

Disaster Risk Reduction and the role of the Meteorological Department Curaçao

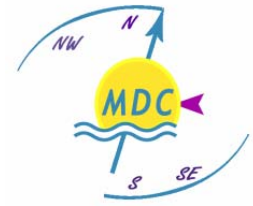
Protehé bida i propiedat

Protecting life and property

*Levens en eigendommen
beschermend*



Albert Martis
Director



Mission & Vision MDC

Mission

*To protect life and property through the issuance of appropriate weather forecasts and warnings for the Dutch Caribbean, adjacent waters and air space,
and to provide meteorological and climate related services to specific sectors, in order to sustain social-economic development.*

Vision

Deliver service of high quality, timely and accurate

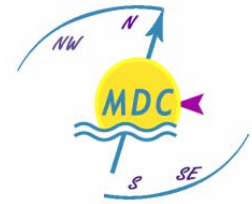




Area of Responsibility MDC

- Aruba (T) MoA*
- Curaçao (T) MoA
- Bonaire (NL) MoA
- Saba (NL) MoA
- St. Eustatius (NL) MoA
- S. Maarten (T) MoA



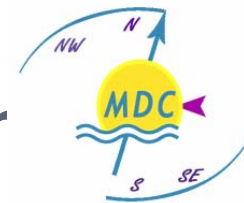


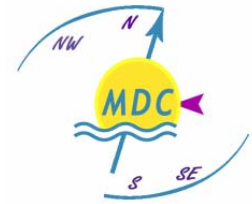
Key Costumers of MDC

- **Aeronautical Services (ICAO) (65%)**
 - Airports Hato International, Flamingo, Saba and St. Eus
 - Airlines and airports operators
 - Curacao Flight Information Region through NAATC
 - Search and Rescue, Militarily operations
- **Public Weather Services (WMO) (24%)**
 - Authorities, Emergency Organizations,
 - Media and General Public
 - Police Investigations and Insurance Companies
 - Research consultants and Universities
- **Marine Services (WMO and IMO) (11%)**
 - Port Authorities, ships, Coast Guard
 - Small craft, Tour Operators



WMO Disaster Risk Management Program





Early Warning System

- Forecasting/Detection
 - Hazards and Impacts
- Production of Bulletins
- Dissemination
 - Response or Action
- Monitoring
 - Hazards, Impact and information
- Updating the Bulletins



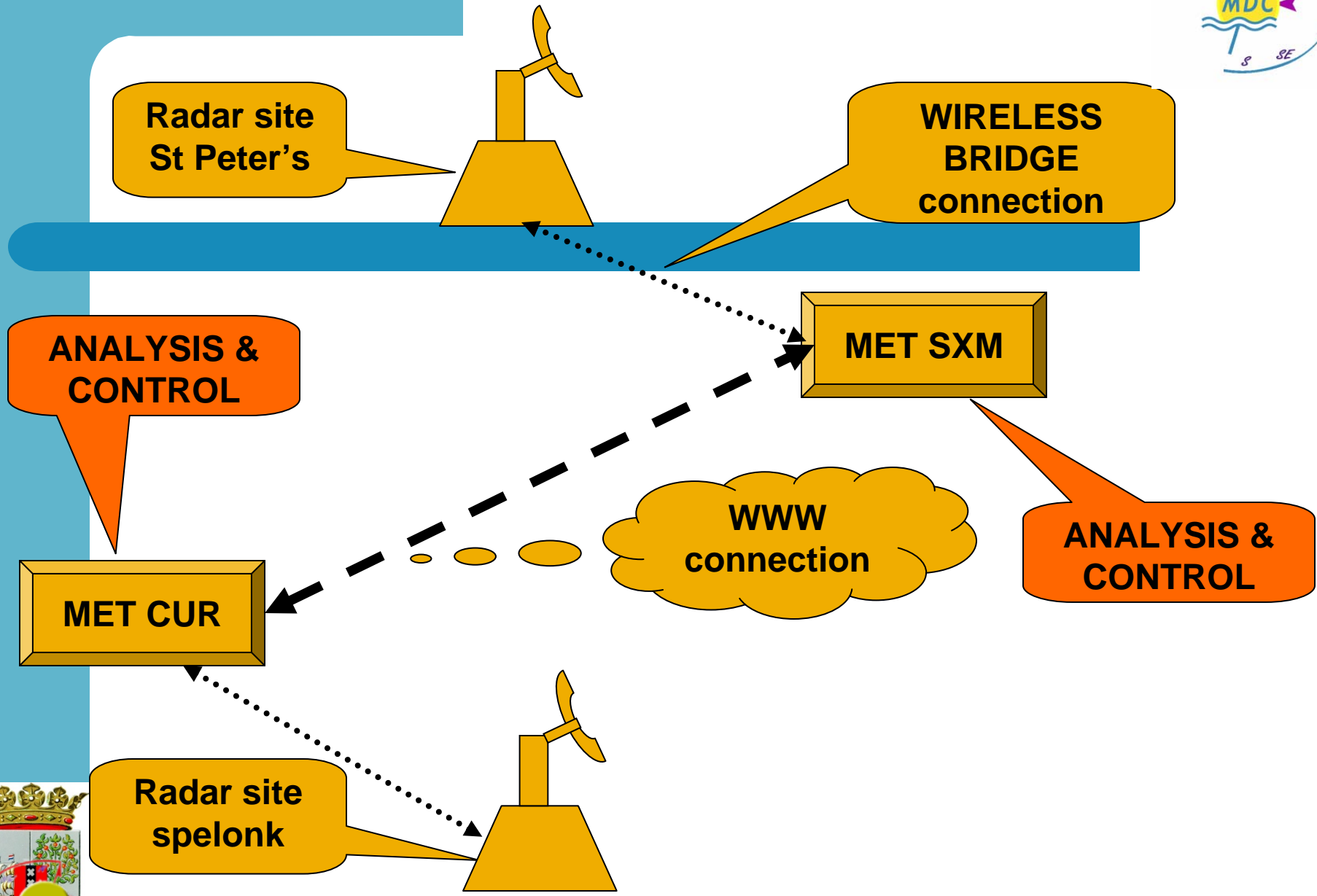
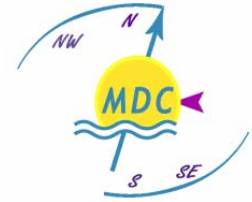


Detection and Monitoring Networks MDC

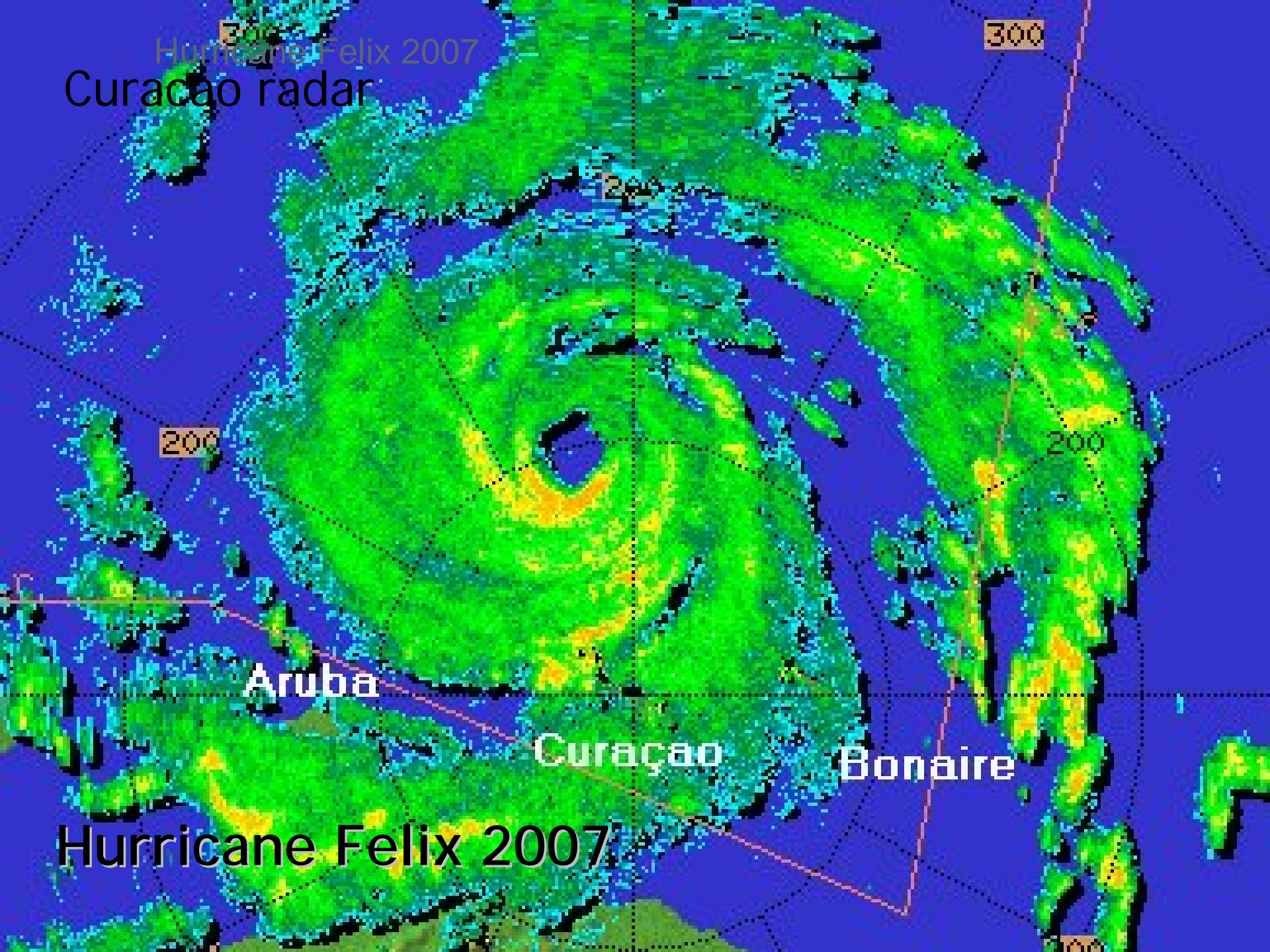
- **Land stations**
- **Weather Radar (Curaçao and St. Maarten)**
- **Upper air stations (Curaçao and St. Maarten)**
- **Satellite imagery**
- **Numerical models**
- **US NHC (WMO RSMC)**



