

Report No: AUS0001805

Honduras

Strengthening DRM in Honduras

Report on the improvement of the meteorological, climatological and hydrological Database Management System (MCH) and hydromet services website.

June 30, 2020

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Strengthening hydromet services, disaster preparedness and urban resilience in Honduras (P172149)

Improve the operation of the meteorological, climatological and hydrological Database Management System (MCH) and hydromet services website.

Output Report – June 2020

1. Background

Through the Honduras and Nicaragua hydromet capacity assessment and strengthen project (P155112), a Modernization Plan was proposed for the strengthening of hydromet services in Honduras. This modernization plan will require an investment of approximately US\$ 10 million distributed in (i) institutional strengthening, (ii) enhancing observation, analysis and forecasting, and (iii) enhancing service provision.

This project “Strengthening Hydromet Services, Disaster Preparedness and Urban Resiliency in Honduras” aims at supporting the Government of Honduras with the next step of making the modernization plan implementable. One of the priority activities included in the Hydromet Services Modernization Plan is the installation and implementation of the Meteorological, Climatological and Hydrological Database Management System (MCH), which is a database management system (DBMS) based on databases and open source software. This system, developed by Mexico and adapted by the Cooperation Program for National Meteorological and Hydrological Services (SMHN) of Ibero-America, was transferred to WMO in 2011.

MCH was installed and commissioned in Honduras in 2018 at National Center for Atmospheric, Oceanographic and Seismic Studies (CENAOS), branch of the Permanent Contingency Commission (COPECO) as a first step to get a national-wide data solution to integrate climatological and hydrological data from several government and society organizations, and in 2019 a Website was developed and launched which provided meteorological, hydrological and climate-based products and services for the general public and institutional users. This site is fed with real-time and historical information managed and stored with the MCH meteorological, hydrological and climate database management system.

The General Office of Water Resources (DGRH) handles the hydrological data and has its own automated climatological and hydrological stations. In 2018 was installed their local MCH and was put in operation with the load of two nets of automatic stations and a local Web server to monitoring the actual conditions. There was also conducted a successful test of communication and synchronization between two MCH databases, CENAOS and DGRH, proven that technical issues are already endorsed with the technologies and telecommunications available. There was also installed, configured, loaded historical data to a third MCH installation at the National University of Honduras and there is a fourth fully-operational MCH installation at Honduran Civil Aeronautics Agency (AHAC). These facilities and trainings, although used at different levels, establish an operational base for the sharing and integration of climatological and hydrological data at the national level, and are only awaiting the signing of inter-institutional cooperation agreements.

These works have been coordinated with the Regional Office of the Americas, Region IV of the Water Meteorological Organization (WMO), allowing the Honduran MCH users to access to MCH group support and training.

2. Objectives

Advise and support the Governments of Honduras on strengthening hydromet services. More specifically, the goal was to support the operation of the Meteorological, Climatological and Hydrological Database Management System (MCH) and the website. <http://cenaos.copeco.gob.hn/>

3. Outputs / Deliverables

To achieve the above-referenced objective the following activities were carried out:

a. Technically assist CENAOS for the configuration of MCH database for automatically uploading GOES 16 satellite data received through HRIT system.

In December 2019 the server where CENAOS was hosting the MCH database experienced a crash due to hard disk problems, so before introducing improvements to the MCH the consultant had to reinstall and reconfigure the MCH on a new server. The following are the actions developed to develop the committed output/deliverable:

- Re-establishment of database and web services on a new server machine.
- Automation of data synchronization between MCH climatology and MCH Honduras
- Reconfiguration of the manual loading processes.
- Generation of backup of final server and database configurations.
- Technical coordination for raw message consumption of automatic station transmissions from OpenCDS.
- Configuration and documentation of how the decoding parameters such as sensor order, accuracy, units and frequency of the measurements are modified for the decoding of raw text and binary type messages.
- Decoding of the raw messages for data upload to the MCH.
- Preparation and delivery of the Report and the Installation and Configuration Manual of the MCH server (pending).

The re-installed server received the latest backup COPECO, that was not so up-to-date, but all the configurations missing were reconstructed from the technical documentation of the previous work.

