

# Precipitation forecast verification of the FFGS and SisPI tools during the impact of the Tropical Storm Isaias over Dominican Republic

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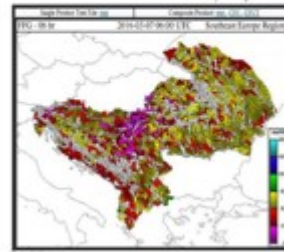
**Shallys Alfonso Águila**

# Motivation

Dominican Republic is in the path of tropical cyclones and it is frequently affected by these hydrometeors.

For monitoring and forecasting extreme events, ONAMET has several numerical weather modeling based systems

FFGS

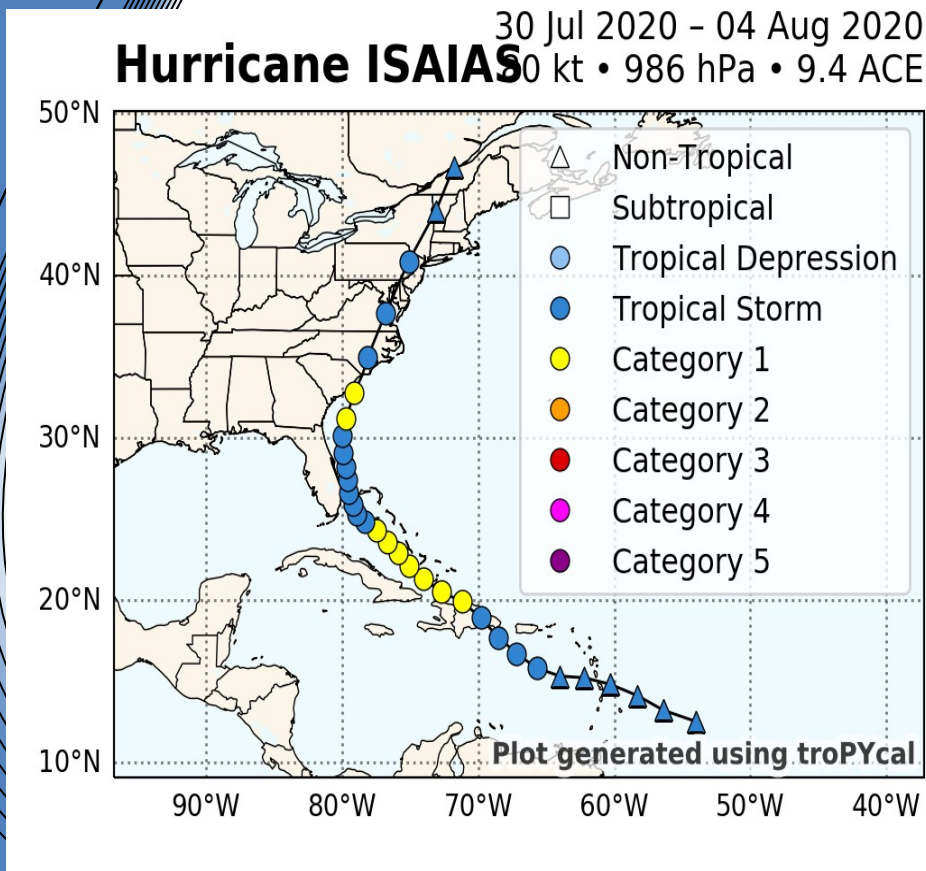


SISPI



The skills of these systems for quantitative forecast the precipitation generated by the hydrometeorological events that affect the country is not known.

# Study Case



Isaias impacted Dominican Republic entering its center through the San Pedro de Macorís province around noon on Thursday, July 30 with maximum sustained winds of up to 95 km / h.

Total precipitation during July 29, 30 and 31 was **327.6** mm in Sabana del Mar and **300.4** in Samana.

