

Projet CREWS Afrique Centrale

Step 1 Session 4

Course Program – 4th March 2026

08:00-10:00 - Libreville, Kinshasa, Brazzaville, N'Djaména, Niamey

Abuja Time

H-SAF Satellite Precipitation and Soil Moisture Products – practical session

General Objective

This course aims to introduce participants to selected precipitation and soil moisture products developed within the H-SAF framework. Through a series of tutor-led, hands-on exercises, participants will gain practical experience by working in a JupyterHub environment.

Part 1 – Watershed Delineation

The first part of the course is dedicated to the delineation of a watershed associated with a selected river section in Africa. This activity is based on the HDMA 90 m Digital Elevation Model, resampled to a spatial resolution of 1 km × 1 km, and provides an essential spatial framework for subsequent analyses.

Part 2 – Precipitation Data Access and Download

The second part focuses on H-SAF precipitation products and guides participants through the download of the H64 data product. The workflow is designed to be user-friendly and interactive, making use of widgets to support user input.

Key steps include:

- User authentication using H-SAF credentials (username and password) to securely access the data server
- Definition of the Area of Interest (AOI) using either a bounding box or a shapefile
- Automated retrieval of precipitation data for the selected region and time period (downloaded files are organized and stored in a dedicated data directory)

The analysis is framed around a real-world flooding event, providing a meaningful and practical context for geospatial and climatological analysis using Earth Observation data.

Part 3 – Rainfall Analysis

In the third part, participants explore and quantify rainfall patterns within the selected region through the following steps:

- Extraction and pre-processing of NetCDF precipitation datasets
- Spatial visualization of cumulative rainfall over user-defined time periods
- Statistical analysis of rainfall over the area of interest
- Monthly precipitation anomaly mapping to identify deviations from climatological norms

Part 4 – Soil Moisture Analysis

The final part of the course is dedicated to soil moisture analysis using the near-real-time (NRT) RZSM-ASCAT-NRT-10km product (H26). Participants will download and analyze the dataset following a workflow similar to the precipitation analysis, including:

- Extraction and pre-processing of NetCDF soil moisture datasets
- Spatial visualization of average soil moisture over user-defined periods
- Monthly soil moisture anomaly mapping to detect deviations from climatological norms

Expected Outcomes

In this short course participants will:

- Gain a first understanding of the H-SAF precipitation and soil moisture products, their development, and their applications in hydrology, weather monitoring and climate studies.
- Develop some technical skills to access, process, and analyze H-SAF satellite data for operational hydrological monitoring and water management.
- Start enhancing their capacity to apply H-SAF products.

Prerequisites

Before attending the course, participants are encouraged to:

- Complete online courses that introduce the fundamentals of H-SAF precipitation products.
- Review the course presentations available at [H-SAF Training Courses](#).

- Register for free access to the H-SAF training materials
<https://edu.cimafoundation.org/login/>.

Planned Program

Welcome Mot (WMO, EUMETSAT)

Overview training plan.

Short introduction to the H-SAF products (20') [Speaker TDB]

- Introduction to the precipitation product used in the exercises
- Introduction to the soil moisture product used in the exercises

Exercise session (120') [Speaker Andrea Libertino and Nicola Testa]

- Overview of the H-SAF precipitation products (e.g., instantaneous, accumulated, and blended products).
- Description of retrieval algorithms and product validation.
- Strengths, limitations, and uncertainties of satellite precipitation data.
- Comparison between satellite-based and ground-based precipitation measurements.

Format: Online

H SAF Team N. Roberto, A. Libertino, N. Testa, A. Boucherie, S. Gabellani.

Language: French

Max number of participants: 20