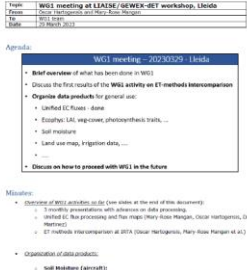| Topic	**WG1 meeting on LIAISE land surface characteristics** (update from Lleida meeting action list of 23 March 2023)
From	Oscar Hartogensis and Mary-Rose Mangan
To	WG1 team
Date	25 Jan 2024

Agenda:

For data interpretation and especially modelling efforts it is essential to have a good description of surface characteristics, preferably in a gridded format. Some of these data were gathered during the LIAISE campaign, like for instance the airborne soil moisture measurements, but other are auxiliary datasets from the local government, incidental measurements by LIAISE participants. This meeting followed up on the meeting in Lleida where an overview of these datasets was initiated.

Minutes:

- *Organization of data products:*

    o **Soil Moisture (aircraft):**
        ▪ Additional data is needed to process aircraft soil moisture products from GLORI (CESBIO, PI: Zribi Mehrez) and SLAP (NASA, PI: Ed Kim), notably soil texture, vegetation opacity (vegetation maturity), soil roughness and in-situ soil moisture data for validation
        ▪ Soil moisture data available on CESBIO and NASA databases
        ▪ **Actions:**
            • CESBIO will take the lead in organizing additional data (*Karin Dassas and/or Nadia Ouaadi*). Once organized, will share with Ed Kim.
            • *Joaquim Bellvert* has access to soil texture maps of the LIAISE domain
            • *Michel Le Page* PI of in-situ network of soil moisture sensors. More in-situ soil moisture measurements available?
        ▪ *Update 20240125:*
            • *Karin Dassas talk: Glori soil moisture product has been processed and placed in the LIAISE database. Data has been calibrated and validated against soil moisture sensor network of Michel Le Page. It represents volumetric soil moisture at ~5cm depth. Algorithm and dataset have been published (see end of minutes for references).*

- Direct download from CESBIO database: https://sie.cesbio.omp.eu/ --> *Projects --> HILIAISE*
- *Ed Kim not present to give an update on the NASA soil moisture flights*
- *Short discussion on how to interpolate/extrapolate the soil moisture flight track lines to a gridded dataset. There is not an established method available. Interpolate using additional explanatory variables such as landuse, Ts and fluorescence from Glori-Hyplant (Bastian Siegmann suggestion)*

- o **Landuse maps**
  - Mary-Rose used a landuse map (30m resolution) provided by *Pere Quintana* based on a field survey in 2020
  - *Karin Dassas* showed results from the ORFEO toolbox that estimates landuse from satellite RS products
  - *Anais Barella and Joaquim Bellvert* mentioned the SIGPAC database where farmers have to register their cultivated crops each year.
  - **Actions:**
    - Open question: what is the best landuse product to use for the LIAISE-2021 campaign?
  - ***Update 20240125:***
    - *No update on the soil texture map from Joaquim, but IRTA (Jordi Cristobal and Joaquim) have access to the SIGPAC database. Contact Jordi/Joaquim to extract a landuse map for the LIAISE region. It seems to be in a shapefile format.*
    - *SIGPAC data is available for multiple years. Relevant for WG3. Note that WG3 deals with the whole Ebro catchment, not just the LIAISE experimental domain*
    - *Supposedly the SIGPAC database is the most accurate. The landuse maps have not been intercompared.*
    - CESBIO LU map (see presentation Karin Dassas): CESBIO database: https://sie.cesbio.omp.eu/ --> *Projects --> HILIAISE -->* HILIAISE_Leida_landcover_transect_25_07_2021_poly and HILIAISE_Leida_InsituMeasurements_July_2021 are the same as the one presented in the datapaper. Here you can also find: Catalogne_NDVI and SSM

- o **Irrigation and alfalfa cutting:**
  - Irrigation data disperse: mais was irrigated every day, alfalfa not know exactly for the LOP, *Michel Le Page* has the irrigation data for Boldu/Verdu
  - **Actions:**
    - *Joaquim Bellvert* will ask the farmer of La Cendrosa about cutting and irrigation dates during the LOP
    - Open Question: what is the best way to organize this type of data?
  - ***Update 20240125:***
    - *Note done yet.*