Basic Weather radar data flow



Hurricane Felix 2007
Curacao radar



Aruba

Curaçao

Bonaire

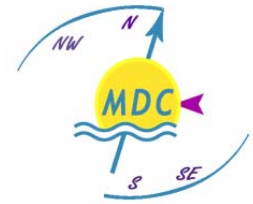
Hurricane Felix 2007

200

300

200

100

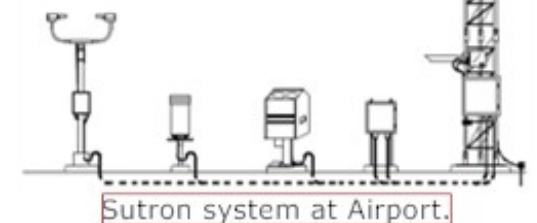
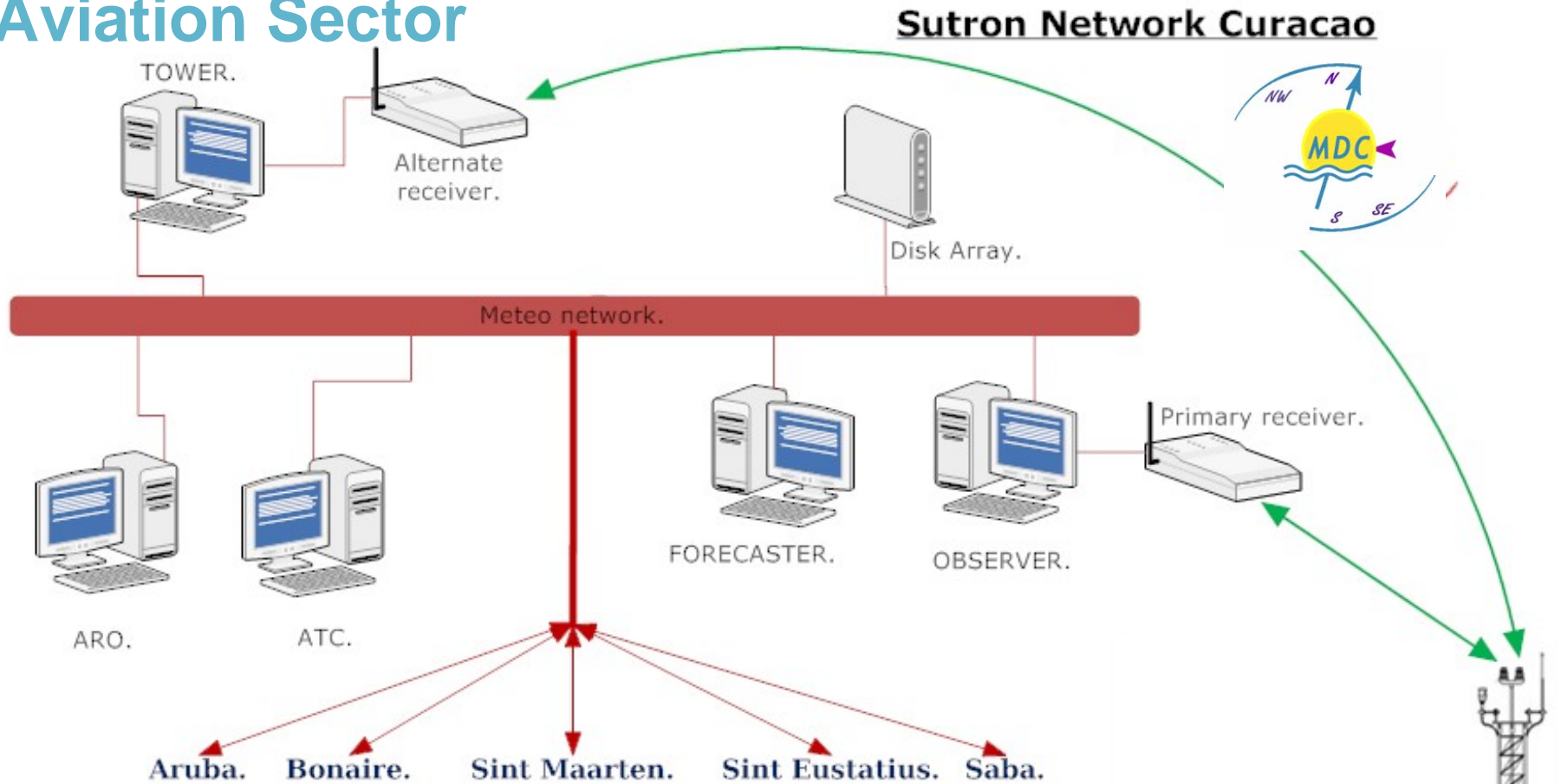


Early Warning Systems (2)

- **Type of products**
 - **Severe Weather (cautionary/watch/warning bulletin)**
 - **Sea condition (small craft and high surf bulletin)**
 - **Tsunami (Info/warning bulletin)**
 - **Tropical Cyclone (information/watch/warning advisory)**



Early Warning Dissemination System Aviation Sector

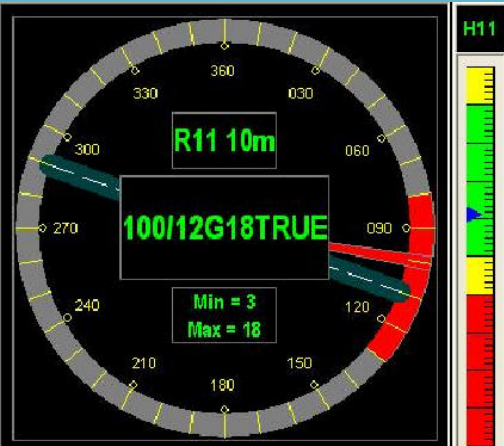


Real time Met data

Text: Reports, Bulletins, Warnings

Graphics: Radar, Satellite SWC

Alarm: Sound, Pop-up window



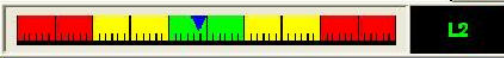
0.0 mm
0.0 mm(hour)
0.0 mm(day)



OPEN
Enclosure Door

Rain Accumulation

31.4°C Temperature	23.9°C Dew Point	1012.4hPa QNH	1011.3hPa QFE	88.5°F Temp(F)
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~25000m Visibility	Weather	~FEW020 Sky Condition
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64.4% RH	1011.5hPa QFER	1011.3hPa Pressure
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REMARK

METAR/SPECI

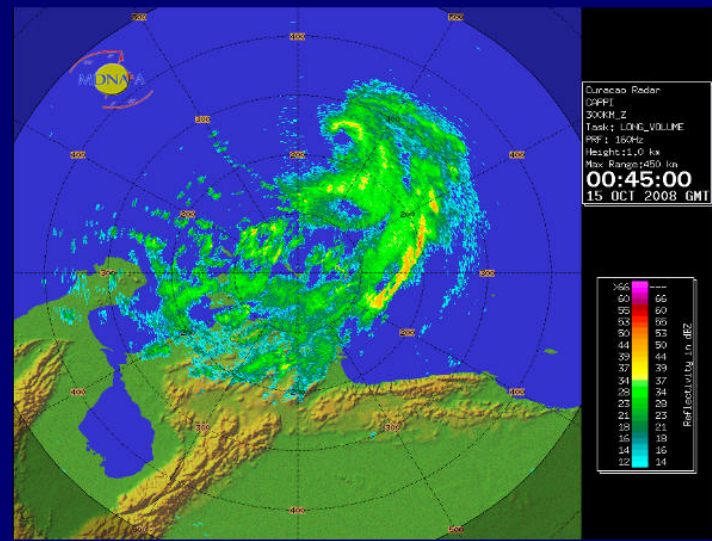
METAR TNCC 081400Z 10012KT 080V160 9999 FEW020 31/24 Q1012=
SPECI TNCC 081346Z AUTO 10012KT 9999 FEW020 31/24 Q1012 NOSIG
SPECI TNCC 081330Z AUTO 10012KT 9999 FEW020 31/24 Q1012 NOSIG

