

Severe Flooding Event In St Lucia....08/11/14



**Presenter: Maclean Jn Baptiste
SLU Met Services.**

St Lucian's Location.....



Lat..14.0N....Long...61.0W



Goals

- EXAMINE AND VERIFY THE CAUSE OF HOURS OF PRECIPITATION WHICH LEAD TO FLOODING ACROSS ST LUCIA.
 - IDENTIFY PREDICTORS FOR THIS TYPE OF EVENT.
- FIND OUT WHETHER THE EVENT WAS CAPTURED WELL BY
 - THE GFS MODEL
 - THE MET OFFICE OF ST LUCIA.

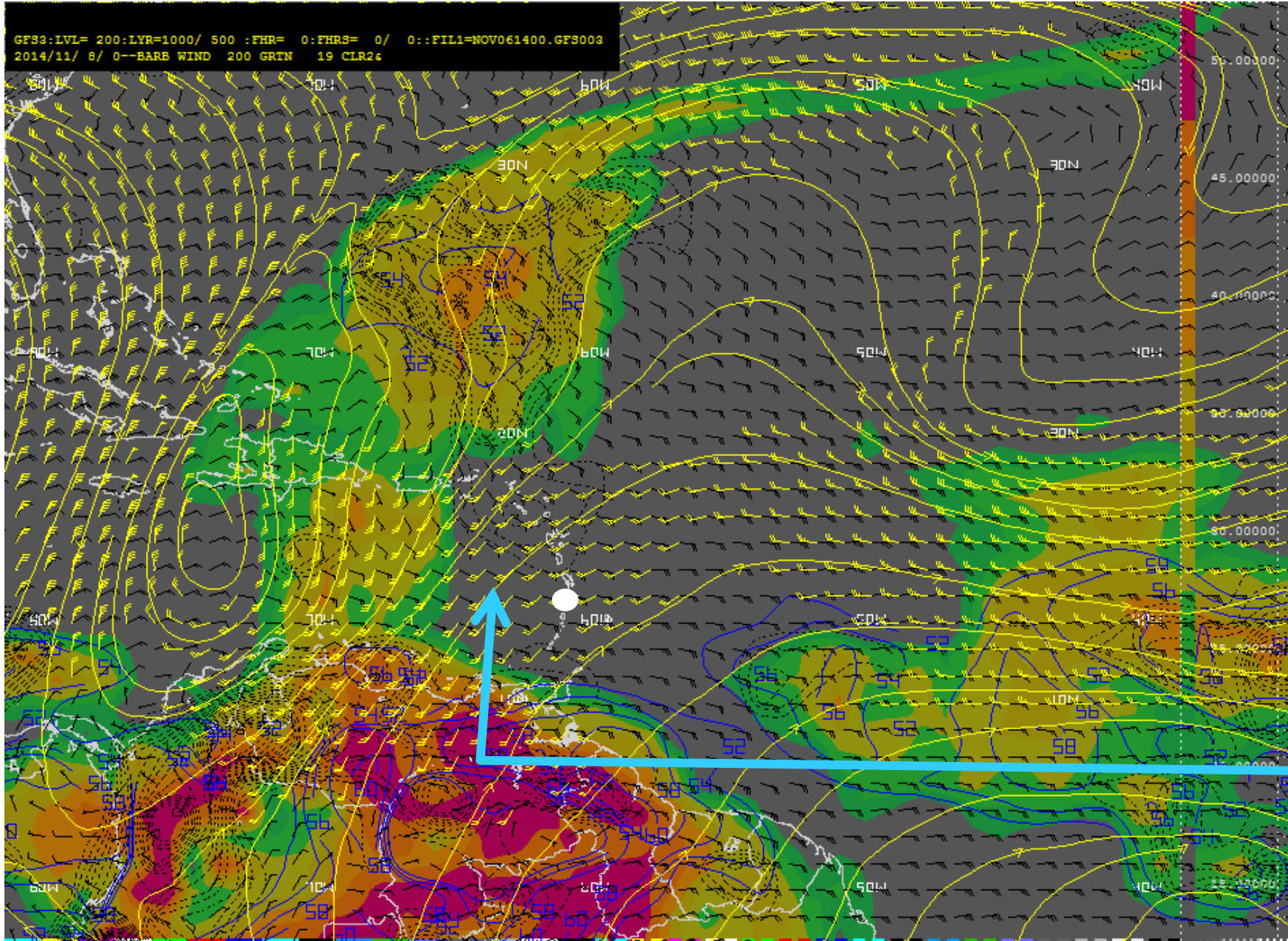
Event Summary

- ~100mm in 18 hrs (00-18Z Nov 8)
- Drainage issues



The event began at about 00Z and lasted till about 18Z based on the observations from both stations on the island. This resulted in rainfall accumulation of 118.1mm at TLPC and 86.8mm at TLPL during the period mentioned above .

00Z Run, Nov 06 2014 Showing Evolution Of The System



GDI (shaded)