- o **Soil texture**
  - *Joaquim Bellvert* has access to soil texture maps of the LIAISE domain
  - *Jannis Groh* (5 sites) and Guylaine Canut (La Cendrosa, Preixana, Ivars) took soil samples home to be analyzed in their labs.
  - *Anne Verhoef* stresses the importance of getting the soil hydraulic properties right in the models. Anne can provide "best practices" to relate soil texture

information to soil hydraulic properties. Ideally, these (particularly soil water retention curves) are to be determined in a lab.

- **Actions:**
  - *Joaquim Bellvert* will gather the in-site measured soil texture data from Jannis and Guylaine and package these with the available soil texture map as one data product on the Aeris database
  - *Joaquim Bellvert* will explore the possibility to determine soil retention curves by a local, commercial lab
- ***Update 20240125:***
  - *Jannis Groh completed a full soil texture analysis on the samples he took. They will be published in the paper being prepared by Joan Cuxart. Data available upon request*
  - *Samples taken by Guylaine Canut have been analysed as well. Better contact person is Belen Marti.*
  - *Pedo-transfer functions required . Jenn Brooke suggests to use those implemented in the JULES scheme*
  - Mary-Rose Mangan will gather these (small) datasets and publish them as one on the database with Jannis and Guylaine as contact persons.

o **Ecophysiology:**
- *Hugo de Boer and Jannis Groh* took ecophys measurements (photosynthesis traits but also LAI) at various sites. Data have been organized already; not yet on the database/
- *Bastian Siegmann and Joaquim Bellvert* (and Michel Le Page?) took ecophys measurements as well.
- **Actions:**
  - *Raquel Gonzalez* will gather all ecophys data and post them as one package on the Aeris database.
- ***Update 20240125:***
  - *Action point completed. All ecophys data above have been posted on the database*
  - *Discussion on LAI whether a transfer function has been applied to correct for the clumping effect. Not certain. Sensor used was a LiCor 2000*
  - *Data from Michel Le Page can be found on the CESBIO database: https://sie.cesbio.omp.eu/ --> Projects --> HILIAISE*
  - *Mary Dantec (CESBIO, La Cendrosa fluorescence measurements) took ecophys measurements as well. Unclear where these have been archived. Possibly in CESBIO database*
  - *Low tech measurements such as vegetation have been gathered as well and seem to be scattered over the database. Please use the key-word "ecophysiology" in the description of any measurement that pertains to vegetation properties.*

o **Rain events during SOP:**
- Detailed rain measurements are available from Met-Cat radar measurements and rain gauge network and disdrometer network (*Joan Bech*). Especially useful to map the spatial extent of the two rain events during the LIAISE-SOP: 20 + 27 July 2021.
- **Actions:**

- Josep Miro & Vicent Altava (Met-Cat) and *Joan Bech* will organize all relevant information concerning the two rain events and post these on the database
  - ***Update 20240125:***
    - *Seems that only the radar is available in the database at this point*

  o **AWS network:**
    ▪ **Actions:**
      - *Josep Miro & Vicent Altava* (Met-Cat) will organize for the year 2021 all data from the automatic weather station network incl ET0 estimates on post these on the database
    ▪ ***Update 20240125:***
      - *Josep-Ramon Miro mentioned that they are working on AWS data, but Vicent still working on best ET0 estimate.*
      - *IRTA (Jordi Cristobal): ET0 input data available at https://ruralcat.gencat.cat/agrometeo.estacions (site in Catalan...).*

