Tropical Disturbance Rainfall Exercise

A tropical disturbance lies south of Puerto Rico at 0000 UTC on the 21st of the month

You will draw a 72-hour quantitative precipitation forecast (QPF) for Puerto Rico for the period from 21/1200 UTC to 24/1200 UTC

You will be provided:

- Infrared (IR) Satellite Loop through 21st at 1200 UTC
- San Juan Radar Loop through 21st at 1200 UTC
- San Juan soundings from 0000 and 1200 UTC on the 21st
- Water Vapor Satellite Loop through 21st at 1200 UTC
- ECMWF 250mb forecast initialized 21st at 1200 UTC
- Track guidance including the GFS and ECMWF
- GFS 850mb, MSLP, and QPF forecasts
- ECMWF 850mb, MSLP, and QPF forecast
- Puerto Rico topographic map
Infrared Satellite Loop
San Juan Radiosonde – 00Z 21st

Precipitable Water: 56.9 mm
San Juan Radiosonde – 12Z 21st

Precipitable Water: 58.4 mm
Weak Anticyclone Aloft Near Puerto Rico
ATCF Track Guidance
ECMWF 850mb Height, Wind, Relative Vorticity Forecast
ECMWF MSLP, 1000-500 Thickness, & 10-m Wind Forecast

21/1200 UTC ECMWF MSLP, 1000-500 HB THKM, 10-M WIND (KT)
ECMWF 72-h QPF ending 1200 UTC 24th
Initialized 1200 UTC 21st

General Forecast Track Across Hispaniola
GFS 850mb Height, Wind, Relative Vorticity Forecast
GFS MSLP, 1000-500 Thickness, and 10-m Wind Forecast
GFS 24-h QPF ending 1200 UTC 23rd
Initialized 1200 UTC 21st
GFS 24-h QPF ending 1200 UTC 24th
Initialized 1200 UTC 21st
At FHR 30, the convective component (right) was less than 1/3 of the total precipitation (left). This means that most of the QPF was produced by the model on the grid scale and not by the convective scheme.
GFS 72-h QPF ending 1200 UTC 24th
Initialized 1200 UTC 21st

General Forecast Track Over Puerto Rico
72-h QPFs ending 1200 UTC 24th
Initialized 1200 UTC 21st

GFS

ECMWF

Black contours = 50 mm isohyets
How well will the GFS and ECMWF resolve the topography?
Terrain Map of Puerto Rico

Draw your 50 mm isohyets on this topographic map.
Terrain Map of Puerto Rico

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Instructions

Draw a 72-hour QPF for Puerto Rico ending 1200 UTC on the 24th with 50 mm isohyets

• Since there is no official NHC forecast, you will need to determine a forecast track for the system
  — How will forecast track impact the distribution of precipitation?

• How well are the models handling the current conditions?
  — Do you think the ECMWF and GFS are too high or too low with their QPF amounts? How well do they incorporate orographic lift?
  — Are they placing the heaviest rainfall where you would expect it to fall relative to the forecast track?

• What factors will help enhance precipitation?

• What factors will diminish precipitation?

Provide a forecast for the maximum rainfall amount expected during this 72-hour period and its location