200mb wind barbs & streamlines

1000-850mb averaged winds

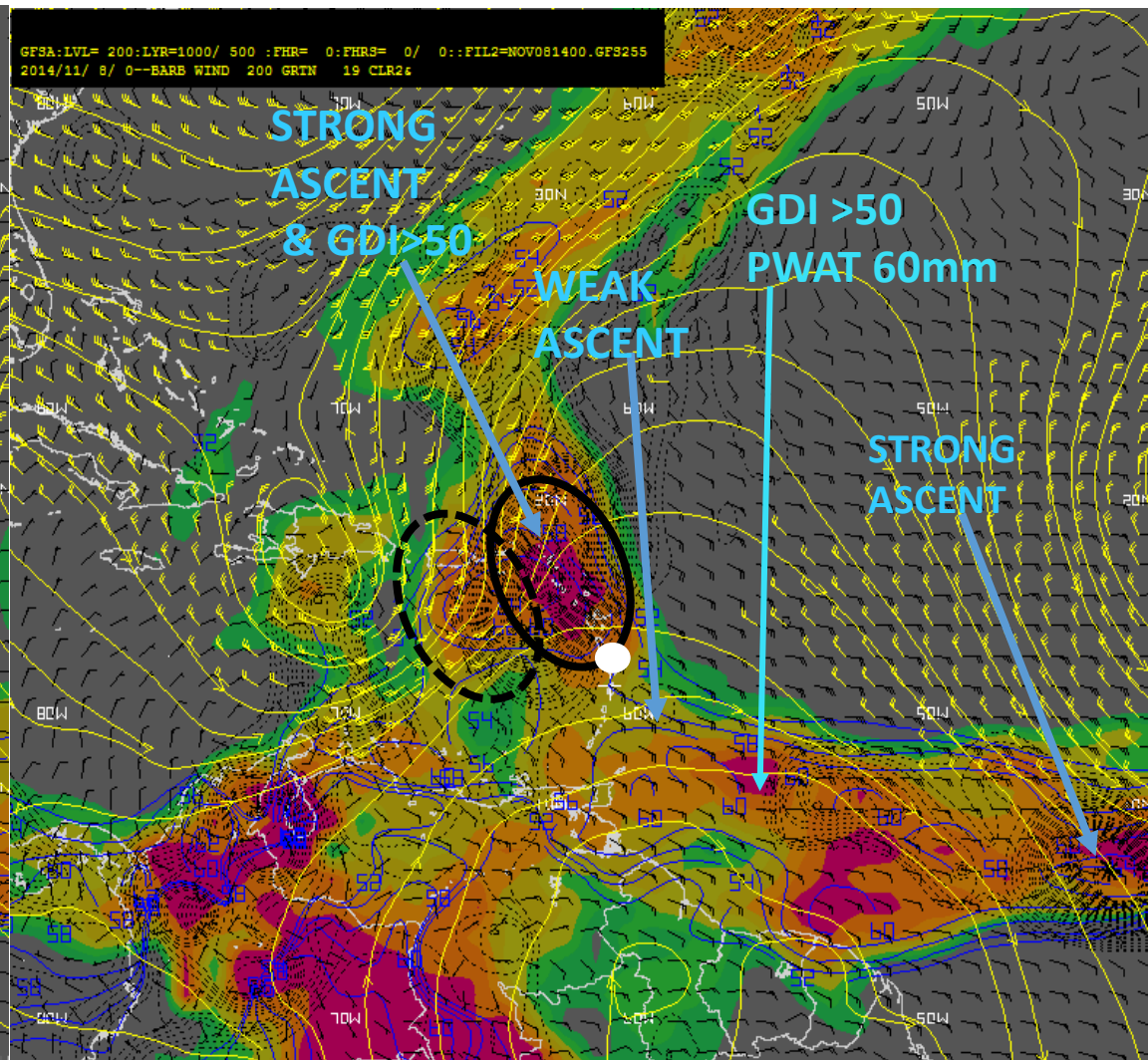
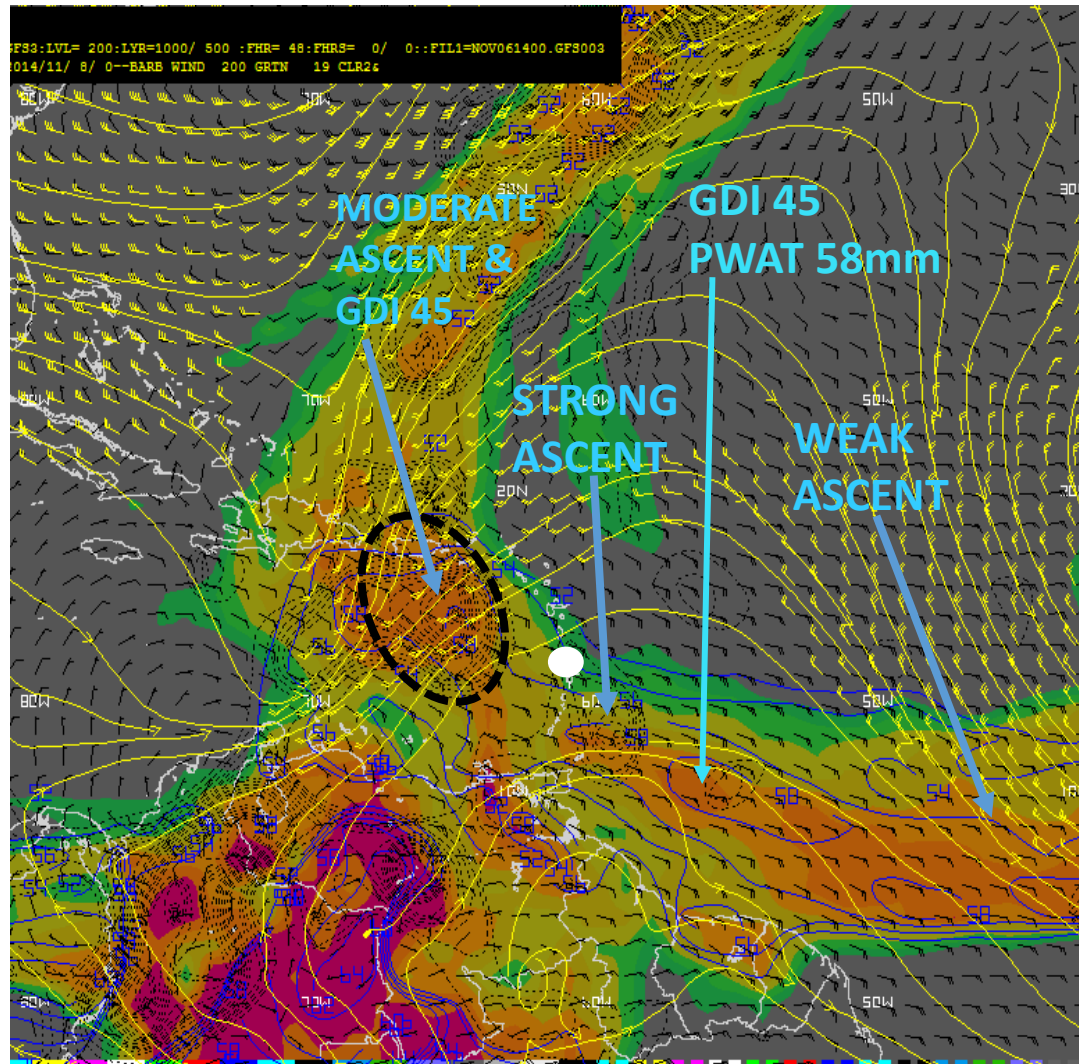
Ascent (black dashed lines)

