

## README FILE

### **Products: Soil Moisture Maps**

**Data used: Sentinel-1 (SAR- radar sensor) and Sentinel-2 (optical sensor)**

**Scale: Plot scale**

**Site: Düren, Germany**

The soil moisture maps were carried out at a plot scale. A map is provided each 6 days (12 days with Sentinel-1A and 12 days with Sentinel-1B) for the period between September 2017 and December 2018.

Inversion algorithm for estimating soil moisture was applied for agricultural areas with any vegetation cover.

Sentinel-2 images were used to calculate the NDVI (Normalized Differential Vegetation Index) and to segment the agricultural areas in order to extract homogeneous polygons within agricultural plots.

13 NDVI maps for the zone are provided in the folder named "NDVI". For each Sentinel-1 acquisition date a corresponding NDVI map was used in producing the soil moisture map:

<b>Sentinel-1 acquisition date</b>	<b>NDVI map used</b>
September 2017 - October 2017	NDVI October 2017
November 2017 - December 2017	NDVI November 2017
January 2018 – February 2018	NDVI February 2018
March 2018	NDVI March 2018
April 2018	NDVI April 2018
May 2018	NDVI May 2018
June 2018	NDVI June 2018
July 2018	NDVI July 2018
August 2018	NDVI August 2018
September 2018	NDVI September 2018
October 2018	NDVI October 2018
November 2018	NDVI November 2018
December 2018	NDVI December 2018



## Important:

1. In the provided soil moisture maps (WGS84, EPSG: 4326), the soil moisture values (*mv*) are multiplied by **5**. In order to derive the estimated soil moisture value from the provided maps **it is necessary to divide** by **5**.

$$\text{Soil Moisture Estimation (mv Vol. \%)} = \frac{\text{Value obtained from the Map}}{5}$$

2. In the provided NDVI maps (NDVI folder, Geotiff format), the NDVI values are multiplied by **100**. To derive the NDVI value from the maps **it is necessary to divide** the obtained value by **100**.

$$\text{NDVI} = \frac{\text{Value obtained from the Map}}{100}$$

3. Null values in the soil moisture maps = no data (no soil moisture estimation)
4. **Attention :** When the soil temperature is negative (Frozen Conditions), the real water content of the soil is higher than that which could be estimated from SAR images because a part of the water content is found on ice form.

Nicolas Baghdadi, Mohammad El Hajj, Hassan Bazzi, Michael Arhinful

Avec la collaboration de Mehrez Zribi (Cesbio)

Irstea, TETIS, Montpellier