# Data and Verification

- 57 meteorological surface stations
- Precipitation estimated by GPM product.
- Traditional verification methods were used. The metrics used were the **bias**, **rmse**, **CSI**, **POD** and **FAR**

## Verification Metrics For Yes / No Forecasts

### 2 x 2 Contingency Table

		<u>Observed</u>	
		YES	NO
F O R E C A S T	Y E S	<b>A</b>	<b>B</b>
	N O	<b>C</b>	<b>D</b>

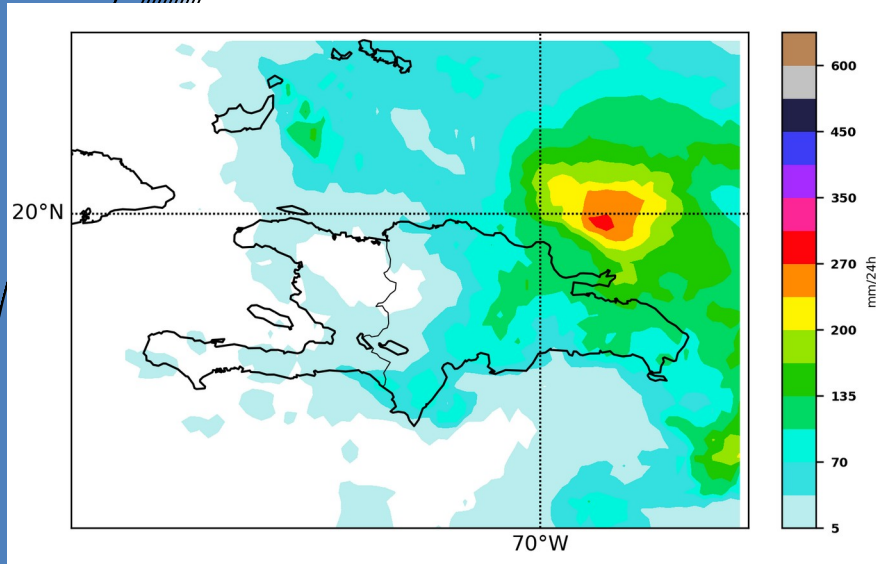
$$\text{POD} = A / (A + C)$$

$$\text{FAR} = B / (A + B)$$

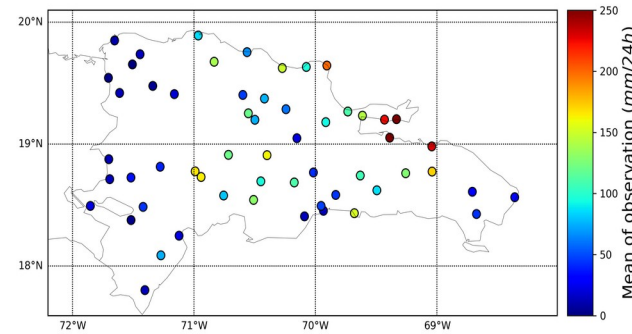
$$\text{CSI} = A / (A + B + C)$$

# Results

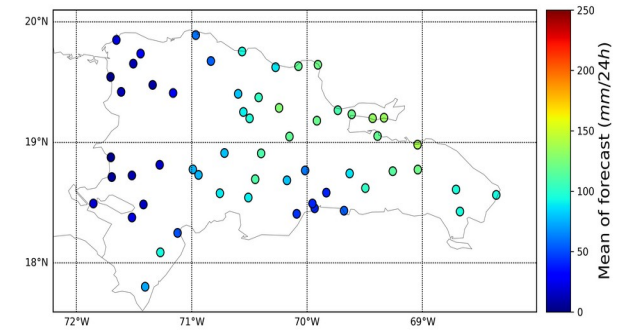
- GPM vs Surface Stations (24h accumulated precipitation)