Precipitable water

GFS SUGGESTED BEST COUPLING BETWEEN UPPER TROUGH AND TRADE WIND WAVE/ MOISTURE SURGE WEST OF ST LUCIA

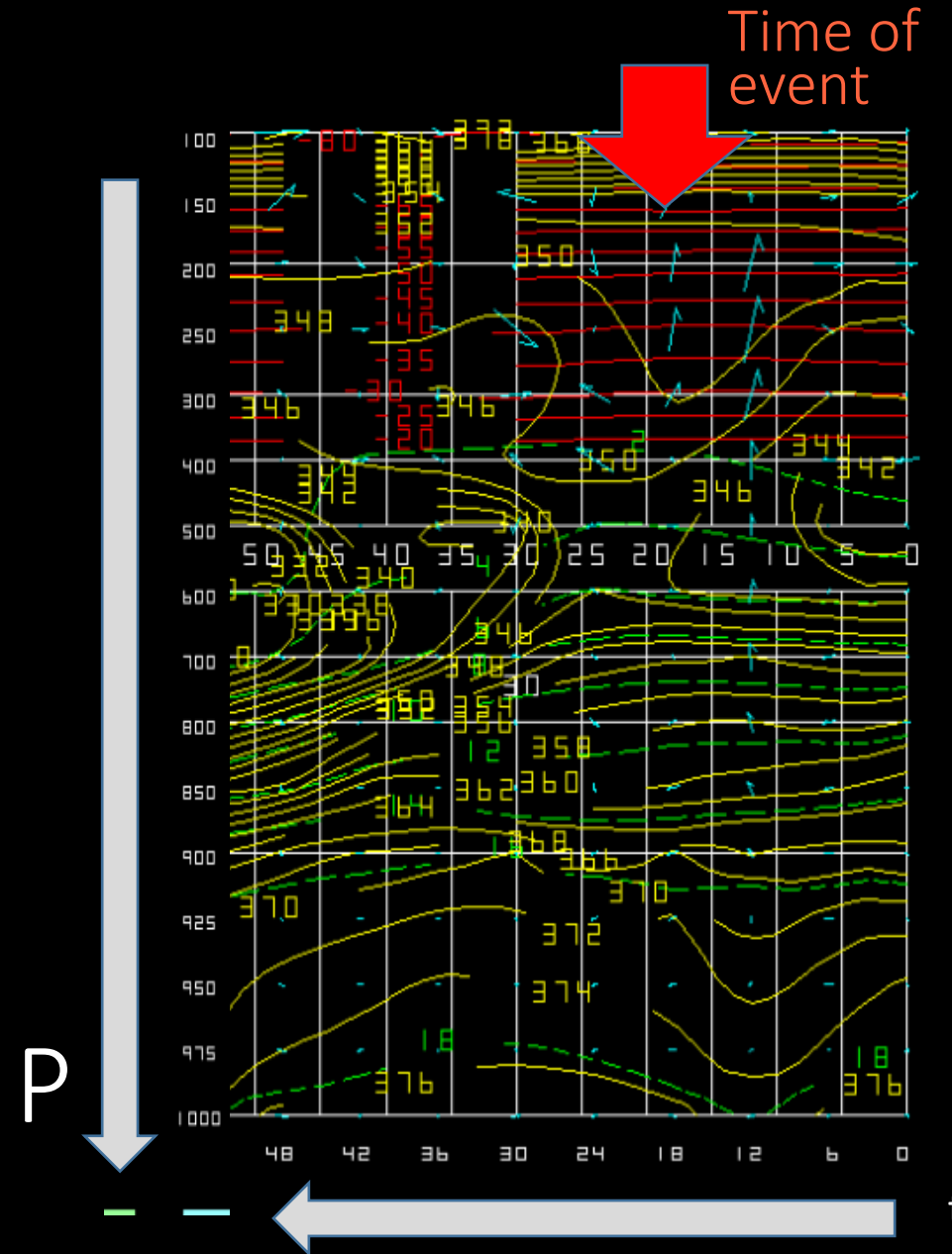
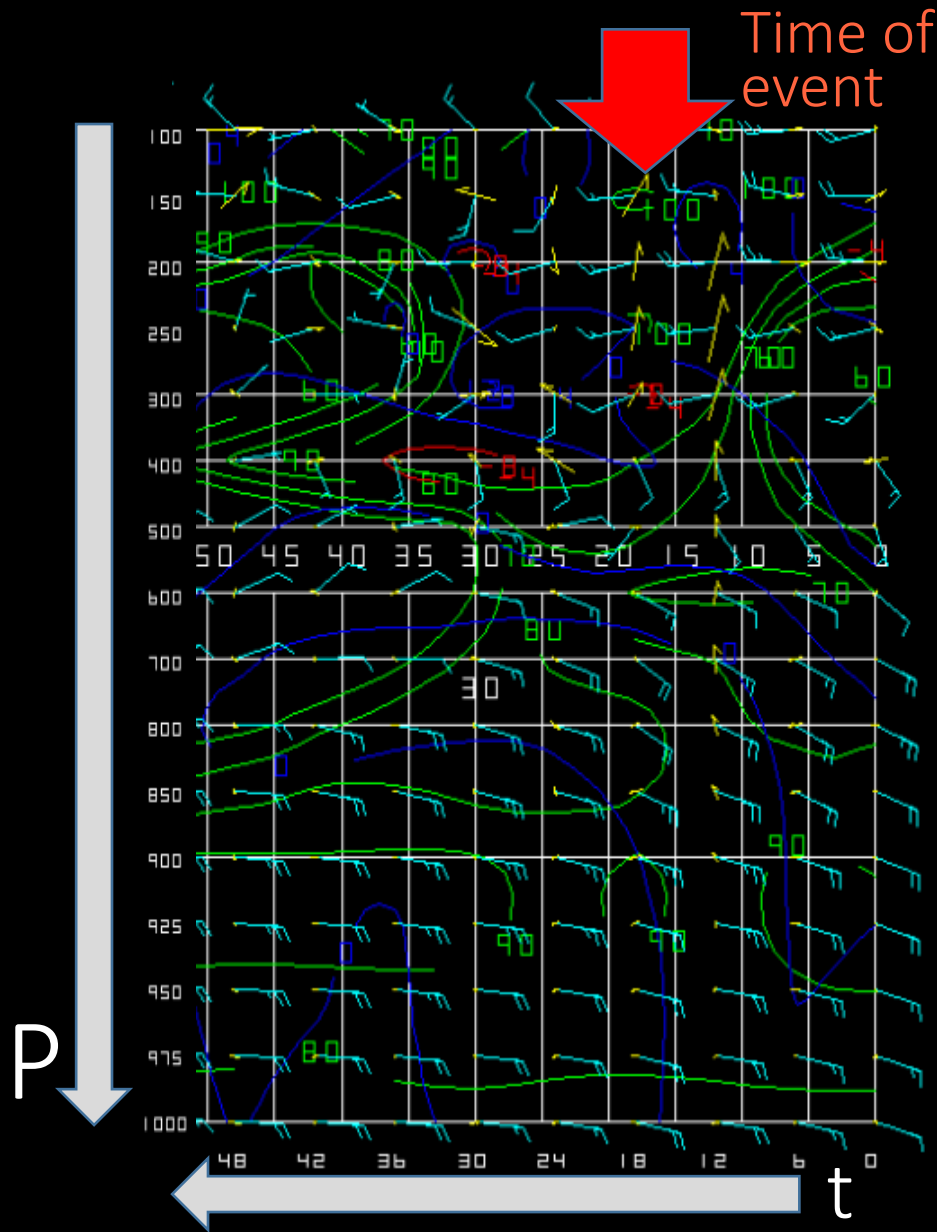
Earlier Run For 00Z..06/11/14

