Layer-2 (5-15cm)	2555	0.610	9.804	5.503	7.645
Layer-3 (15-45cm)	5039	0.532	7.759	-4.266	6.503

\* No ground observation for Layer 4, 5 depth

\* Release accuracy: 8%  
(Mean absolute error: MAE)

# Validation results of Soil Moisture Content based on the Land Data Assimilation Methodology

ISMN Statistics (All sites): Mean Absolute Error (MAE)



Mean Absolute Error (Average of all sites)

Layer	MAE
1	6.759
2	8.973
3	9.120
Four	8.993
Five	7.688

Unit : Volumetric moisture content %

\* Release accuracy: 8%



Validation statistics :  
Mean Absolute Error (MAE)

Validation data:  
International Soil Moisture Network (ISMN)

Verification period: 2012 -2020

Site conditions:  
10% or less of water surface within 25km surrounding area

# Validation results of Vegetation Water Content based on the Land Data Assimilation Methodology



Validation location: near the Australian Yanco validation site (latitude E146, longitude S34)

Validation period : 2003 -2010 (AMSR-E period) , 2013 -2019 (AMSR2 period)

Data used: MODIS LAI (MCD15A2H2), Average value of surrounding 12.5km