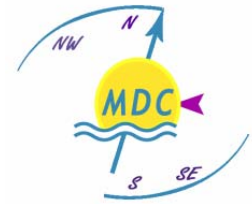
MET REPORT/SPECIAL

MET REPORT TNCC 081400Z WIND 110/13KT VIS NOT AVBL CLD FEW 2000FT
T31 DP24 QNH 1012HPA QFE 1011HPA
MET REPORT TNCC 081300Z WIND 110/12KT VIS NOT AVBL CLD FEW 2000FT
T31 DP24 QNH 1011HPA QFE 1010HPA NOSIG

SYNOP

AAXX 08124 78988 02475 41110 10291 20241 30109 40120 52012 60001 82200 333
10337 20273 59010 60007 82818





Dissemination of Information

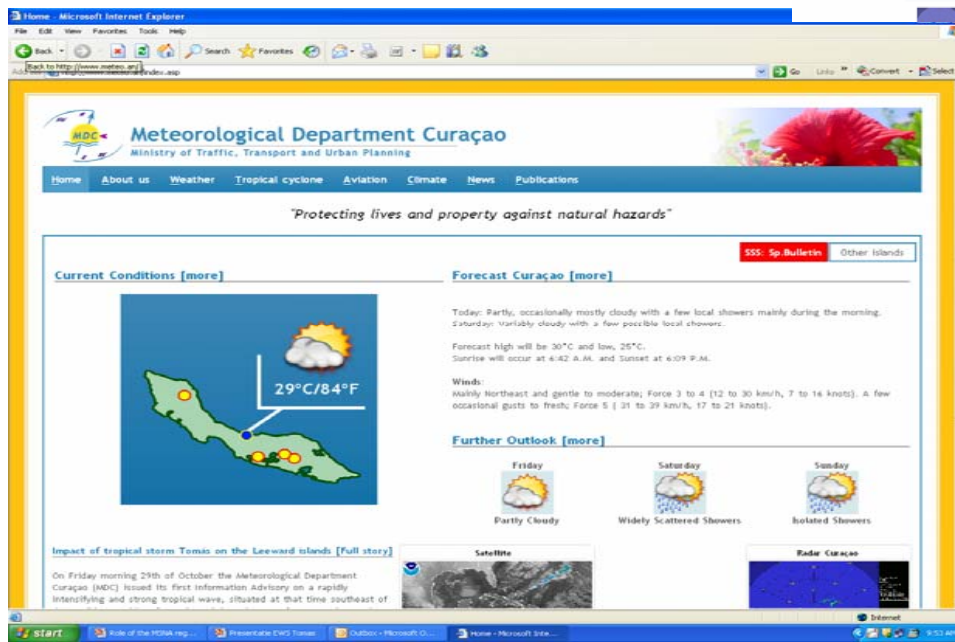
Radio and
TV interviews

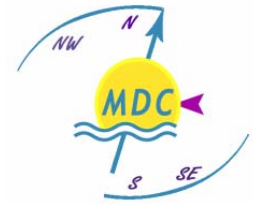
www.meteo.an



Facebook

Mobile





Risk Reduction Management

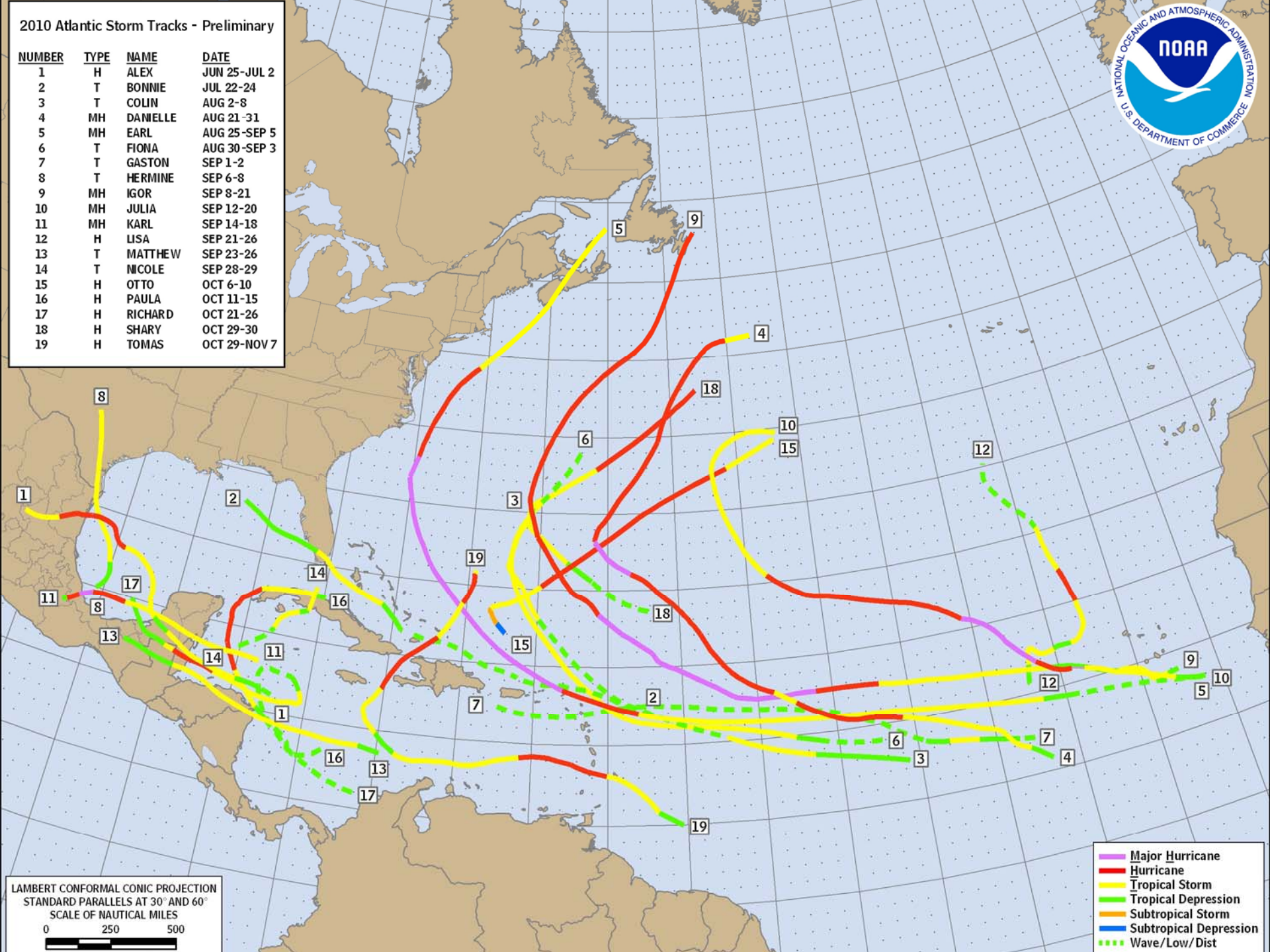
- Hazard and Impact Assessment
- Risk Assessment (Hurricanes, **new: tsunami**)
- Preventive Strategies (sustainable developments)
- Financing Strategies (**insurance, funds**)
- Education and Public Outreach
- Early Warning System
- Response and Recovery



2010 Atlantic Storm Tracks - Preliminary

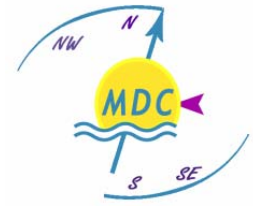


NUMBER	TYPE	NAME	DATE
1	H	ALEX	JUN 25-JUL 2
2	T	BONNIE	JUL 22-24
3	T	COLIN	AUG 2-8
4	MH	DANELLE	AUG 21-31
5	MH	EARL	AUG 25-SEP 5
6	T	FIONA	AUG 30-SEP 3
7	T	GASTON	SEP 1-2
8	T	HERMINE	SEP 6-8
9	MH	IGOR	SEP 8-21
10	MH	JULIA	SEP 12-20
11	MH	KARL	SEP 14-18
12	H	LISA	SEP 21-26
13	T	MATTHEW	SEP 23-26
14	T	NICOLE	SEP 28-29
15	H	OTTO	OCT 6-10
16	H	PAULA	OCT 11-15
17	H	RICHARD	OCT 21-26
18	H	SHARY	OCT 29-30
19	H	TOMAS	OCT 29-NOV 7



- Major Hurricane
- Hurricane
- Tropical Storm
- Tropical Depression
- Subtropical Storm
- Subtropical Depression
- - - Wave/Low/Dist