The integration with the satellite images and the reception of the documents were put in operation again. The refreshment of the SPI, monthly values, and climate products will be re-started with the return of the personnel to the offices, as the normal flow of data will commence again.

Using the raw messages of the automatic stations that were previously separated from the image data with the file manager tool after the HIRT injector was configured the MCH decoder program uses the parameters in the MCH table of decoding message, that specifies for each station and each variable in it, the type, order and precision, letting the users make the normal adjustments that are necessary with the

operational issues. The knowledge of the current parameters of decoding were lost with stop of the ability of decoding due to the new antenna and the personnel that left the institution to work somewhere else. Collecting again these parameters will be updated as the information were available at the office.

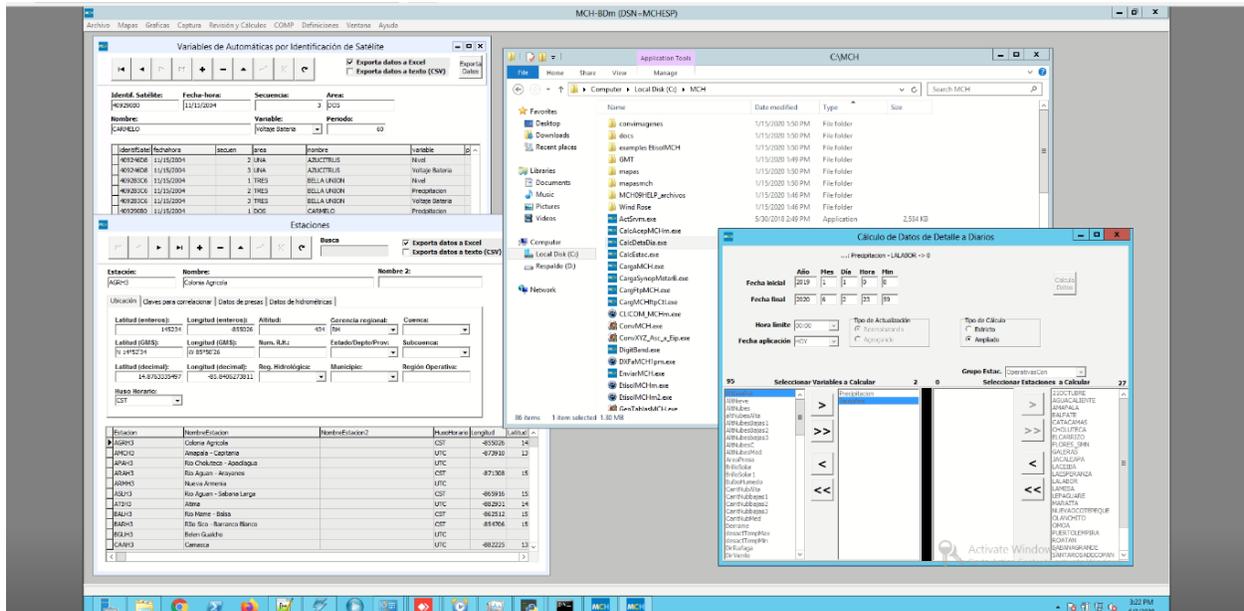


Figure 1.- Automatic stations decoding configuration parameters and detailed to daily data.