Analysis Run 00Z...08/11/14

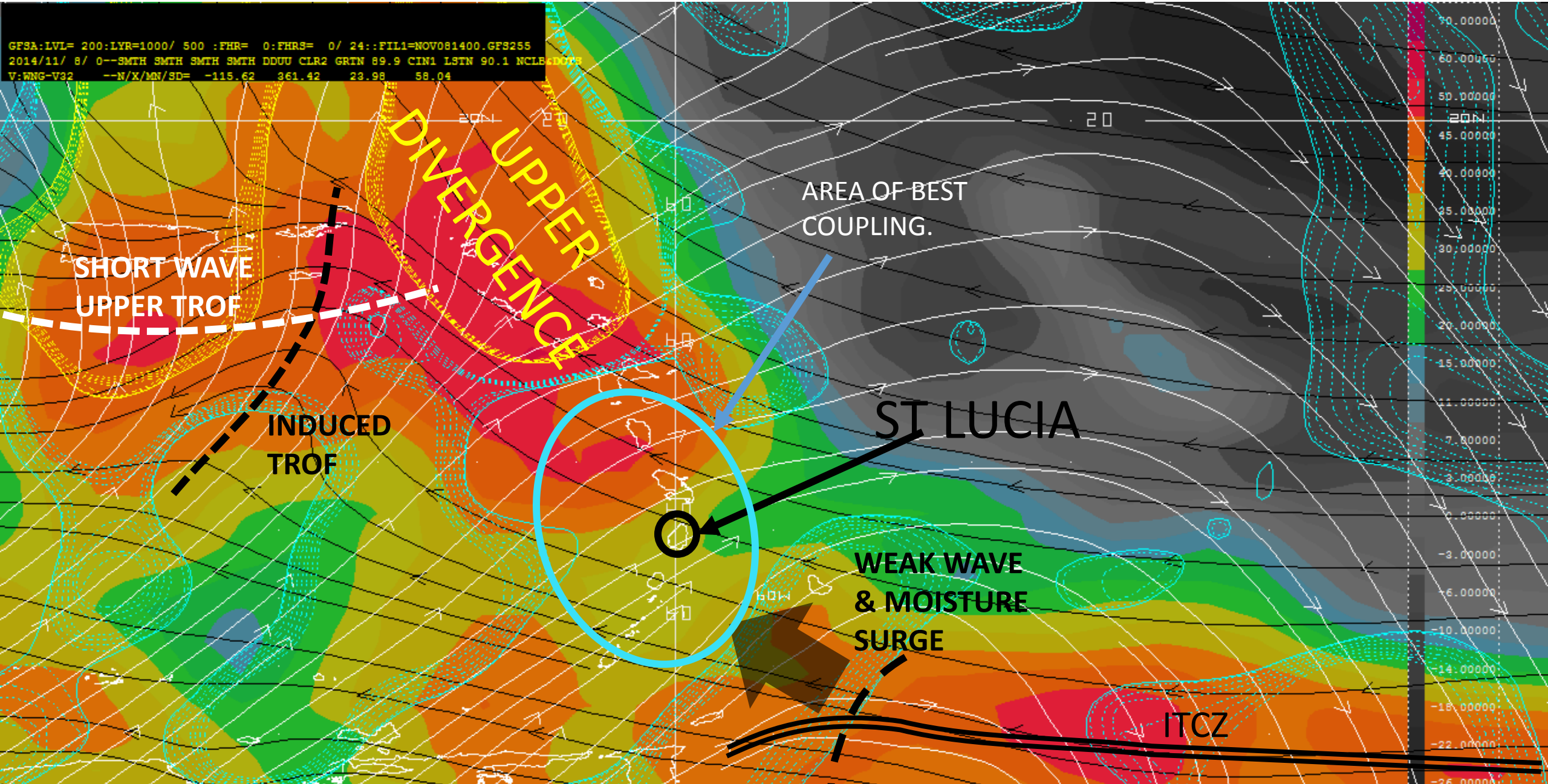


Models corrected (1) structure of upper trough making it negatively tilted and correcting to the east in future runs. This generated upper divergence/column vertical motion and enhanced