LAMBERT CONFORMAL CONIC PROJECTION
 STANDARD PARALLELS AT 30° AND 60°
 SCALE OF NAUTICAL MILES
 0 250 500

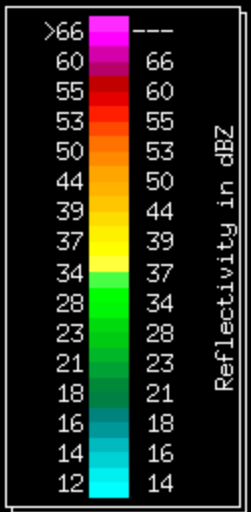
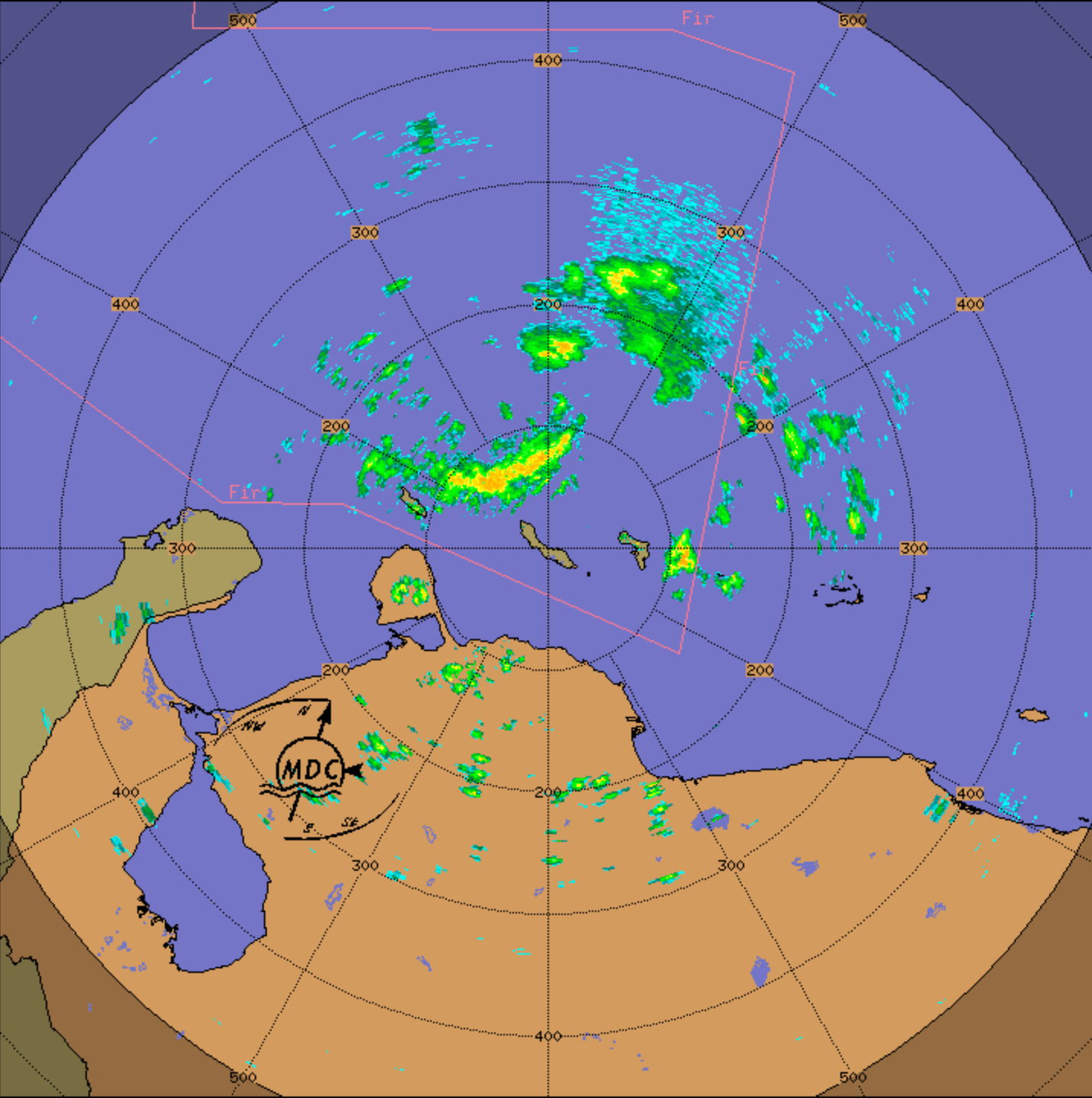


EWS Tropical Storm Tomas

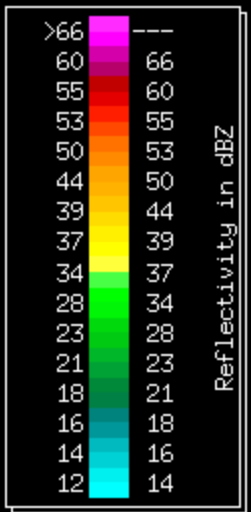
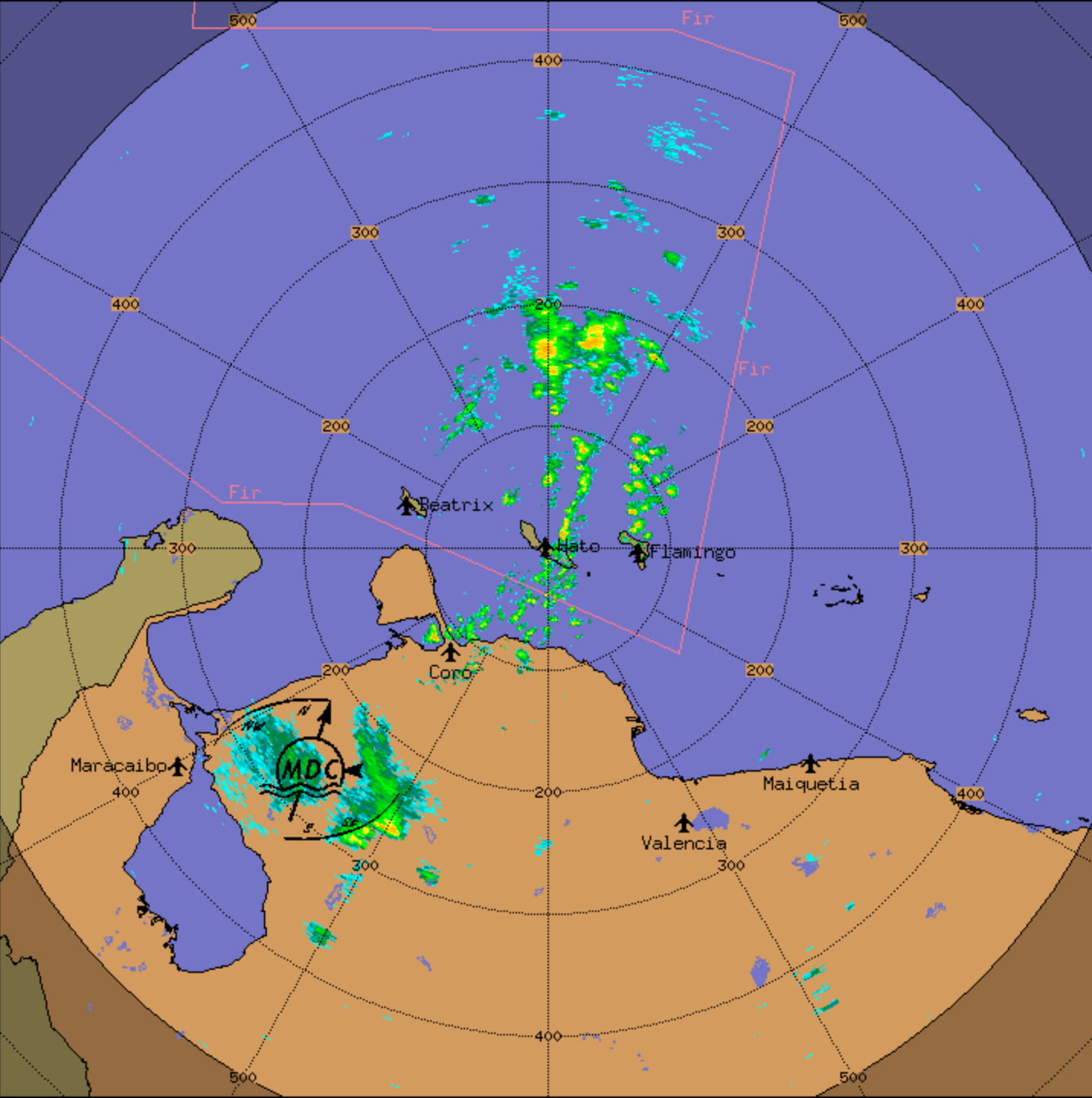
- Local Hazards and Impacts
- Forecast:
 - Winds : no Tropical Storm force Winds
 - Seas: Small craft advisory /high surf advisory
 - Rainfall: heavy rainfall (50 -80 mm local flooding)



