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Canada

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2012 Hurricane Briefing Institute for Catastrophic Loss Reduction

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Warning Preparedness Meteorologist
Canadian Hurricane Centre
Environment Canada
June 15th, 2012

Contents

- Canadian Hurricane Centre – 25 years of tropical meteorology in Canada
- Hurricanes 101
- Summary of the 2011 Hurricane Season
- Outlook for the 2012 Hurricane Season
- Operational Notes
- What's on the horizon for hurricane forecasts?

“Storm of the Century” - 1985

IN THE NATION

Hurricane Gloria raging off East Coast

Associated Press

MIAMI — Hurricane Gloria, one of the most powerful storms ever recorded in the open Atlantic, spared the Bahamas and headed for the East Coast Wednesday as it spanned across the sea with 150 mph winds.

Officials in coastal states began taking precautions, and campers were evacuated from one coastal island. A hurricane watch was posted for North Carolina's vulnerable barrier islands and parts of Virginia and South Carolina.

"Some place along the East Coast of the United States is going to be threatened by this storm, and very quickly," if the storm's path doesn't change, said Neil Frank, director of the National Hurricane Center in nearby Coral Gables.

Frank said that even if Gloria's winds weaken before landfall, which could come by Friday at a site yet uncertain, it might attain such a fast forward speed that it could be just as dangerous because there would be less time to evacuate.

At 6 p.m. EDT, Gloria's eye was near latitude 27.5 north, longitude 73.5 west, or about 550 miles south-southeast of Cape Hatteras, N.C. It was moving northwest at 15 mph and was expected to turn northward and increase its forward speed.

Gloria did not make an expected turn, increasing the threat to the Carolinas, the weather service said.

A hurricane watch was posted from Edisto Beach, just south of Charleston, S.C., to Cape Henry, Va., including North Carolina's Outer Banks. A campground on Ocracoke Island, a short ferry ride from Cape Hatteras, was evacuated Wednesday morning, and residents of Ocracoke and Portsmouth islands were asked to leave.

Even with a Category 4 storm has winds between 131 mph and 155 mph, and storms with higher winds are classified Category 5. However, Gerrish said Gloria was classified Category 5 because its low central barometric pressure, which pulls in the wind, fluctuated above and below 27.17 inches, the threshold for that category.

Only two hurricanes of that strength have

LIKELY, HEAVY RAIN
FLOODING
QUESTION: HOW MUCH WIND
HURRICANE WARNING



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In Canada: Gloria was relatively low damage.....but definitely high impact!

Canadian Hurricane Centre

- Planning began 1985
- Began operations in 1987
- Specially trained forecasters
- Certification program
 - Junior CHC forecasters
 - CHC Forecasters
 - Senior CHC forecasters
- Several landmark and damaging storms since 1987



Hurricane Forecaster Training Miami



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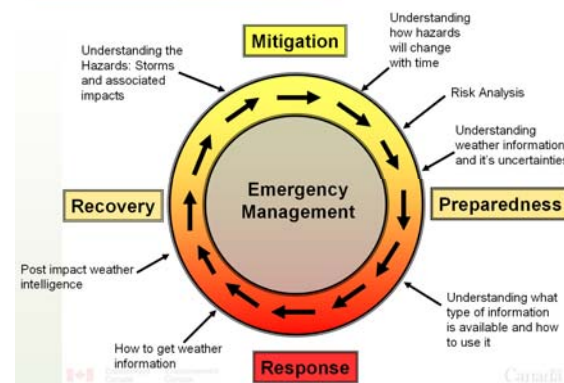
Our partners in Emergency Management..

Canadian Hurricane Centre

- Very close working relationship with emergency management officials
- Through Warning Preparedness Meteorologist program we train and exercise on a regular basis
- Seasonal prep briefings
- Regular briefings during events
- Relocation the Joint emergency Operations Centre



Weather in Emergency Management



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...and our partners in the media

Canadian Hurricane Centre

- Dedicated media room with direct plug-in facilities
- Seasonal forecast briefings
- Media workshops
- Special media technical briefings during actual events



Media Technical Briefings



CHC Partners and Stakeholders

Tropical_Cyclone_Information

- **Canadian Hurricane Center provides the “Big Picture”**
- **Regional weather offices (storm prediction centres in Environment Canada) Prepare more detailed products**