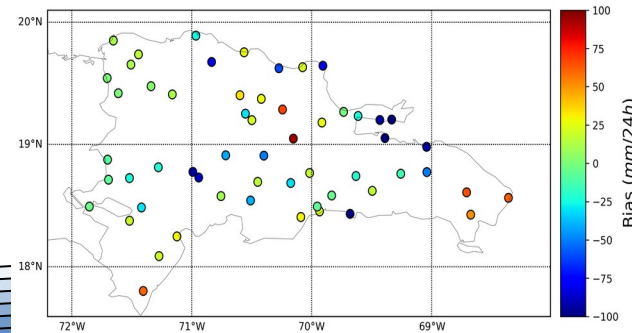
## STN



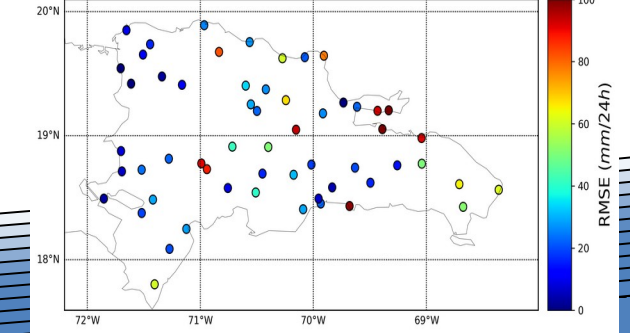
## GPM



## BIAS



## RMSE



**GPM underestimate the precipitation values**  
**A maximum BIAS ~ -100 mm**

# Results

CSI values for the 24 hour rainfall forecast

Threshold	HIRESW-ARW 0600/1800		HIRESW-NMMB 0600/1800		SisPI 0600/1800	
0.1	0.725	0.851	0.824	0.852	0.668	0.702
50	0.457	0.484	0.263	0.269	0.397	0.472
100	0.138	0.274	0.042	0.136	0.317	0.254
150	0.038	0.160	0.003	0.132	0.177	0.129
200	0.025	0.1	0.0	0.048	0.041	0.009

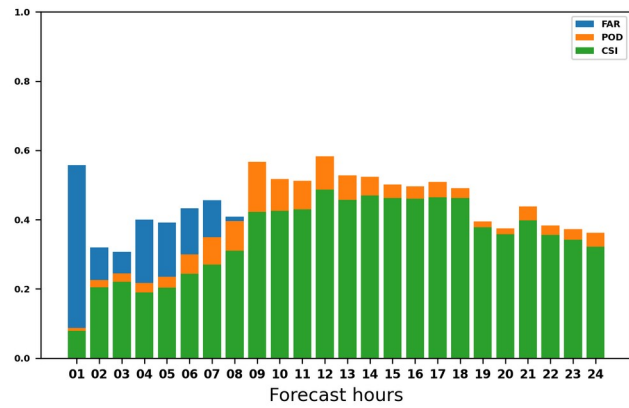
**HIRESW-NMMB:**  
Better for rain/no rain event detection