activity in the Leewards instead of only Puerto Rico; (2) ITCZ became more active in later runs in terms of instability, velocity and PWAT.

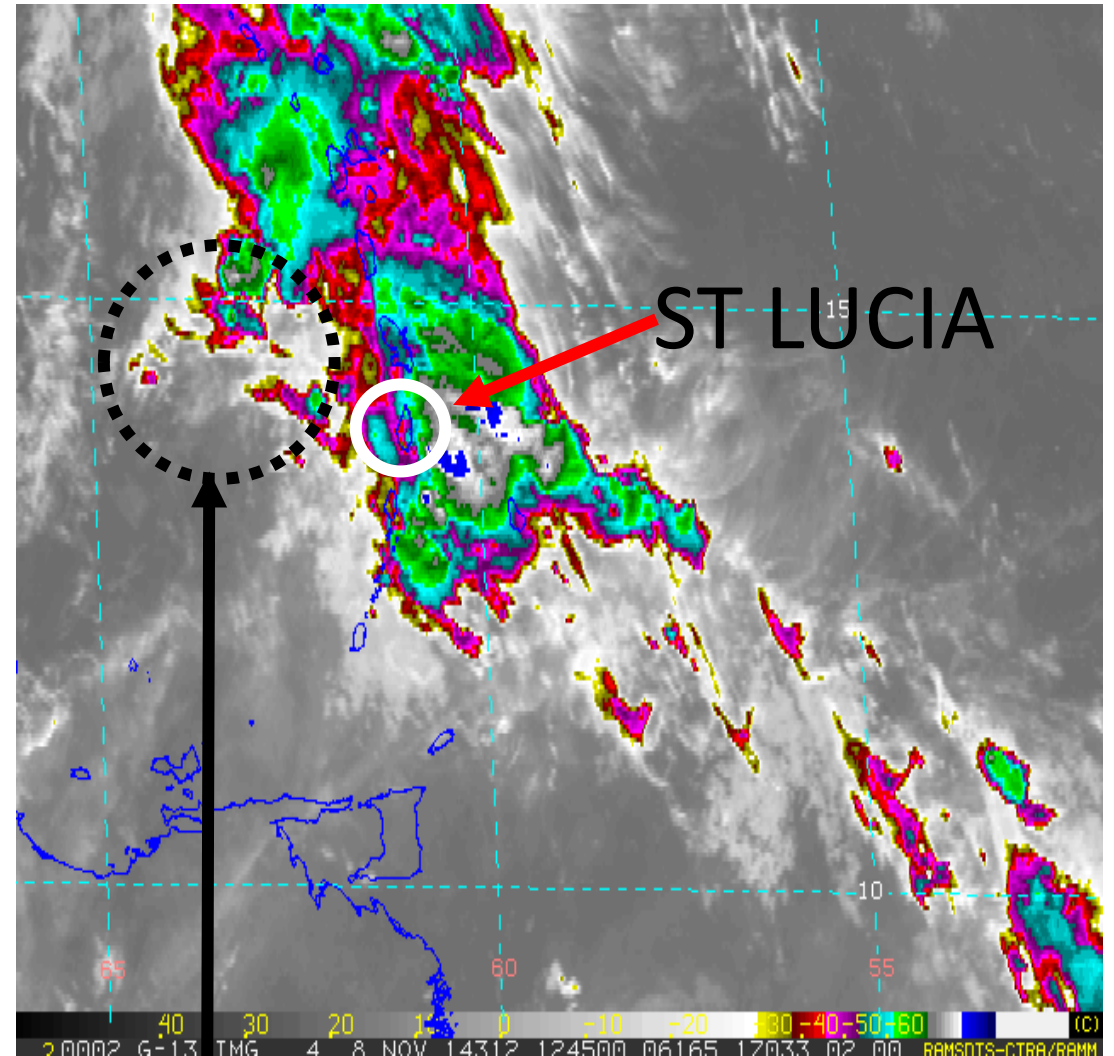
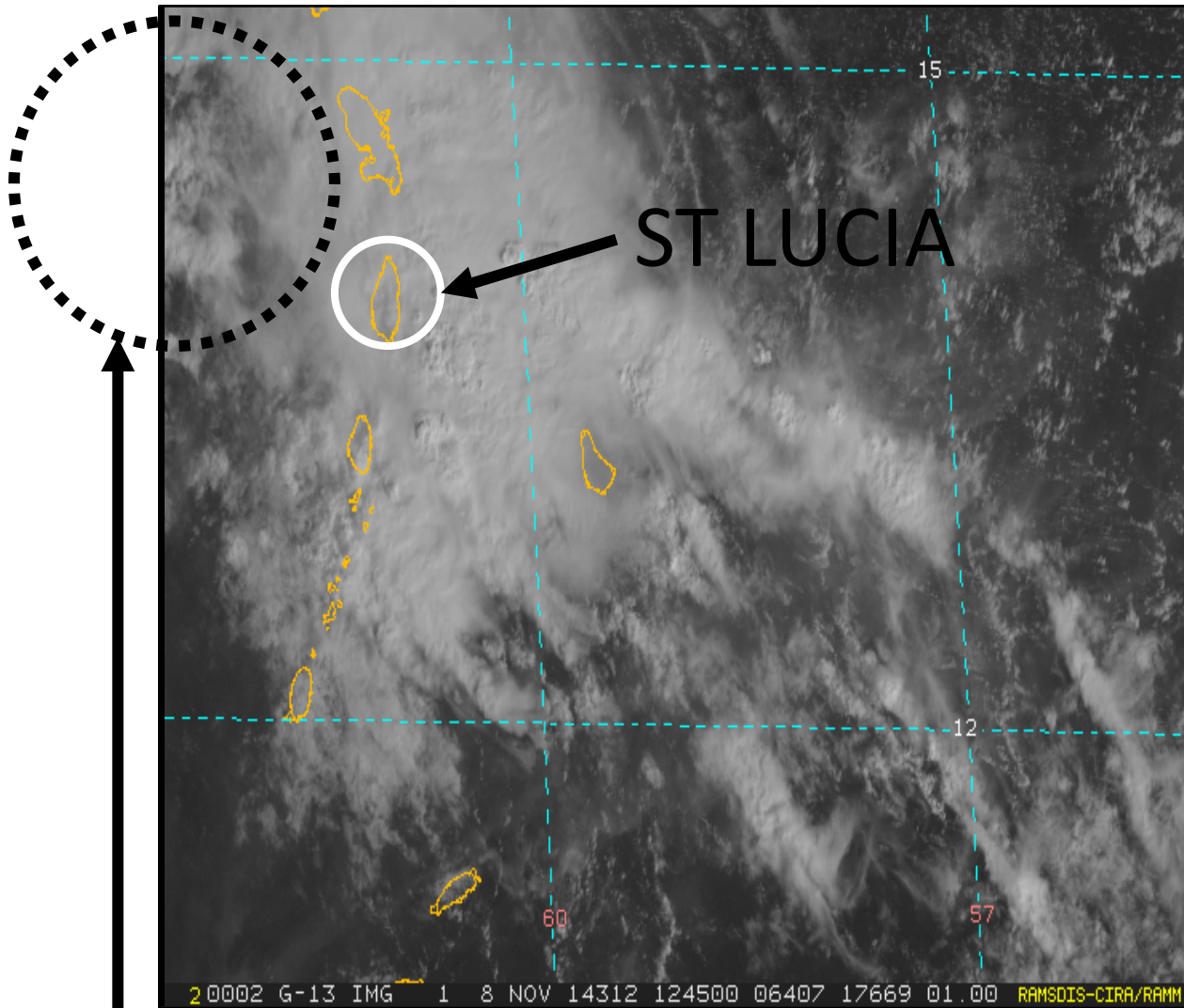
Time section charts for TLPL (ST. LUCIA)