- *ET-intercomparison discussion:*
  o The first results are based on experimental techniques that were deployed at and around the IRTA site in Mollerussa. It was discussed if this should be extended by including model results and/or include other sites where other techniques were available.
  o It was decided to keep the maintain the current focus but refine the data processing and include, if possible, flux estimates from the UAV flights of *Wrenger Burkhard* (diurnal cycle of Ts)
  o **Actions:**
    ▪ *Oscar Hartogensis* will take the lead in this
  o ***Update 20240125:***
    ▪ *Joan Cuxart is preparing a JGR paper focussing on the variability of ET and other terms of the energy balance over the LIAISE domain. Different measurement techniques are included but certainly to full the breadth of techniques deployed during LIAISE. Another paper focussing more on the different techniques is still worthwhile to explore.*
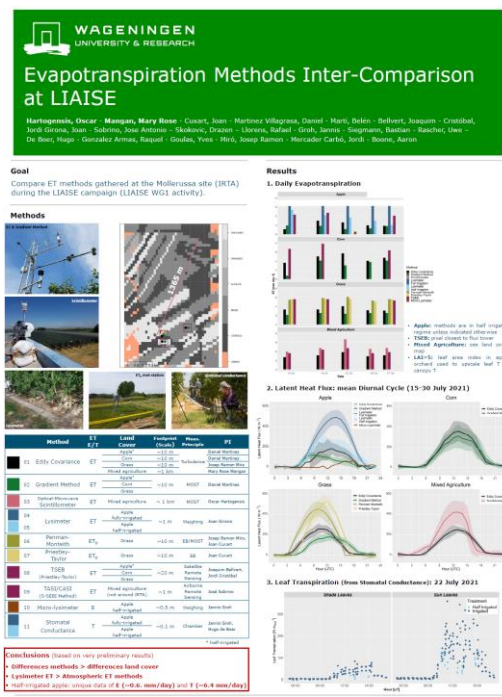
- *FAO-ET0 discussion:*
  - Discussion by Henk de Bruin on ET0 brought in by Anne Verhoef. Weather stations for FAO-ET0, especially in semi-arid areas, are most of the time not installed over the prescribed irrigated short cut grass as the methods prescribed. Typically there installed over a much drier surface leading to an overestimation of ET0.
  - **Actions:**
    - This is a possible working group activity. Meteo-Cat was interested in looking into this.
  - ***Update 20240125:***
    - *Not discussed*

- *Database discussion:*
  - There is no overview of what data is available at each site. Talking with each other people find out there have been much more variables measured than what was known
  - What is the best way to organize data: by site?, by data-type (soil moisture, ecophys, etc.).
  - **Actions:**
    - *Aaron Boone* will set-up a spreadsheet where everyone can fill out what was measured, when and where. Exact format to be discussed
  - ***Update 20240125:***
    - *Aaron initiated the spreadsheet but there was not much response*
    - *If you have problems uploading data to the database, please contact both Guylaine AND Aaron.*

- ***Upcoming workshops and conferences:***
  - GEWEX conference in Sapporro, July 2024: https://www.gewexevents.org/meetings/gewex-osc2024/
  - Aaron proposes to organize a joined LIAISE workshop and MetMed conference in May 2025 (tentatively the week of 19 May) in Toulouse. Still to be decided, but the seed has been planted.

- ***Update papers:***
  - See https://www.hymex.fr/liaise/pubs.html
  - Not on website yet:

Moonen, R.P.J., Adnew, G.A., Hartogensis, O.K., Vilà-Guerau de Arellano, J., and Röckmann, T., 2023: Data treatment and corrections for estimating H2O and CO2 isotope fluxes from high-frequency observation. Accepted for publication in Atmospheric Measurement Techniques (doi.org/10.5194/egusphere-2023-785)

Dassas, Karin & Fanise, Pascal & Le Page, Michel & Ayari, Emna & Baillion, Philippe & Sige, Mateo & Boone, Aaron & Zribi, Mehrez. (2023). Polarimetric instrument Global Navigation Satellite System - Reflectometry airborne data. Data in Brief. 52. 109850. 10.1016/j.dib.2023.109850.

Karin Dassas: M. Zribi, K. Dassas, V. Dehaye, P. Fanise, E. Ayari and M. Le Page, "Analysis of Polarimetric GNSS-R Airborne Data as a Function of Land Use," in IEEE Geoscience and Remote Sensing Letters, vol. 20, pp. 1-5, 2023, Art no. 2502105, doi: 10.1109/LGRS.2023.3270730.