

# Climate Surface Modelling with Remote and In-Situ Data

---

Tartu, Tuesday 16 June 2026

**Organiser:** *Lluís Pesquer Mayos (Grumets Research Group, CREAM), Miquel Ninyerola Casals (Grumets Research Group, Departament de Biologia Animal, de Biologia Vegetal i d'Ecologia, Universitat Autònoma de Barcelona), Xavier Pons Fernández (Grumets Research Group, Departament de Geografia, Universitat Autònoma de Barcelona)*

## **Topic(s) and focus**

The workshop will guide participants through the entire cartographic workflow: from raw data acquisition to final data publication.

- 1. Introduction:** review of methods and concepts.
- 2. Data Capture and Preparation:** sources, formats and data cleaning. Specifications for remote sensing and in-situ data.
- 3. Exploration and Analysis:** descriptive statistics, map visualization, patterns and trends.
- 4. Spatial Interpolation and Multivariate Geostatistics:** test beds and accuracy assessment.
- 5. Metadata:** documentation with ISO standards. Automatic and full traceability of involved processing tools.
- 6. Practical Case Study:** climate surface maps from remote sensing products and in-situ datasets for a specific region and discussion of the results.

## **Objective(s)**

- Demonstrate the integration of meteorological station data and satellite observations to produce accurate climate maps.
- Showcase the full workflow using MiraMon tools, from raw data acquisition to map generation.
- Guide participants through data exploration, preprocessing, including cleaning and transformation into suitable formats.
- Introduce spatial interpolation and multivariate geostatistical techniques for generating continuous climate surfaces.
- Highlight the importance of metadata, lineage (traceability) and documentation following international standards.
- Discuss challenges and solutions in combining heterogeneous data sources for climate analysis.

### ***Planned outcome(s)***

The workshop is a mixt of:

- 1) review of the multivariate geostatistical methods for combining in-situ and remote sensing climate data.
- 2) hands-on tutorial in which participants gain experience using the geostatistical tools which properly combine remote sensing products and in-situ measurements in order to generate climate continuous surfaces.

In the practical part 2), we will basically use MiraMon ([https://www.miramon.cat/Index\\_eng.htm](https://www.miramon.cat/Index_eng.htm)) tools. R package (<https://www.r-project.org/>) is also possible, we will compare the higher geospatial capabilities of a GIS environment and the more complete statistical functionalities of the R package.

### ***Workshop format***

1h 45 min session

5 min – Introduction to the workshop

45 min - Review of the multivariate geostatistical methods for combining in-situ and remote sensing climate data

45 min - Hands-on tutorial multivariate geostatistical tools

10 min – Discussion and conclusions

### ***Target audience***

Interested participants in multivariate spatial analysis, geostatistics and remote sensing application in climate are very welcome. Basic knowledge of GIS and remote sensing formats and tools will be helpful.