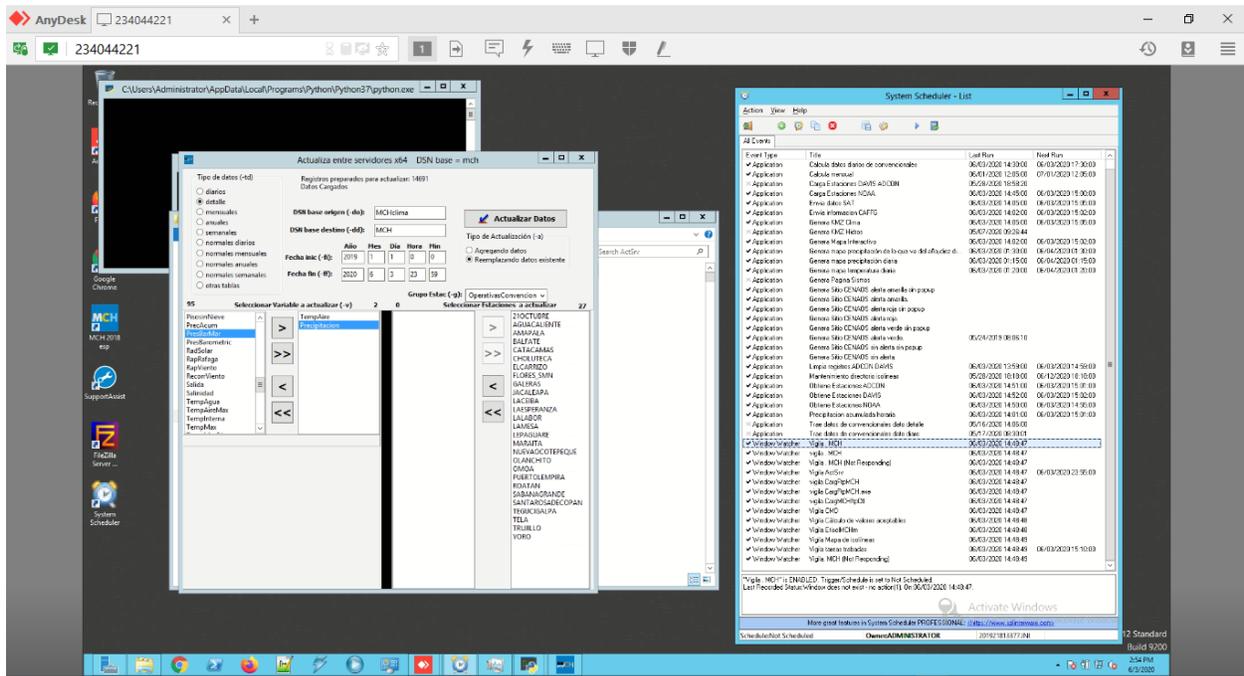


Figure 2.- Re-establishment of the MCH server in a new virtual machine; the hard disk failed in the old physical server.