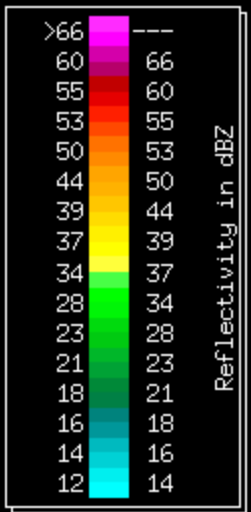
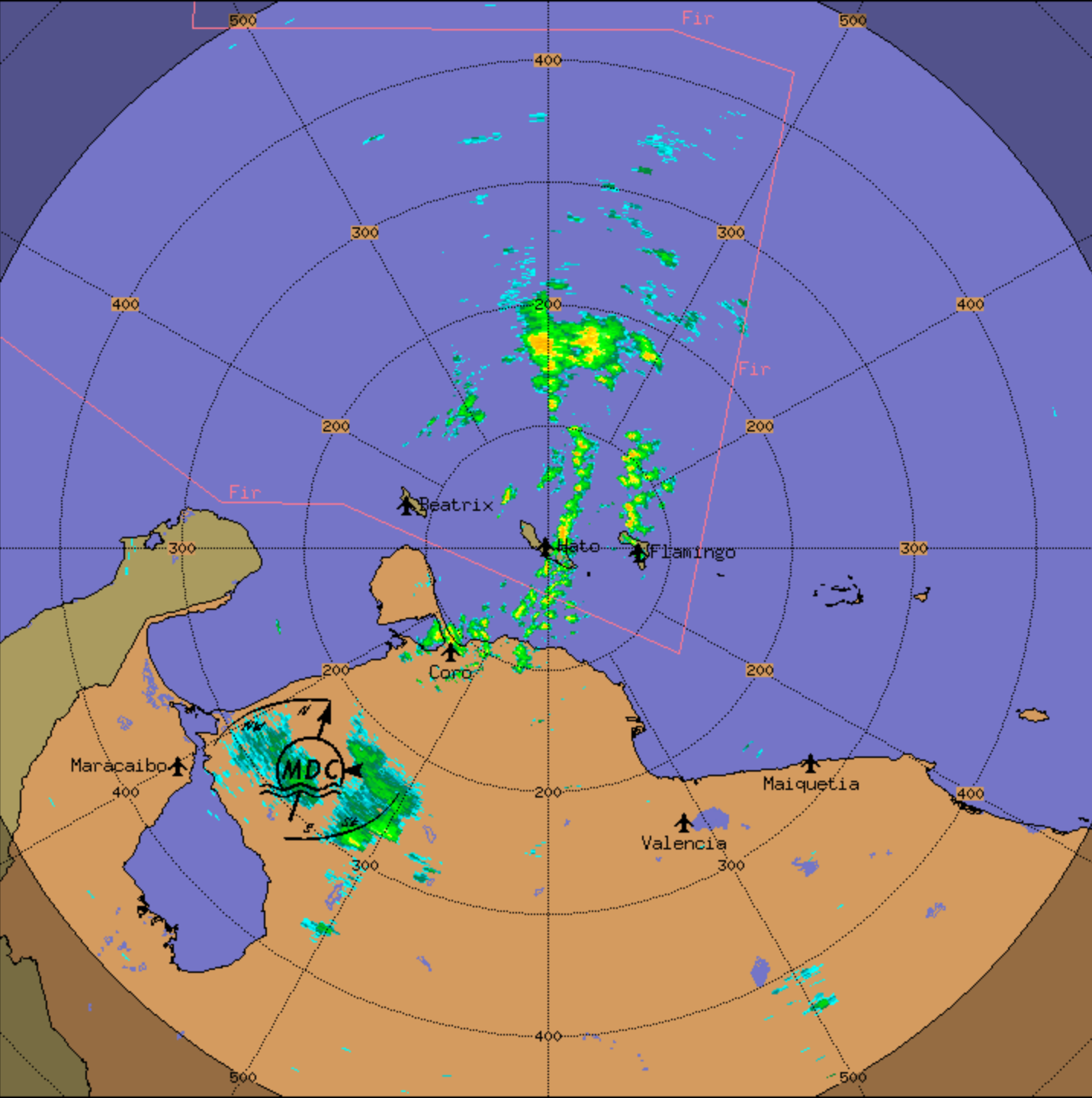
Curacao Radar
CAPPI
300KM_Z
Task: LONG_VOLUME
PRF: 160Hz
Height: 1.0 km
Max Range: 450 km
17:45:00
1 NOV 2010 GMT



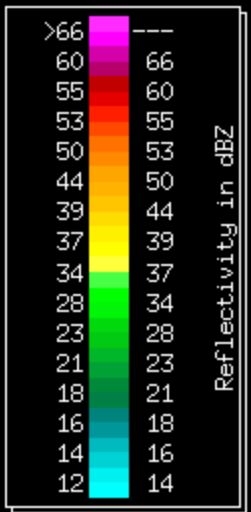
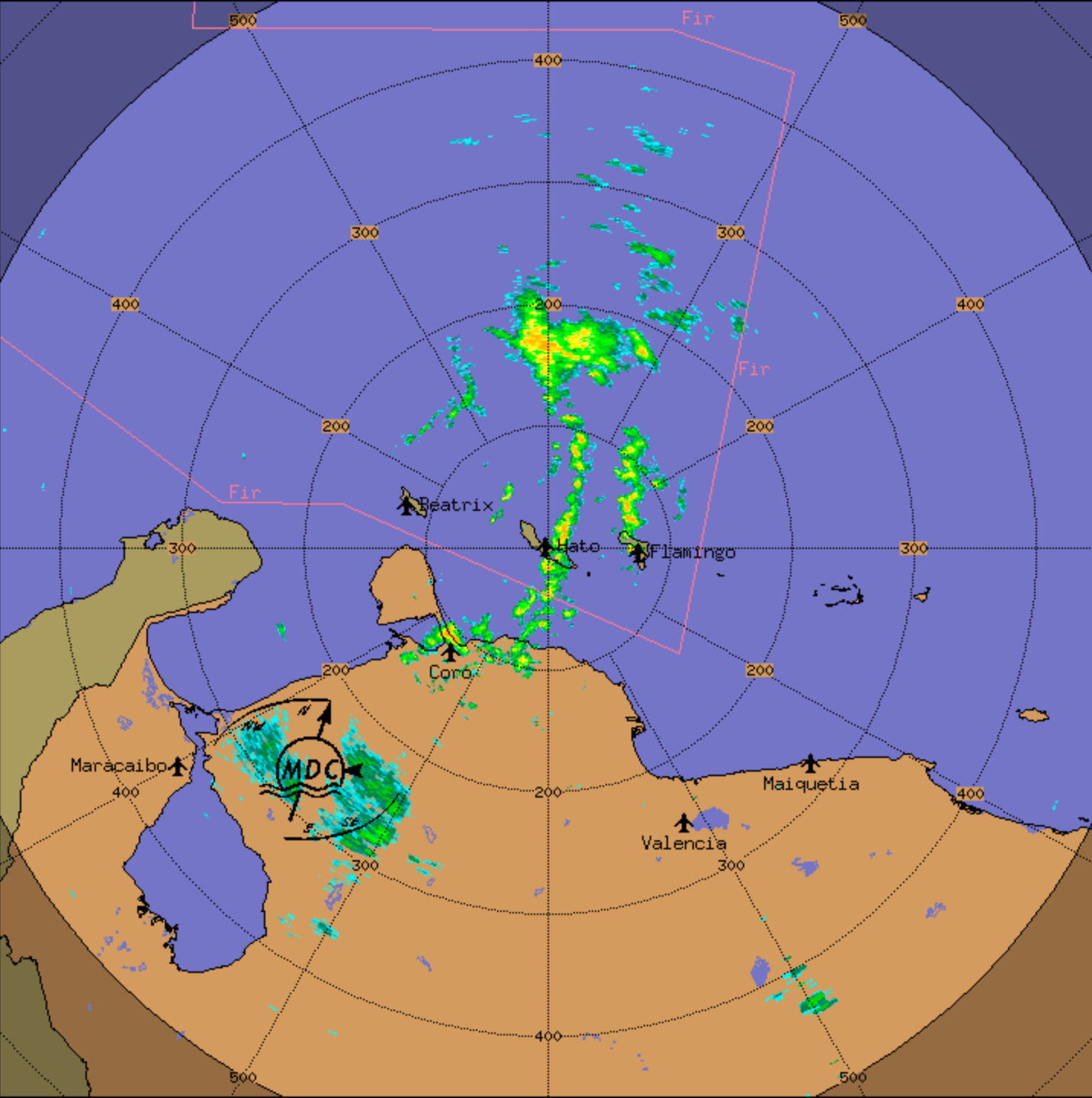
Curacao Radar
 CAPPI
 300KM_Z
 Task: LONG_VOLUME
 PRF: 160Hz
 Height: 1.0 km
 Max Range: 450 km
23:15:00
1 NOV 2010 GMT