**HIRESW-ARW and SisPI:**  
Better for heavy rain values

# RAIN / NO RAIN event

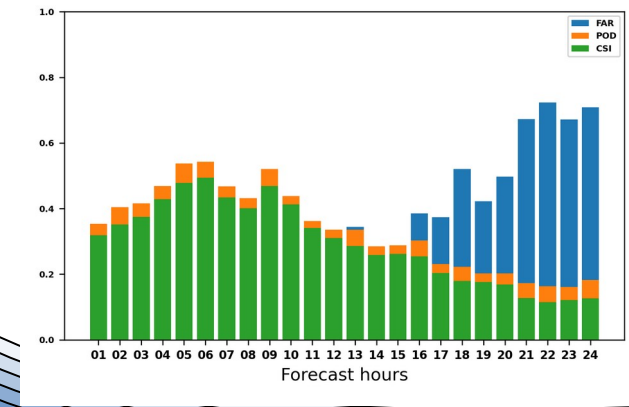
# Results

## HIRESW-ARW

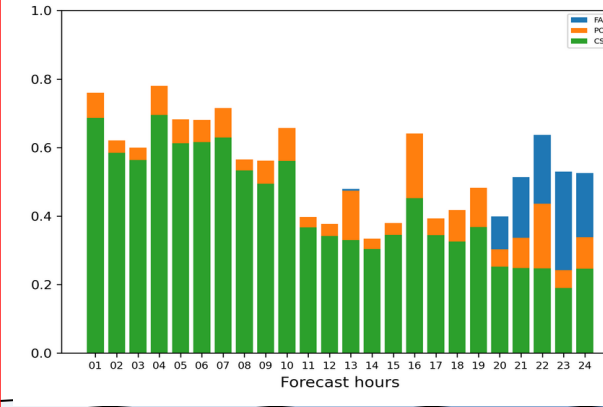
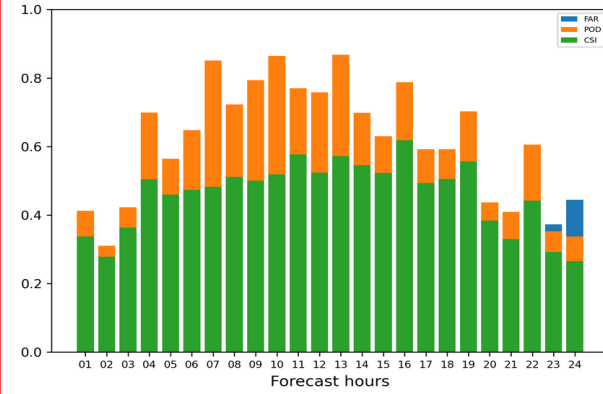


0600 UTC

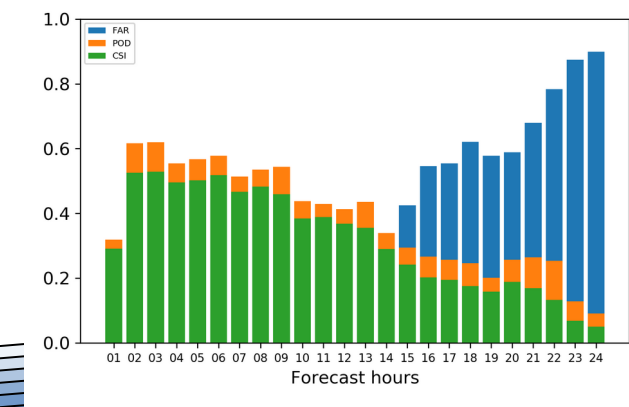
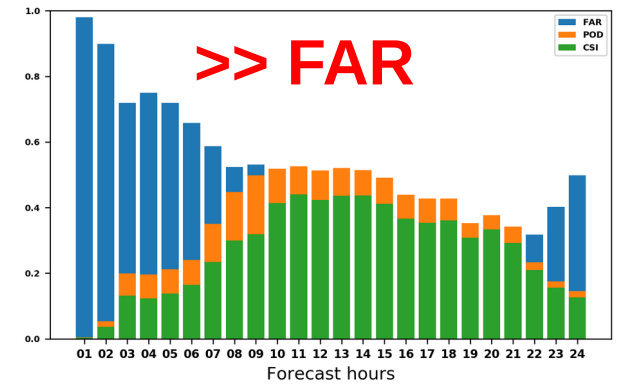
1800 UTC