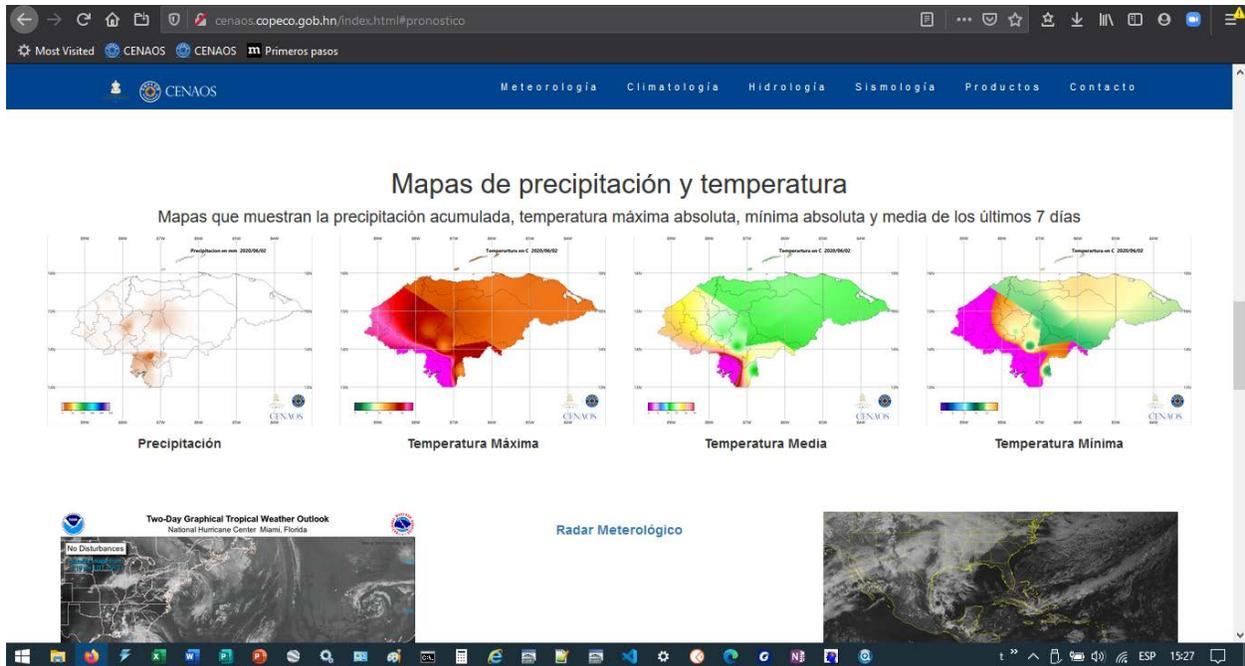


Figure 3.- Full and correct decoding of the satellite messages on the known parameters of sensors and resolution.

b. Technically assist the General Direction of Hydric Resources (GDRH) of the Secretary of Environment to automatically upload their automatic station data to MCH.

Since 2018, the WMO regional office has been supporting the DGRH-MiAmbiente in Honduras for the installation and commissioning of MCH for their hydrometeorological data management. In close coordination with the WMO, and upon request of the DGRH, the consultant provided its services to consolidate some aspects of the installation.

- Technical coordination for data upload to MCH.
- Uploading data from automatic stations to the MCH.
- Training documentation for additional automatic loading configurations and training to keep the loading service running.
- Preparation and delivery of the Report and the Installation and Configuration Manual of the MCH server (pending).

Automated loading data form satellite stations was customarily jammed due to intermittent net services. To solve this a two tasks approach was taken. First were developed new version of the decoding and loading data desist of the attempt if there is no communication. Also was reassured the network communication permissions of the MCH server. Second there were the compromise of the personnel of DGRH to enhance the network connection to let the server decode and load the data. So, the server was physically moved to a better network services location within the office.

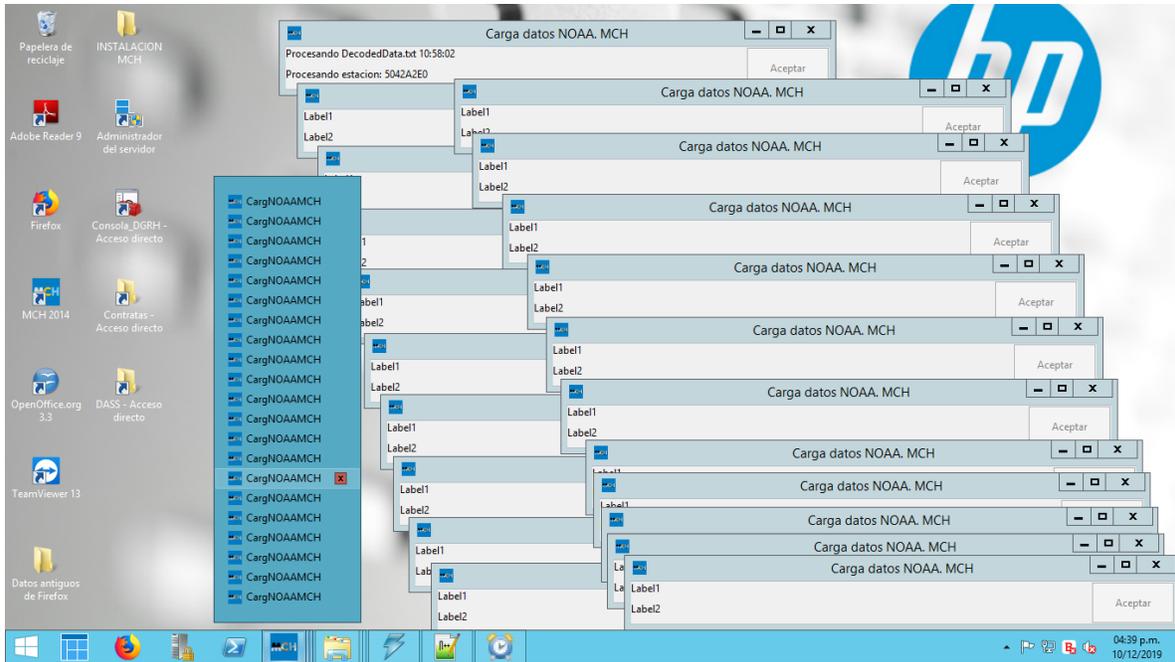


Figure 4.- This is the problem that were solved to correctly upload automatic stations data to MCH. Now is solved.