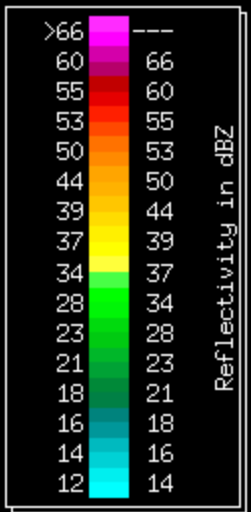
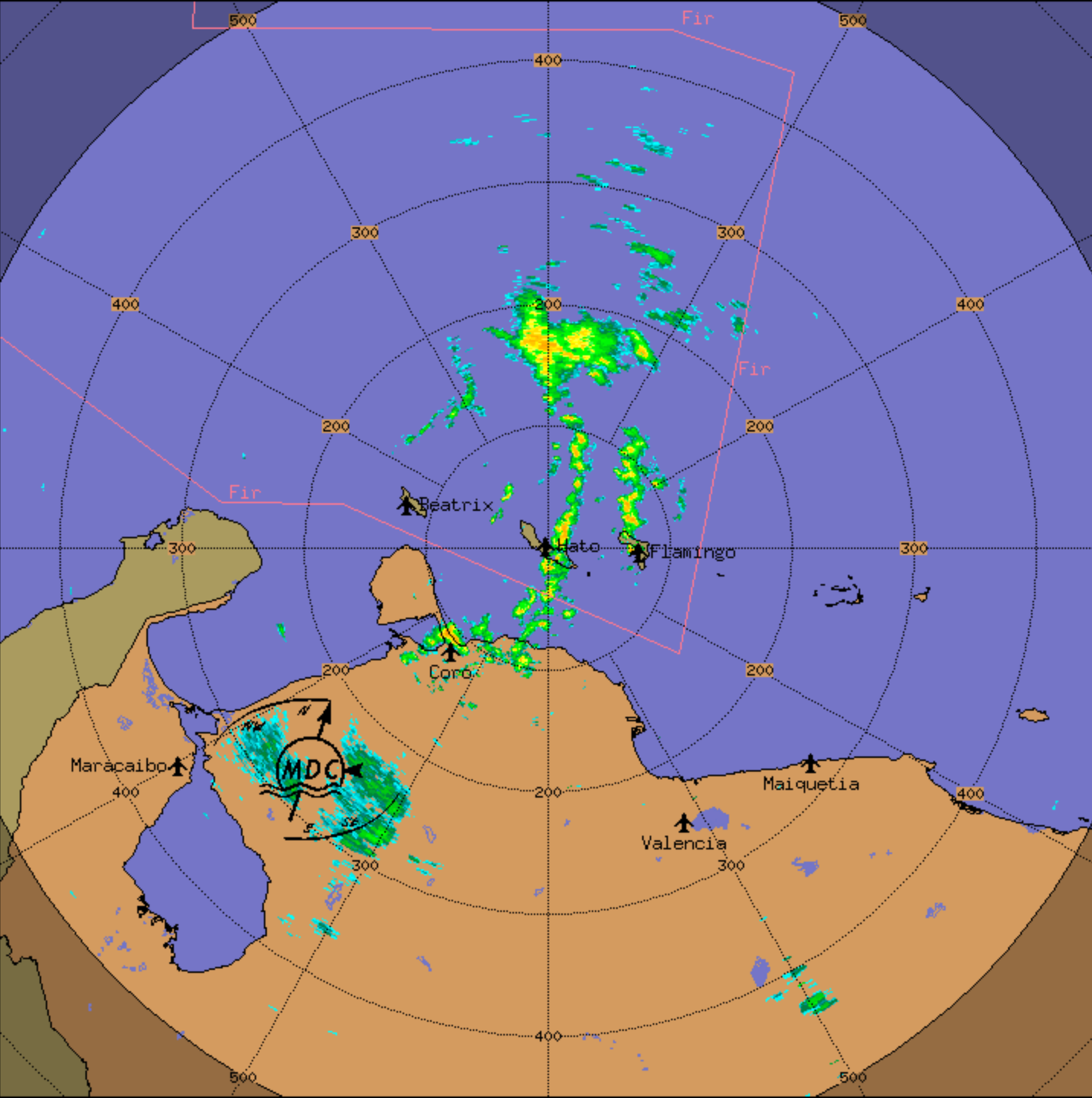
Curacao Radar
 CAPPI
 300KM_Z
 Task: LONG_VOLUME
 PRF: 160Hz
 Height: 1.0 km
 Max Range: 450 km
23:30:00
1 NOV 2010 GMT



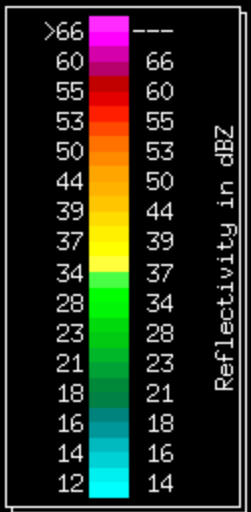
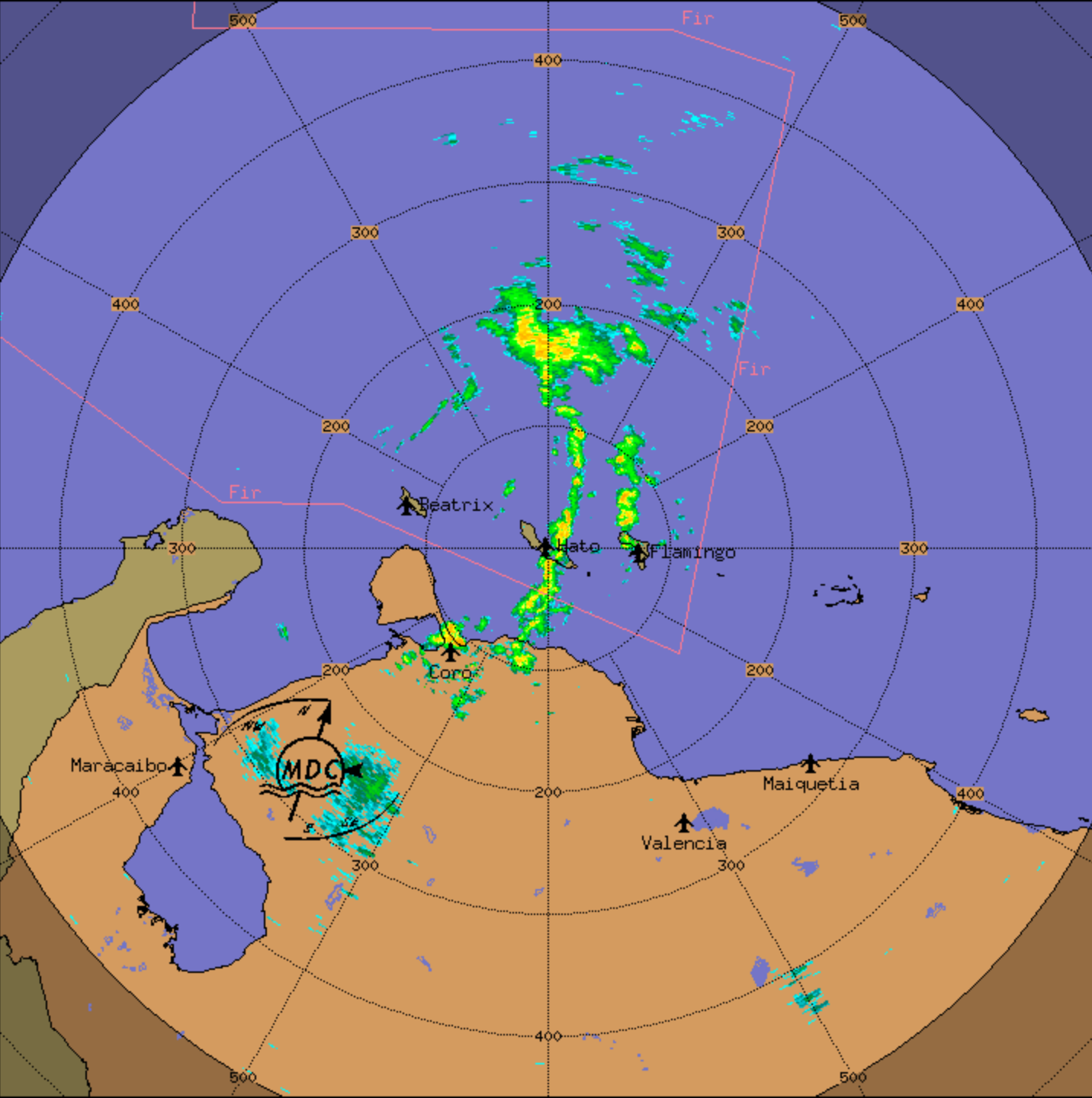
Curacao Radar
 CAPPI
 300KM_Z
 Task: LONG_VOLUME
 PRF: 160Hz
 Height: 1.0 km
 Max Range: 450 km
23:45:00
1 NOV 2010 GMT