RELEVANT FEATURES BY THE START OF THE RAINS(00Z 08/11/14)



IR AND VIS IMAGERY

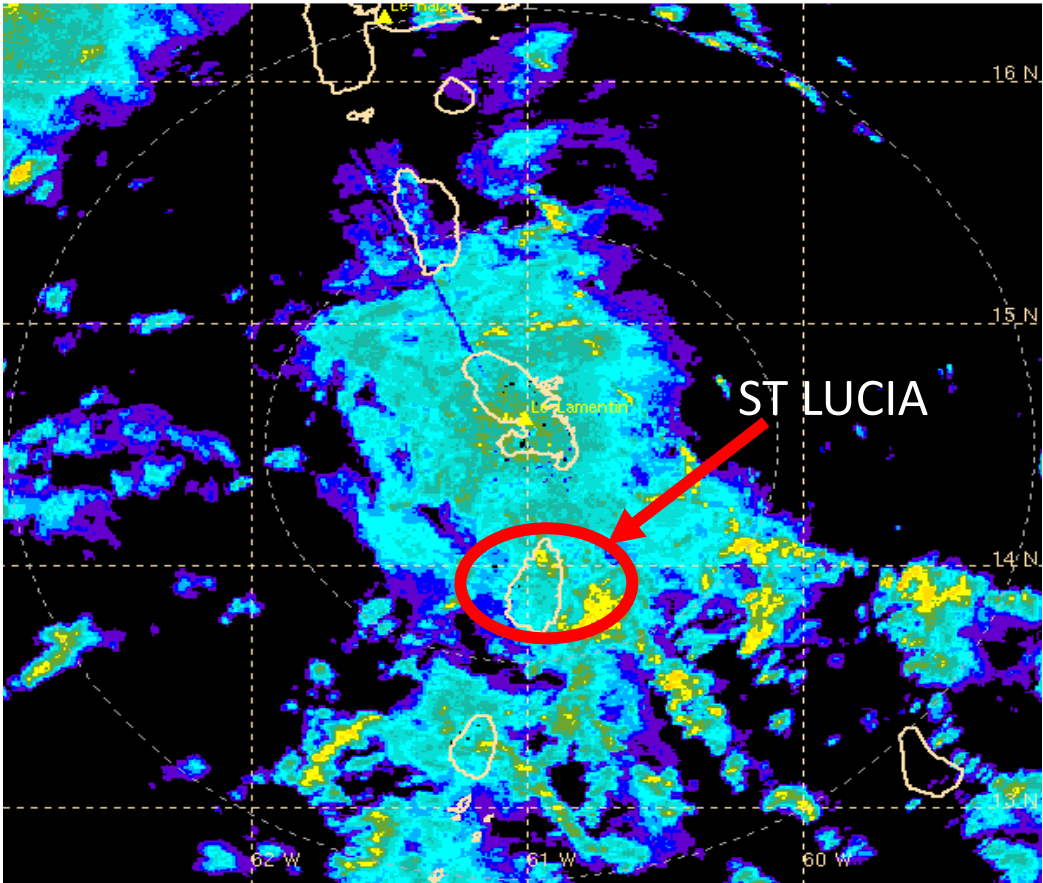


Area of best coupling as suggested by model

1 KM RADAR IMAGERY

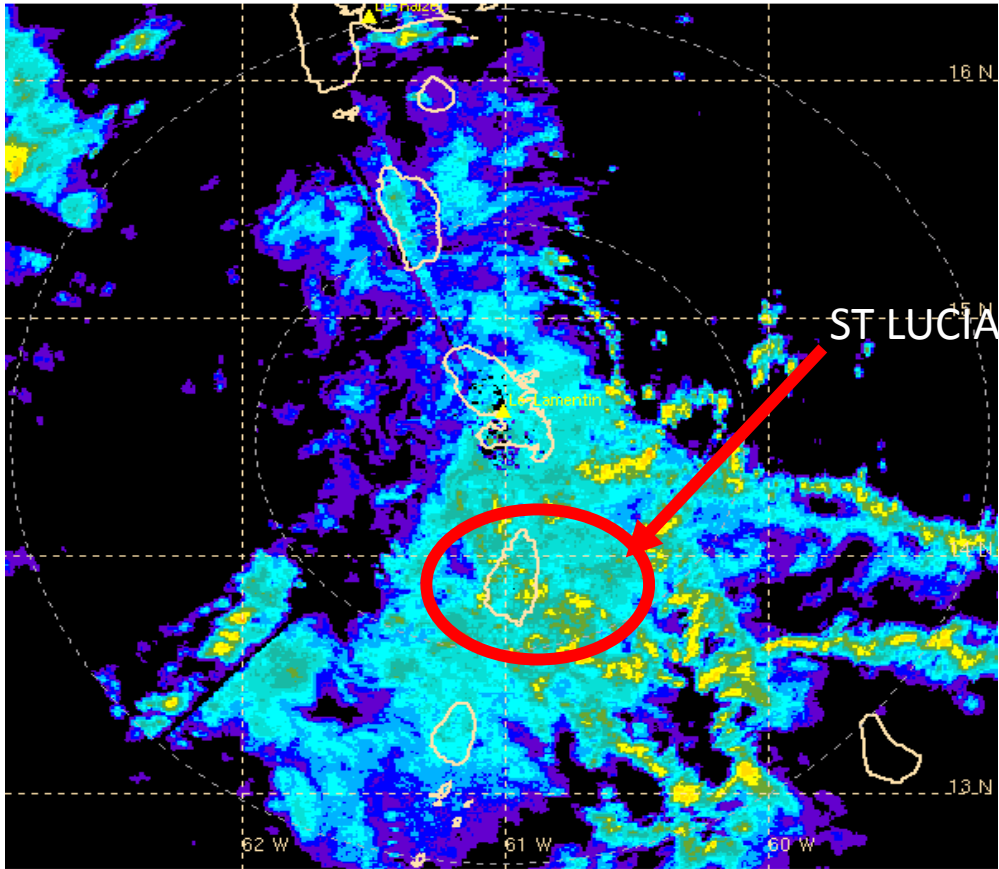
Radar MARTINIQUE (FWI) 08/11/2014 13H00 UTC (Loc+4H)

WMO: 78924 - Latitude: 14.501 N - Longitude: 61.018 W - range 200KM - Resolution 1KM



Radar MARTINIQUE (FWI) 08/11/2014 14H50 UTC (Loc+4H)

WMO: 78924 - Latitude: 14.501 N - Longitude: 61.018 W - range 200KM - Resolution 1KM



TLPL METARS

TIME OF EVENT

- 
- METAR TLPL 080000Z 12013KT 9999 -SHRA SCT015CB BKN280 27/26 Q1012 TEMPO SHRA=
 - METAR TLPL 080100Z 15017KT 7000 -SHRA SCT014CB SCT018 28/26 Q1013 TEMPO SHRA=
 - METAR TLPL 080200Z 13009KT 9999 VCTS SCT014CB SCT080 27/26 Q1013 TEMPO SHRA=
 - METAR TLPL 080300Z 15005KT 9999 FEW015CB BKN040 28/26 Q1013 TEMPO SHRA=
 - METAR TLPL 080400Z 17008KT 150V210 9999 SCT015CB BKN040 28/25 Q1012 TEMPO SHRA=
 - METAR TLPL 080500Z 12020KT 9999 SHRA SCT014CB BKN040 27/25 Q1012 NOSIG=
 - METAR TLPL 080600Z 00000KT 9999 FEW014CB SCT016 BKN040 25/25 Q1011 TEMPO SHRA=