## HIRESW-NMMB



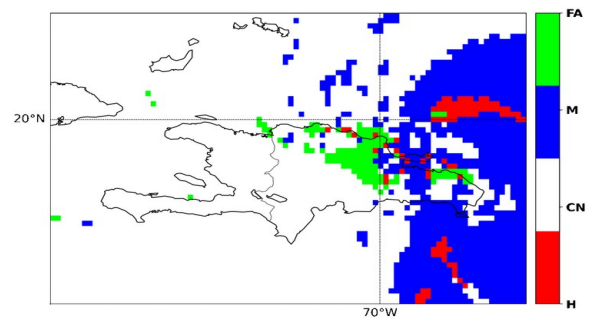
## SisPI



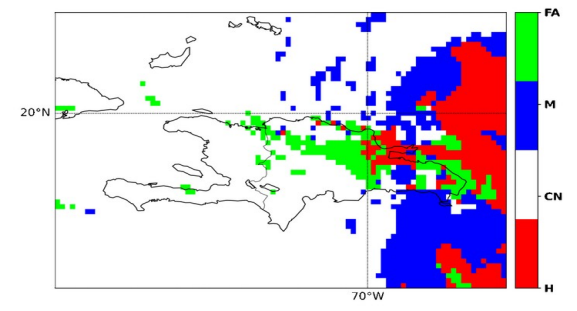
Best performance

# Results

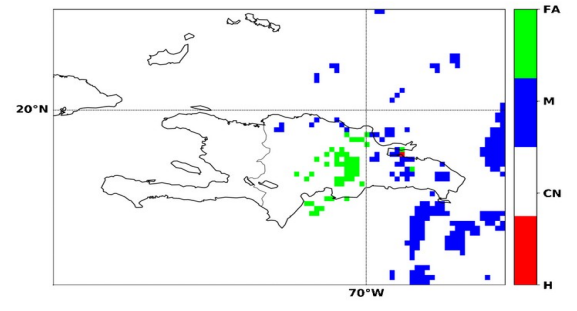
## HIRESW-ARW



## HIRESW-NMMB

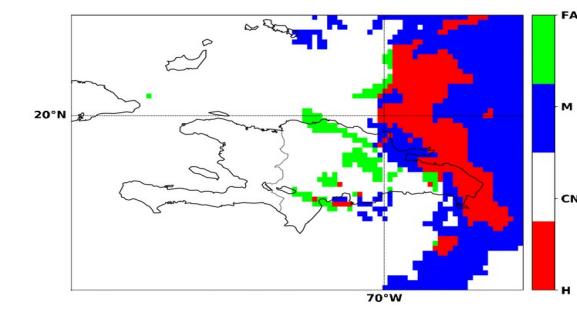
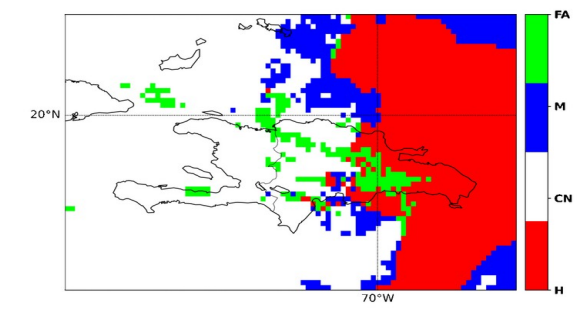
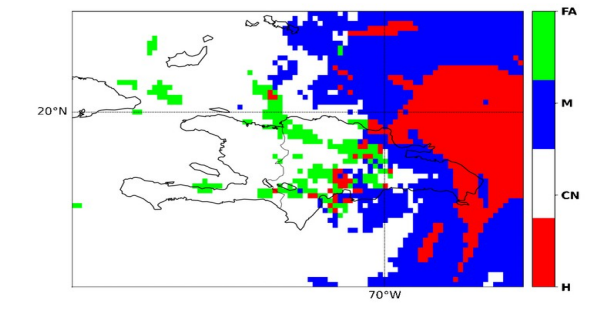


## SisPI



0600 UTC

1800 UTC





# Conclusions

- In general, the three forecast systems evaluated showed good ability to forecast the rainy areas of Tropical Storm Isaias.
- For the forecast of rain occurrence, the HIRESW-NMMB presents the best results with a probability of detection that reaches values of 0.8.
- The HIRESW-ARW and SisPI systems have better performance than the HIRESW-NMMB for heavy rain values.
- SisPI presents the higher FAR index values.

# Thank You!!!

## **Authors want to thanks:**

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