

Internship Program and Young Professionals Program

Climate Data and Forecasting for Hydrological Analysis in the Eastern Nile Region

Regional Climate Resilience Program (RCRP) for Eastern and Southern Africa Project 4th Internship Batch

Terms of Reference (ToR)

**Eastern Nile Technical Regional Office (ENTRO)
Addis, Ababa
September 2026**

1. Background

ENTRO has proactively established the Internship and Young Professional program as part of its core activities and has successfully implemented it since 2010. The program has enabled ENTRO to strengthen engagement with member countries through partnerships with scientific communities and practitioners, promoting knowledge sharing and capacity building. Through the enrollment of youth and early-career professionals from the Eastern Nile (EN) Region, the program has contributed to developing skilled professionals and fostering regional cooperation.

ENTRO's internship opportunities provide significant benefits to early- and mid-career professionals, by offering exposure to and training in contemporary knowledge, tools, and skills related to water resources, environmental management and climate adversaries. Interns gain experience working in a multicultural environment, develop a regional perspective, and learn new techniques, methodologies, and applications. The program also facilitates interaction with regional and international professionals and consultants, including through field visits to water resources development projects, infrastructure, and demonstration sites, as well as networking and learning exchange with experts through participation in workshops and events. Through these engagements, interns actively contribute to ENTRO's efforts to foster and strengthen cooperation in water resources development and management across the EN sub-basin.

The internship program has proven effective and popular for fostering cooperation that enables ENTRO to expand its professional network while developing human capacity, which is critical where technical and professional skills are lacking in the water sector within the member countries. The program has also delivered results and has been instrumental in building regional capacity and bringing a diversity of expertise and outreach opportunities to the Eastern Nile Subsidiary Action Program (ENSAP), benefiting member countries through this uniquely structured capacity development program. Over the past 15 years, ENTRO has conducted 30 batches of its internship and young professional program, training a total of 247 interns and young professionals from the EN countries, with financial support from the World Bank under previous programs such as the Eastern Nile Planning Model (ENPM), Nile Cooperation for Results (NCORE), and Nile Cooperation for Climate Resilience (NCCR).

ENTRO has been implementing the internship program under the ongoing Regional Climate Resilience Program (RCRP) project, with the first two batches conducted jointly with the NCCR project internship program. The full-fledged 3rd batch internship program supported by the RCRP project was conducted from July to September 2026. The planned 4th batch of the RCRP internship program will be conducted on “***Climate Data and Forecasting for Hydrological Analysis***” by enrolling qualified and practicing candidates from EN countries (Ethiopia, South Sudan, and Sudan). In this context, ENTRO is seeking a highly motivated candidate with strong expertise in ***Climate Data and Forecasting for Hydrological Analysis*** to join ENTRO for three months.

2. Scope of the Work

Generally, the intern/young professional will work on climate and weather data collection, processing, analysis, visualization, and application for hydrological analysis and flood forecasting. The intern will work with observed, satellite-based, reanalysis, and numerical weather prediction datasets to support rainfall monitoring, forecast interpretation, hydrological model input preparation, forecast verification, and preparation of climate-informed hydrological products for the EN sub-basins.

Specifically, the internship activity will be organized around the following technical tasks and learning topics:

Task 1: Weather data collection, quality control, and database development

- Compile historical and near-real-time weather, satellite, and reanalysis datasets relevant to hydrological analysis, including rainfall, temperature, evapotranspiration, river discharge, and water level data using global datasets such as GPM IMERG, CHIRPS, TAMSAT, ARC2, ERA5/ERA5-Land, GLDAS, GPCC, GHCN, and HydroSHEDS.
- Conduct data screening, quality control, gap identification, consistency checking, and preparation of metadata for climate and hydrological datasets.
- Develop a structured hydrometeorological database for EN sub-basins, ensuring clear naming conventions, temporal coverage, spatial references, and data-source documentation.
- Prepare a data gap assessment identifying missing records, priority stations, data access limitations, and recommendations for improving climate and weather data availability for hydrological applications.
- Analyze rainfall and temperature variability, seasonal patterns, anomalies, and trends using statistical and geospatial methods.

- Compare various dataset products, including observed, satellite-based, and model-based products, to assess suitability for hydrological analysis.
- Prepare maps, charts, time-series plots, and concise technical notes communicating weather conditions relevant to hydrological analysis.