 - METAR TLPL 080700Z 13010KT 9999 VCSH FEW014CB BKN016 25/25 Q1010 TEMPO SHRA=
 - METAR TLPL 080800Z 12012KT 9999 SHRA FEW014CB BKN016 25/25 Q1011 TEMPO SHRA=
 - METAR TLPL 080900Z 11008KT 9999 SHRA FEW014CB BKN038 25/25 Q1011 TEMPO SHRA=
 - METAR TLPL 081000Z 12005KT 4000 SHRA FEW014CB BKN016 BKN070 24/24 Q1012 TEMPO SHRA=
 - METAR TLPL 081100Z 08010KT 4000 SHRA FEW014CB SCT016 BKN070 23/23 Q1012 NOSIG=
 - METAR TLPL 081200Z 12010KT 9999 TSRA FEW010CB BKN014 BKN070 25/24 Q1014 NOSIG=
 - METAR TLPL 081300Z COR 08010KT 9999 -TSRA FEW011 SCT015 OVC070 25/24 Q1014 NOSIG=
 - METAR TLPL 081400Z 07010KT 6000 -RA FEW007 FEW010CB SCT035 OVC060 24/24 Q1015 NOSIG=
 - METAR TLPL 081500Z 06007KT 4000 -TSRA FEW006 FEW010CB BKN014 OVC060 24/24 Q1015 NOSIG=
 - METAR TLPL 081600Z COR 08010KT 5000 -TSRA FEW006 SCT010CB BKN014 OVC060 24/24 Q1013 NOSIG=
 - METAR TLPL 081700Z 08010KT 4000 SHRA FEW007 FEW011CB BKN015 OVC060 24/24 Q1014 NOSIG=
 - METAR TLPL 081800Z 07012KT 5000 -RA FEW008 BKN015 OVC060 24/24 Q1012 NOSIG=
 - METAR TLPL 081900Z 07014KT 9999 FEW007 OVC060 24/24 Q1011 NOSIG=
 - METAR TLPL 082000Z 08015KT 9999 FEW005 SCT036 OVC060 25/24 Q1011 NOSIG=