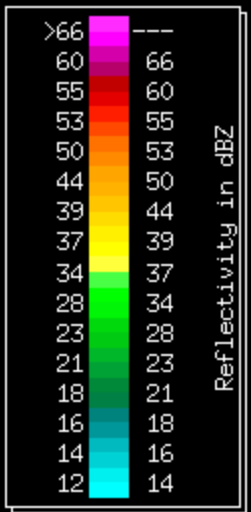
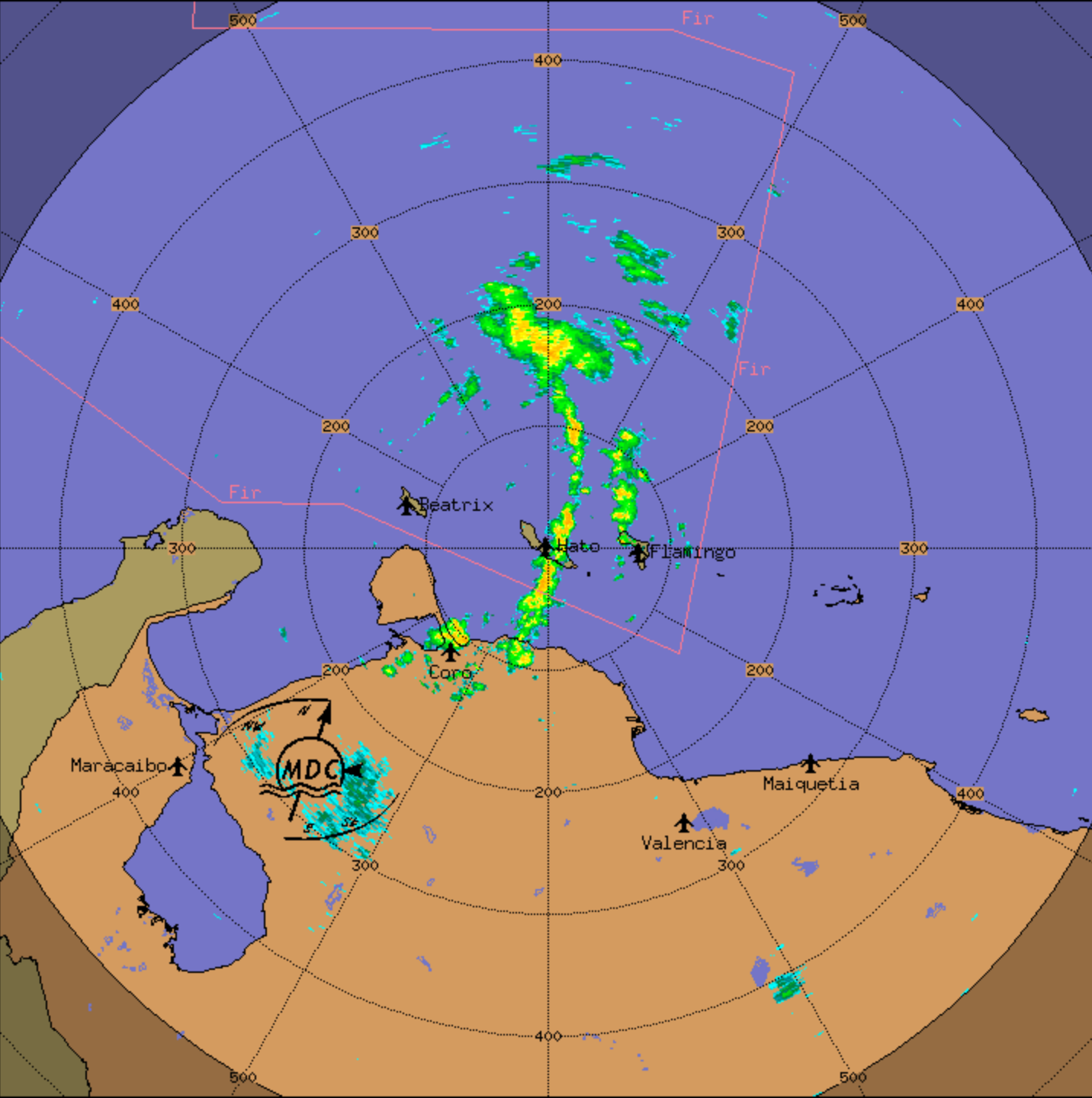
Curacao Radar
 CAPPI
 300KM_Z
 Task: LONG_VOLUME
 PRF: 160Hz
 Height: 1.0 km
 Max Range: 450 km
23:45:00
1 NOV 2010 GMT



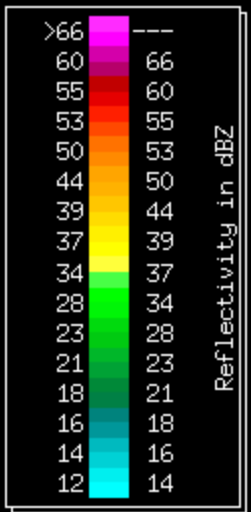
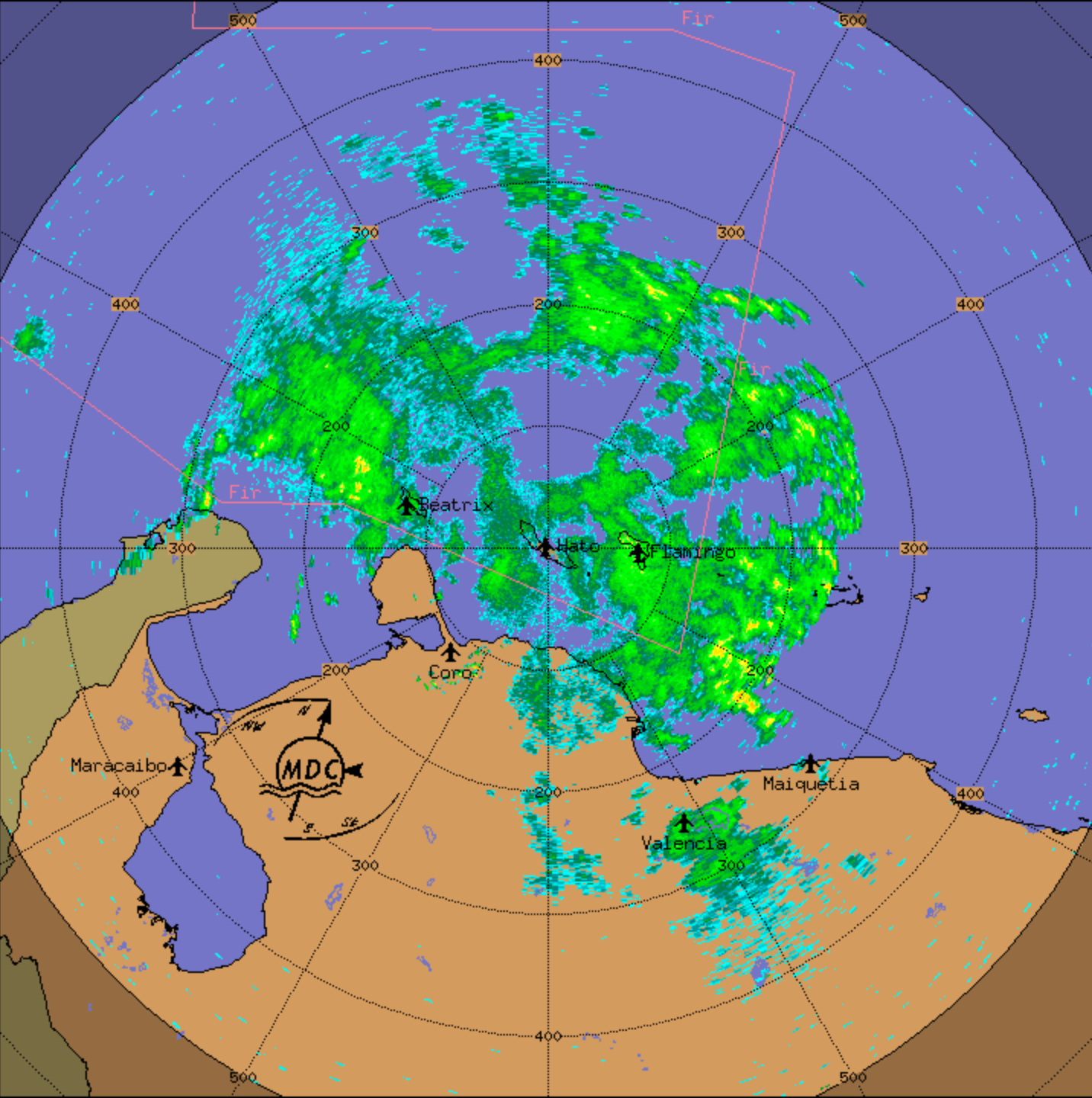
Curacao Radar
 CAPPI
 300KM_Z
 Task: LONG_VOLUME
 PRF: 160Hz
 Height: 1.0 km
 Max Range: 450 km
00:00:00
2 NOV 2010 GMT



