Tropical Disturbance Rainfall Exercise

A tropical disturbance lies south of Puerto Rico at 0000 UTC on the 21\textsuperscript{st} 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 21\textsuperscript{st} at 1200 UTC
– San Juan Radar Loop through 21\textsuperscript{st} at 1200 UTC
– San Juan soundings from 0000 and 1200 UTC on the 21\textsuperscript{st}
– Water Vapor Satellite Loop through 21\textsuperscript{st} at 1200 UTC
– ECMWF 250mb forecast initialized 21\textsuperscript{st} 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
Water Vapor Satellite Loop
ECMWF 250mb Height and Wind Forecast

Weak Anticyclone Aloft Near Puerto Rico
ECMWF 850mb Height, Wind, Relative Vorticity Forecast
ECMWF MSLP, 1000-500 Thickness, & 10-m Wind Forecast
ECMWF 72-h QPF ending 1200 UTC 24th
Initialized 1200 UTC 21st

General Forecast Track Across Hispaniola
GFS MSLP, 1000-500 Thickness, and 10-m Wind Forecast
GFS 24-h QPF ending 1200 UTC 22\textsuperscript{nd}

Initialized 1200 UTC 21\textsuperscript{st}
GFS 24-h QPF ending 1200 UTC 23\textsuperscript{rd}

Initialized 1200 UTC 21\textsuperscript{st}

GFS 24-h PREcip (mm) ending 1200 UTC 23\textsuperscript{rd} (MODEL INITIALIZED AT 12 UTC 21\textsuperscript{st})
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
72-h QPFs ending 1200 UTC 24th
Initialized 1200 UTC 21st

GFS

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

Draw your 50 mm isohyets on this topographic map
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Draw your 50 mm isohyets on this topographic map.
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