README FILE

Products: Soil Moisture Maps

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

Scale: Plot scale

Site: France, Occitanie Region

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 2016 and May 2017.

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

The Land cover map provided by Jordi Inglada et al. (Cesbio, Theia) for the year 2016 was used as well as Sentinel-2 images corrected for atmospheric effects. The Land cover map was used to extract the agricultural areas. 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.

Five NDVI maps 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 :

Sentinel-1 acquisition date	**NDVI map used**
September – October 2016	September 2016
November – December 2016	December 2016
January – February 2017	February 2017
March 2017	March 2017
April – May 2017	April 2017

DELIVERABLE DESCRIPTION

The Soil Moisture Maps are divided into two main folders:

- **S1A: referring to maps derived from Sentinel 1A satellite**

The folder contains four footprint folders:

- Footprint_1
- Footprint_2
- Footprint_3
- Footprint_4

Each footprint folder contains the soil moisture maps corresponding to the footprint location.

To see the location of each footprint according to Occitanie please refer to the provided map "Footprint_S1A (.JPEG)" in folder S1A.

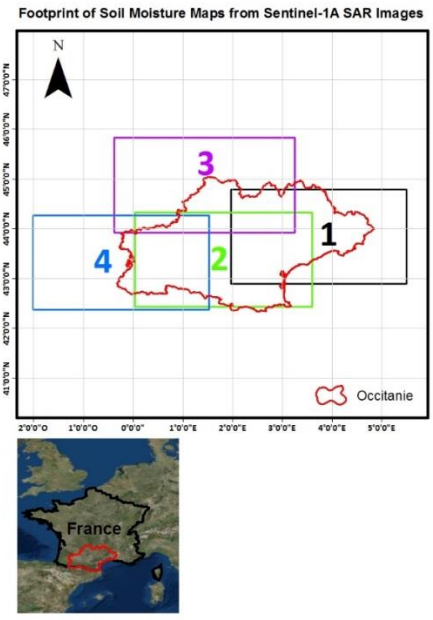
- **S1B: referring to maps derived from Sentinel 1B Satellite**

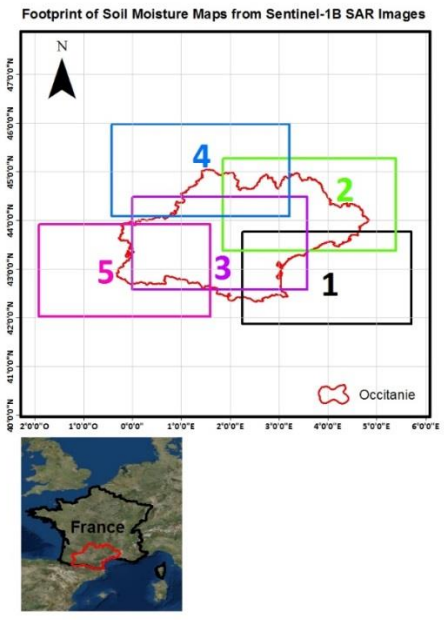
The folder contains four footprint folders:

- Footprint_1
- Footprint_2
- Footprint_3
- Footprint_4
- Footprint_5

Each footprint folder contains the soil moisture maps corresponding to the footprint location.

To see the location of each footprint according to Occitanie please refer to the provided map "Footprint_S1B (.JPEG)" in folder S1B.





FORMAT

Format description of soil moisture maps (for example 20160904T173856_ mv.tif):

- Geotiff
- Structure of files name: yyyymmddThhmmss_mv.tif
  - yyyy:year
  - mm: month
  - dd: acquisition day

T is used to separate the date and the time (UTC)

  - hh: hour
  - mm: minutes
  - ss: seconds

IMPORTANT

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

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

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.***

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

3. Null values in the soil moisture maps = no data (no soil moisture estimation)

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