Task 2: Global/Regional Numerical Weather Prediction Datasets for Flood Forecasting

- Retrieve and download datasets from Global/Regional Numerical Weather Prediction products such as NOAA GFS and WRF
- Define spatial and temporal boundary conditions, including forecast lead times and temporal frequency
- Analyze and read multidimensional GRI/NetCDF Global/Regional Numerical Weather Prediction products
- Configure the Weather Research and Forecasting (WRF) Numerical Weather Prediction for the EN sub-basin
- Interpolate native model grids onto the EN sub-basin domains
- Extract flood-critical variables essential for flood routing, such as total precipitation, temperature, soil moisture, and evapotranspiration
- Perform bias correction by applying statistical adjustment techniques using historical gridded reanalysis datasets or observations

Task 3: Climate change impact analysis on floods in the Eastern Nile Sub-basin

- Collect baseline data (observed rainfall, temperature, streamflow, water level, evapotranspiration, land use, soil, DEM, reservoir, and water demand data) using station data, satellite rainfall products, reanalysis datasets, and hydrological records.
- Assess historical rainfall and temperature patterns, climate variability, trends, anomalies, extreme rainfall events, historical river flow and flood peaks to establish a historical climate and hydrological baseline.
- Select global or regional climate model datasets such as CMIP6, CORDEX-Africa, or downscaled climate products and select emission/development scenarios such as SSP1-2.6 and SSP2-4.5.
- Downscale and bias-correct climate projections applying downscaling methods to validate historical climate data against observations.
- Prepare rainfall, temperature, evapotranspiration, land use, soil, DEM, river network, and basin boundary datasets to prepare inputs for a hydrological model
- Set up, calibrate, and validate hydrological models using various performance indicators
- Run future climate impact simulations using bias-corrected future climate scenarios and compare future outputs with the historical baseline
- Analyze future climate impacts on flood magnitude and frequency in the EN sub-basin

3. Deliverables

Deliverable	Description	Target completion date
Task 1	A report/data on collected and analyzed weather data, developed a hydrometeorological database for EN sub-basins	End of the first month
Task 2	A report/model on configuration of Global/Regional Numerical Weather Prediction Datasets for Flood Forecasting for EN sub-basins	End of the second month
Task 3	A report/data on climate change impact analysis on floods in the Eastern Nile sub-basin	End of the third month

4. Qualification Requirements

- Must hold at least a bachelor's degree in meteorology, climatology, hydrology, water resources engineering, environmental science, geoinformatics, or a closely related field.
- Have practical experience and strong academic exposure in climate/weather data processing, hydrometeorological analysis, GIS, remote sensing, or hydrological modeling.
- Demonstrate familiarity with observed, satellite-based, reanalysis, and gridded datasets
- Have a good understanding of Global and Regional Numerical Weather Prediction models and their application in flood forecasting
- Demonstrate understanding of climate change impact analysis on floods, including use of climate projection datasets and models
- Demonstrate familiarity with climate and weather datasets, including station observations, satellite rainfall estimates, reanalysis products, and numerical weather prediction outputs.
- Possess skills in data analysis and visualization using tools such as Excel, Python, R, ArcGIS, QGIS, CDO, NCO, Panoply, Google Earth Engine and similar software.
- Proven knowledge of hydrological modeling concepts, rainfall-runoff processes, basin water balance, flood forecasting, and climate risk assessment.
- Have good report writing, presentation, teamwork, and communication skills, with proficiency in English.
- Be under 35 years of age at the time of application.
- Be a citizen of an Eastern Nile sub-basin country.
- Female candidates are **highly encouraged** to apply.
- Previous ENTRO interns **are not allowed to apply!**
- Minimum of five (5) years of experience after a B.Sc. degree in the above fields of study.

5. Implementation arrangements

- The deadline for the application is **02 October 2026, time: 12:00 PM** (EAT).
- The assignment is a three-month assignment, extending from 01 November 2026 to 31 January 2027
- ENTRO will cover the cost of the travel expenses (ticket, visa, etc.) as well as the monthly stipend.
- The Intern shall be stationed at ENTRO, Addis Ababa, Ethiopia
- ENTRO shall also provide:
 - Adequate working facilities and support in the gathering of data, access to relevant information and authorities,
 - Adequate office space and support facilities (such as the internet),
 - Tailor-made capacity-building and training programs related to the subject matter.
- Any study report or other materials, graphics, software, or otherwise, prepared by the Intern during the internship period shall belong to and remain the property of ENTRO. The Intern may retain a copy of such documents and software.

6. Application procedure

Interested applicants must submit their CVs together with the cover letter and motivation letter alongside a copy of the passport's biometric page. Applications should be submitted their application via email to the following addresses: entrovacancy@nilebasin.org, gabdi@nilebasin.org, and zanbesa@nilebasin.org. with the subject line "Application for 4th Batch Internship RCRP"

PLEASE make sure **to include all** email addresses above during the application:

Due to the anticipated large number of applications, only successful candidates who meet the required experience and qualifications for this position will be contacted.