Curacao Radar
 CAPPI
 300KM_Z
 Task: LONG_VOLUME
 PRF: 160Hz
 Height: 1.0 km
 Max Range: 450 km
00:15:00
2 NOV 2010 GMT



Curacao Radar
 CAPPI
 300KM_Z
 Task: LONG_VOLUME
 PRF: 160Hz
 Height: 1.0 km
 Max Range: 450 km
14:07:26
2 NOV 2010 GMT



250-300 mm in 7h

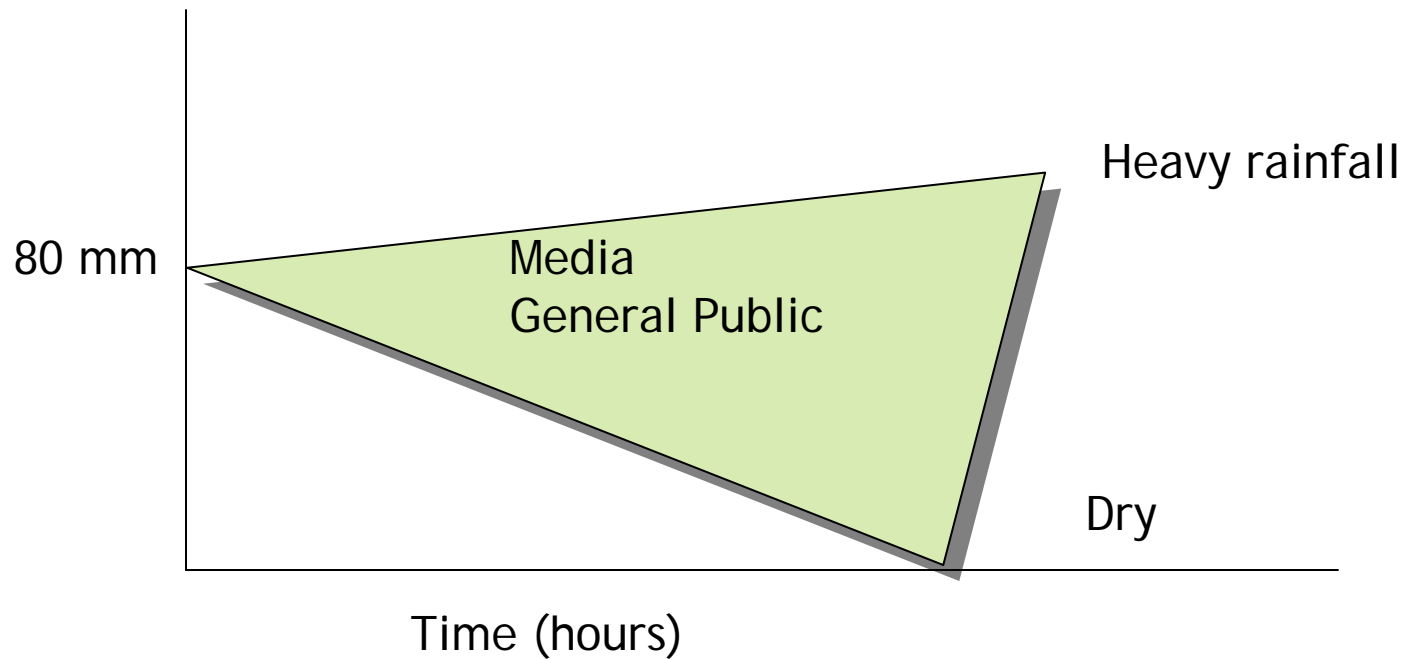
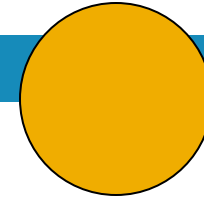


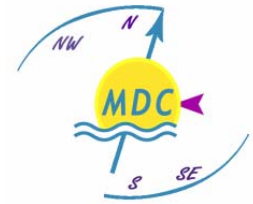
Tropische storm Tomas
Photography by Alex Rodriguez
Curacao 2/11/2010



Tropische storm Tomas
Photography by Alex Rodriguez
Curacao 2/11/2010

Communication Map Tomas

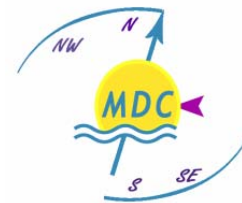




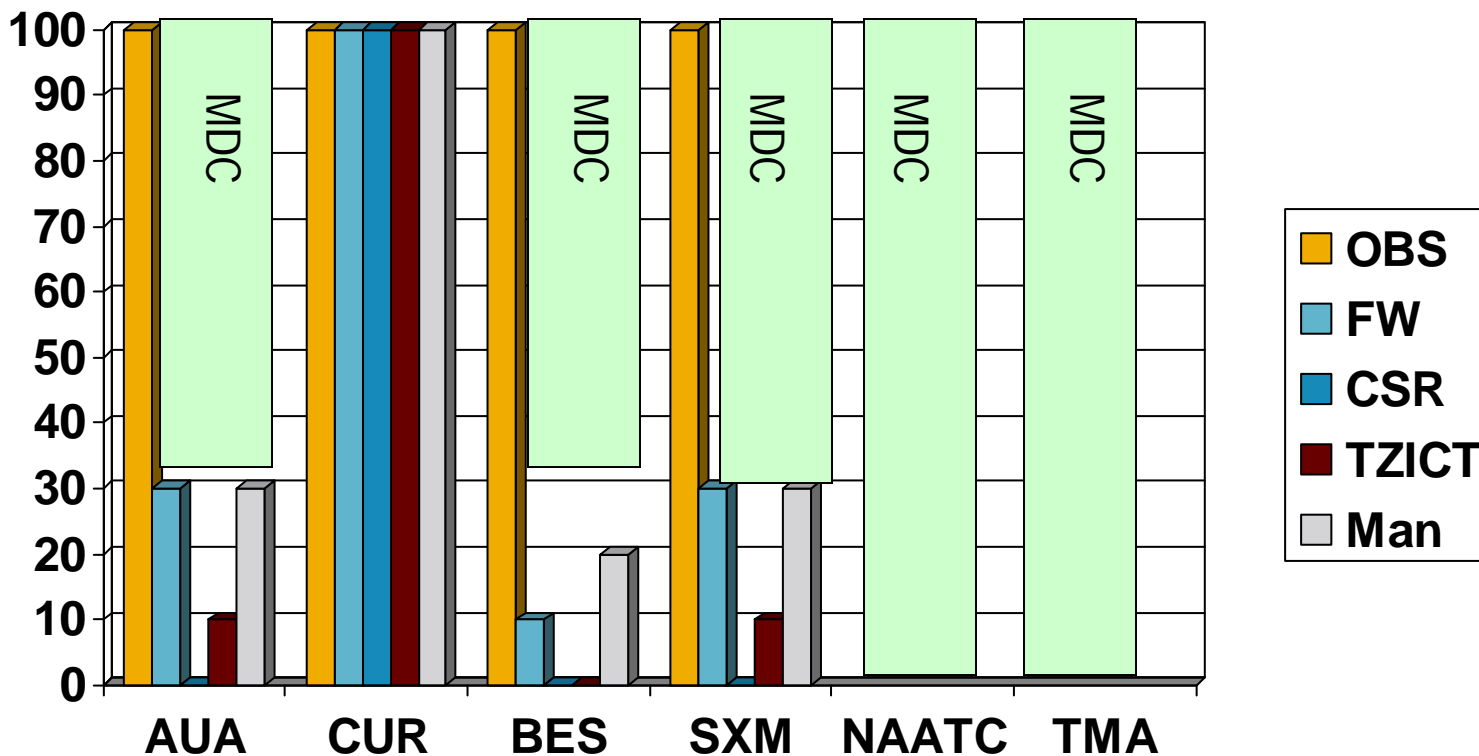
Challenges and Opportunities EWS Communication

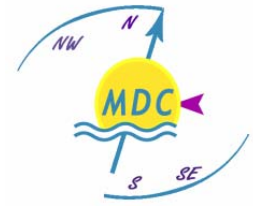
- **Production**
 - Different languages (English, Papiamentu, Dutch, Spanish, French),
 - Understandable (“plane” language), (**new Production engine**)
- **Dissemination**
 - Good Coverage
 - **Monitoring Communications**
 - Radio Emergency,
 - TV (breaking news),
 - **Alarm systems,**
 - SMS (**text and image**)
 - Website





MDC as Service Provider





Quality Management System

Recommendation ICAO Audit in 2008

- Letter of Agreement with ATC units
- Training program personnel (ICAO)
- Implementation QMS (ISO certification)
 - Fit-gap analysis (Jun 2010)
 - Documentation (Start Nov 2010)
 - ISO certification (2011)
- Function evaluation Personnel



Bulletin phases

Severe Weather

Tropical Cyclones

	Strike
Warning	Warning
Watch	Watch
Cautionary	Information
FORECAST	Tropical Info