The result of the work with the DGRH is a fully functional and data loading MCH, ready to be customized further.

In order to maintain stable and operational the MCH, and for the better use of the information of their stations, DGRH personnel has to enhance the stations catalog to match the station-ID the way they accustom to handle it with WMO and to complete the metadata using MCH with any GIS software.

c. Support CENAOS with the review and update of their hydromet services website according to main user's needs.

COPECO/CENAOS have taken first visible steps to improve information to users through the consolidation of databases, the sharing of hydromet information and the development of a hydromet services website which was launched in June 2019. In December 2019 his website went down, due to MCH crash, and had to be set up again while enhancing some of their functionalities according to the request and specifications from CENAOS and its customers. The following are the actions developed to develop the committed output/deliverable:

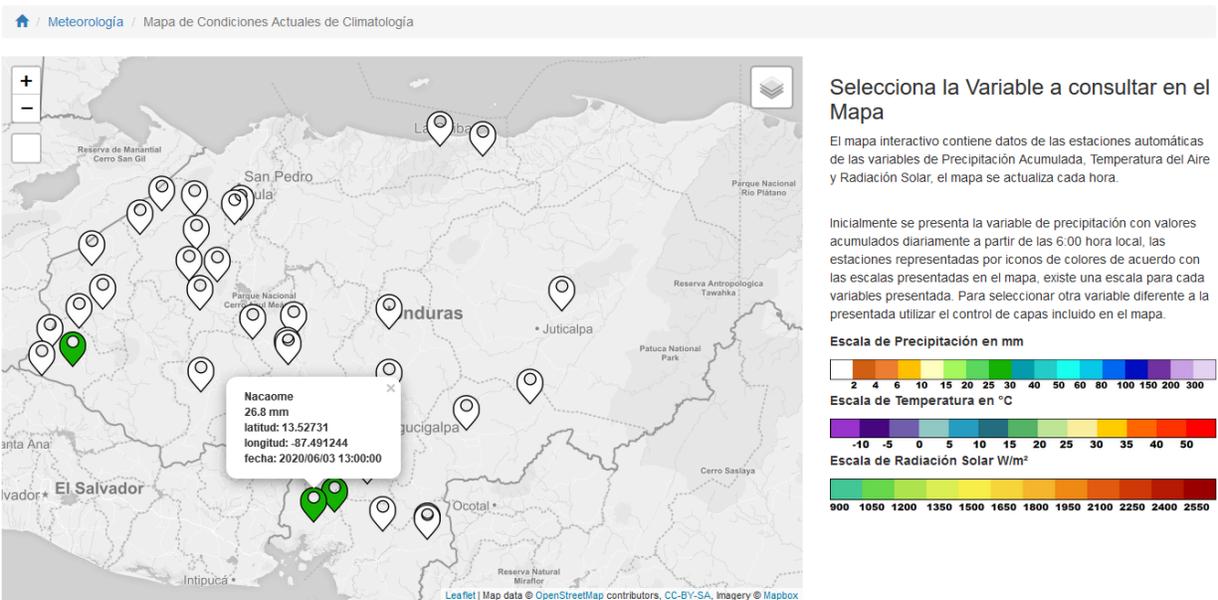
- Re-establishing the processes on the server that automatically produce the products on the website with the current information from automatic and manual ones.
- Reestablishment of the process in which forecasters capture twice a day the forecast for the web page.
- Reset the process of capturing daily weather data.
- Updating of the SPI precipitation drought index.
- Updating of monthly and annual temperature and rainfall products.
- Updating of the web site for the consultation of historical bulletins.
- Creation of documents for training, operation and care of operational problems to continue in service Web page.