TLPC METARS

TIME OF EVENT

- METAR TLPC 080000Z 0000KT 9999 SCT022 SCT080 27/25 Q1012 TEMPO SHRA=
- METAR TLPC 080100Z 0000KT 9999 FEW018CB SCT020 BKN080 27/26 Q1013 TEMPO SHRA=
- METAR TLPC 081000Z 16004KT 3000 +SHRA BKN018 BKN040 25/24 Q1013 TEMPO SHRA=
- METAR TLPC 081100Z 0000KT 9999 -RA FEW007 SCT040 OVC070 24/23 Q1013 TEMPO SHRA=
- METAR TLPC 081140Z 10005KT 1000 +SHRA FEW007 SCT018 OVC070 24/23 Q1014=
- METAR TLPC 081200Z VRB02KT 9999 -SHRA FEW007 SCT018 OVC070 24/24 Q1014 RESH TEMPO TSRA=
- METAR TLPC 081300Z 08007KT 7000 SHRA FEW007 SCT018 OVC070 23/22 Q1015 NOSIG=
- METAR TLPC 081400Z 11003KT 6000 RA FEW007 SCT016 OVC070 24/24 Q1015 TEMPO SHRA=
- METAR TLPC 081500Z 07003KT 9000 -RA FEW008 SCT016 OVC070 24/24 Q1015 RERA=
- METAR TLPC 081600Z VRB02KT 9999 RA SCT016 OVC070 25/24 Q1014 TEMPO SHRA=
- METAR TLPC 081700Z 15003KT 9999 RA SCT07 OVC070 24/24 Q1014 NOSIG=
- METAR TLPC 081720Z 10011KT 2000 +SHRA SCT018 OVC070 24/24 Q1014=
- METAR TLPC 081800Z 07007KT 9999 RA FEW018 OVC070 24/24 Q1012 NOSIG=
- METAR TLPC 081900Z 08004KT 9999 -RA FEW009 SCT019 OVC070 24/24 Q1012 NOSIG=
- METAR TLPC 082000Z 10010KT 9999 FEW009 SCT019 OVC070 25/24 Q1012 NOSIG=

FLOODING IMAGES AROUND THE ISLAND





ST LUCIA'S MET OFFICE PERFORMANCE ON THE EVENT

INITIAL FORECAST

6 Pm Forecast 07/11/2014

- WINDS.....EASTERLY TO EAST-SOUTHEASTERLY NEAR 18 MPH OR 30 KM/H.
- WEATHER...PARTLY CLOUDY SKIES, BECOMING CLOUDY AT TIMES WITH SOME SCATTERED SHOWERS AND A CHANCE OF ISOLATED THUNDERSTORMS.

UPDATED FORECAST

6 Am Forecast 08/11/2014

- WINDS..... EAST SOUTHEASTERLY NEAR 20 MPH OR 31 KM/H.
- WEATHER...PARTLY CLOUDY SKIES, WITH SOME CLOUDY PERIODS, INTERMITTENT SHOWERS AND A CHANCE OF ISOLATED THUNDERSTORMS.

RESIDENTS IN AREAS PRONE TO FLOODING AND LANDSLIDES SHOULD BE VIGILANT.

QUESTION?

DO YOU THINK THAT THE MET OFFICE'S FORECAST HAS BEEN VALIDATED BASED ON THE ABOVE RESULTS?

CONCLUSIONS

EVENT STORY

- An upper level low centered just south of Hispaniola and moving northeastward pulled the ITCZ northward.
- A very small short wave axis developed southeast of the main trough axis and this enhanced upper divergence locally ahead of trough over the central Antilles after 12Z on the 8th.
- A moisture surge/weak wave propagated along the ITCZ.
- Also, a relatively strong Sub Tropical Ridge east of the islands ensured that the upper trough propagated northward and aided in upper divergence.

MODEL PERFORMANCE

- GFS model always had the system west of St Lucia in all the runs.
- Made several corrections on the different runs yet still the event wasn't captured successfully.
- In the end I believe that the GFS model wasn't aggressive enough.

PREDICTORS

- Based on the various model runs the following appear as potential predictors:
 - PWAT>50mm.
 - GDI>40
 - Strong ascent: divergence aloft/wave in trades

Continuous model corrections limited confidence on the establishment of threshold values of the variables that mattered for this event.

ST LUCIA'S F.O. FORECAST

- Continuous GFS corrections/being too conservative may be one of the reasons why the Met Office of St Lucia had a tough time in capturing the event successfully because:
 - The flood warning was issued on the morning when the event had already started.
 - The forecasted conditions were more intense than anticipated.

Thank you/ Gracias