Se mantienen condiciones meteorológicas secas y cálidas en la mayor parte del país.
2019/03/20 13:00:00. CENAOS



Figure 5.- <http://cenos.copeco.gob.hn/> CENAOS Hydromet Services website.

Mapa de Condiciones Actuales de Climatología



Transferring data from cenos.copeco.gob.hn...

Figure 6.- Map Server with actual automatic station data being handled by MCH at COPECO.

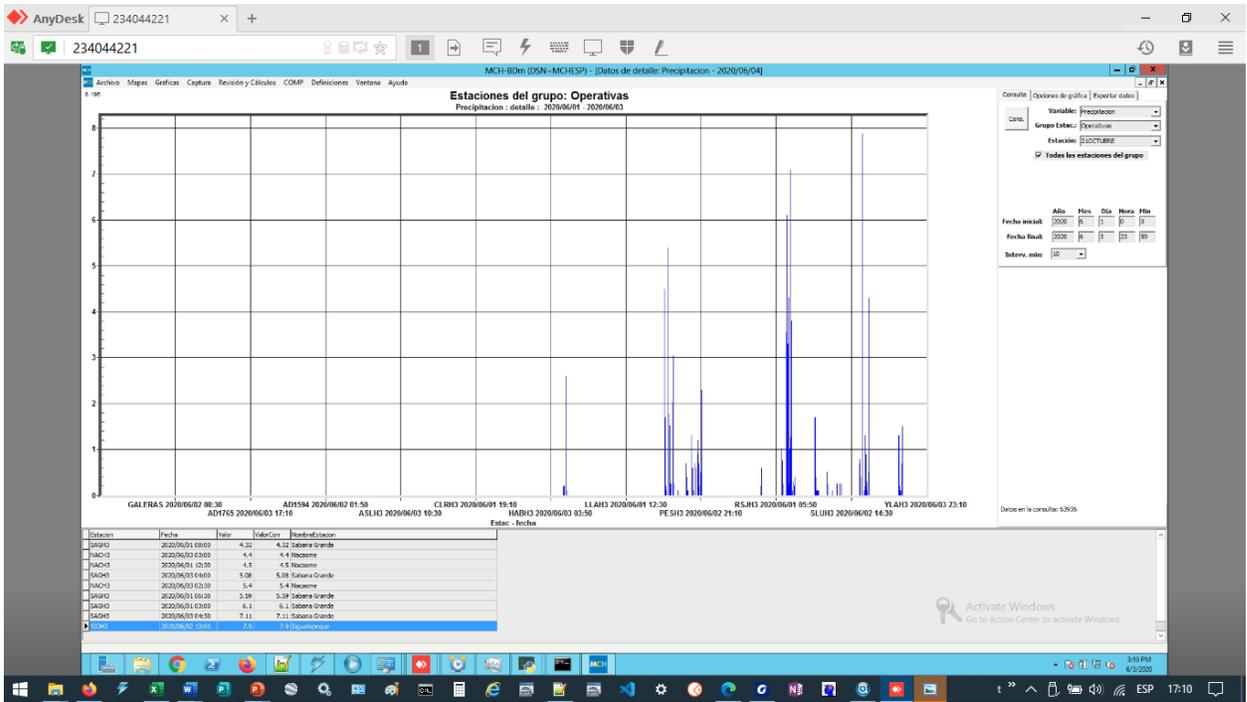


Figure 7.- Actual data into MCH available to produce reports and the Web page.

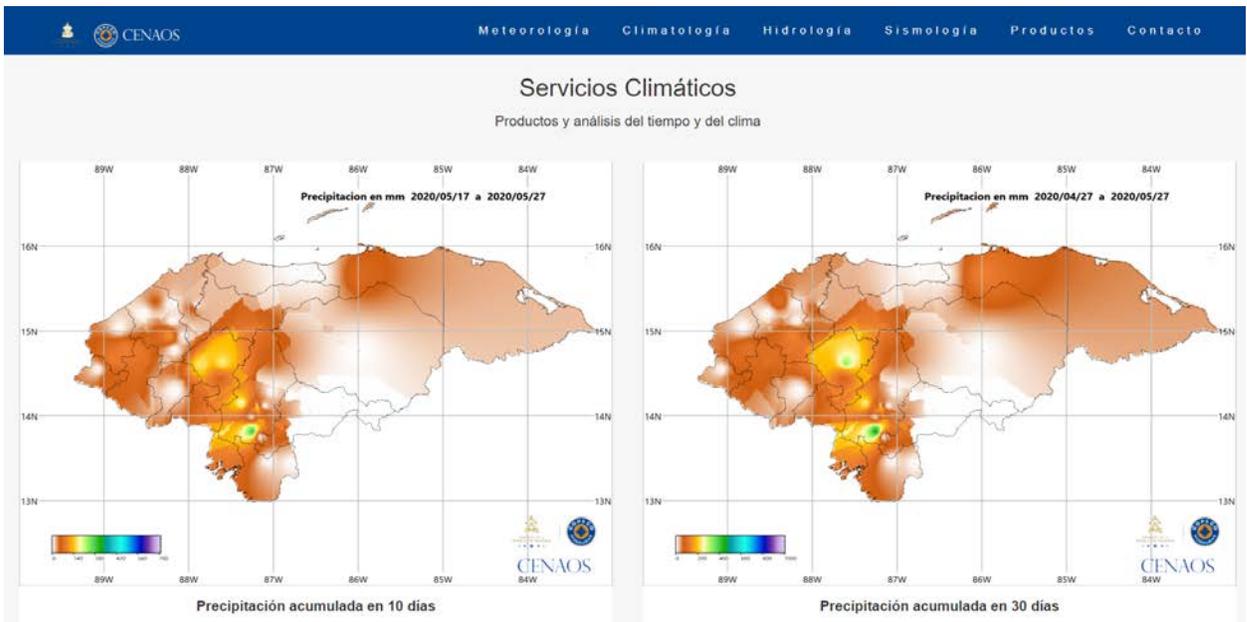


Figure 8.- Automated maps produced for monitoring climate conditions in the MCH Web page.

4. Next Steps

The following are some opportunities identified during this technical assistance to continue with the strengthening of hydromet services in Honduras, in particular with MCH and website consolidation:

- COPECO/CENAOS and MiAmbiente-DGRH have taken first visible steps to improve information to users through the consolidation of databases, the sharing of hydromet information and the development of a hydromet services website which was launched in June 2019 and enhanced in 2020. However, both CENAOS and MiAmbiente-DGRH have the opportunity to develop more products progressively, by establishing a national platform for data exchange and improved hydromet product development for users.
- It is important to continue the efforts to upload historical data to the MCH, both by CENAOS and the MiAmbiente-DGRH.
- Other national institutions which produce/use hydromet data should be incorporated to the national for data exchange and improved product development. These institutions include Civil Aviation (AHAC), the National Service for Aqueducts and Sewage Systems (SANAA), and the National Electric Power Company (ENEE), (that already have their own MCH installation due to a worker that has migrated from CENAOS and that was trained by WBG missions), Ministry of Agriculture and Livestock, and the National Autonomous University of Honduras (UNAH) etc.
- It is necessary to develop a training program for developers and users of MCH within the national institutions that integrate the national platform for data exchange and improved hydromet product development.
- It is proposed to promote a tripartite agreement WB, WMO and GoH for the provision, installation, operation and maintenance of a national platform for data exchange and improved hydromet product development based on MCH. Some training was already scheduled by WMO this year. As the current travel restrictions, it might be suitable to give on-line training and on-line support.
- In order to automate the daily operation of DGRH, it's required to incorporate the data of manual conventional stations and their correspondent hydrological derived variables to MCH, thus, to train the personnel in MCH data capture, MCH derived variables configuration and general MCH data handling. But this training has to be accompanied by the institution's internal commitment to restructure the roles of the personnel involved, and managerial follow-up to comply with the new ways of working.
- DGRH showed interest in basin accounting or hydrological balance of the basin. The model to do so, depends on the physical characteristics of the basin and the measurement capabilities of the Institution, and requires model calibration using the historical data, thus, the MCH can be a tool in the way to obtain this product alongside Hydrological Engineer.