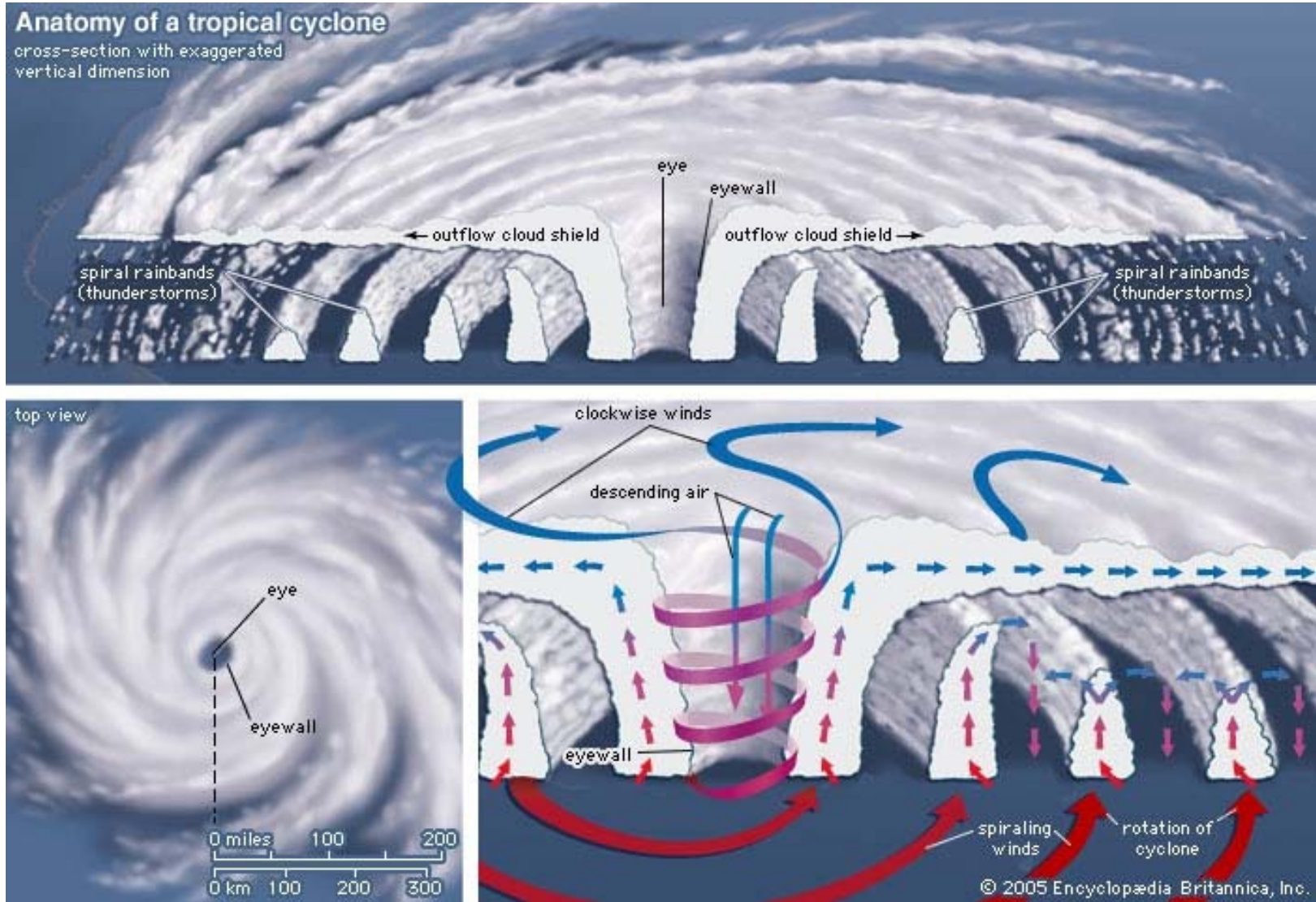
From NHC Training Course.....

TEN DEADLIEST ATLANTIC HURRICANES (NHC Training Material)

<u>Rank</u>	<u>Location/Name</u>	<u>Year</u>	<u>Deaths</u>
1.	Martinique; Barbados...	1780	~22,000
2.	Central America/Mitch	1998	11,000+
3.	Galveston; SE TX	1900	~8,000
4.	Honduras/Fifi	1974	~8,000
5.	Dominican Republic	1930	~8,000
6.	Haiti; Cuba/Flora	1963	~8,000
7.	Martinique	1776	>6,000
8.	FL, Carib./Okeechobee	1928	~4,033
9.	Newfoundland, Canada	1775	>4,000
10.	Puerto Rico; NC; SC	1899	>3,433



What is a Tropical Cyclone?



Stages of Development

Tropical Disturbance
Wind < 37 km/h (23 mph)



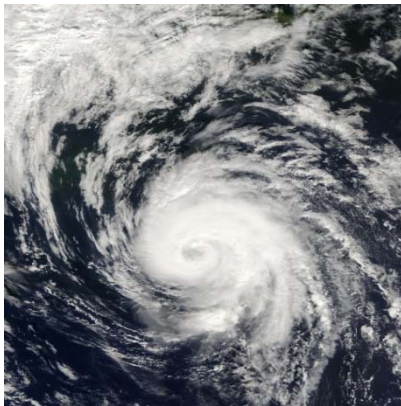
Tropical Depression
Wind 37+ km/h (23 mph)



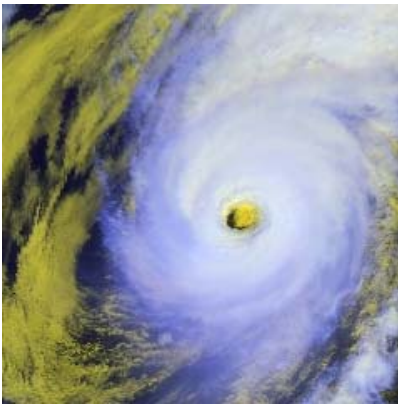
Tropical Storm
Wind 63+ km/h (39 mph)



Hurricane – Cat. 1
Wind 118+ km/h (74 mph)



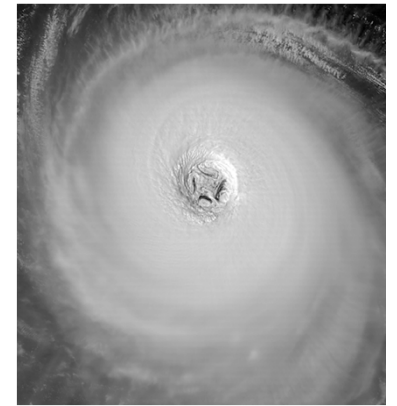
Wind 154+ km/h (96 mph)
Hurricane – Cat. 2



Wind 178+ km/h (111 mph)
Hurricane – Cat. 3



Wind 211+ km/h (131 mph)
Hurricane – Cat. 4



Wind > 251 km/h (156 mph)
Hurricane – Cat. 5

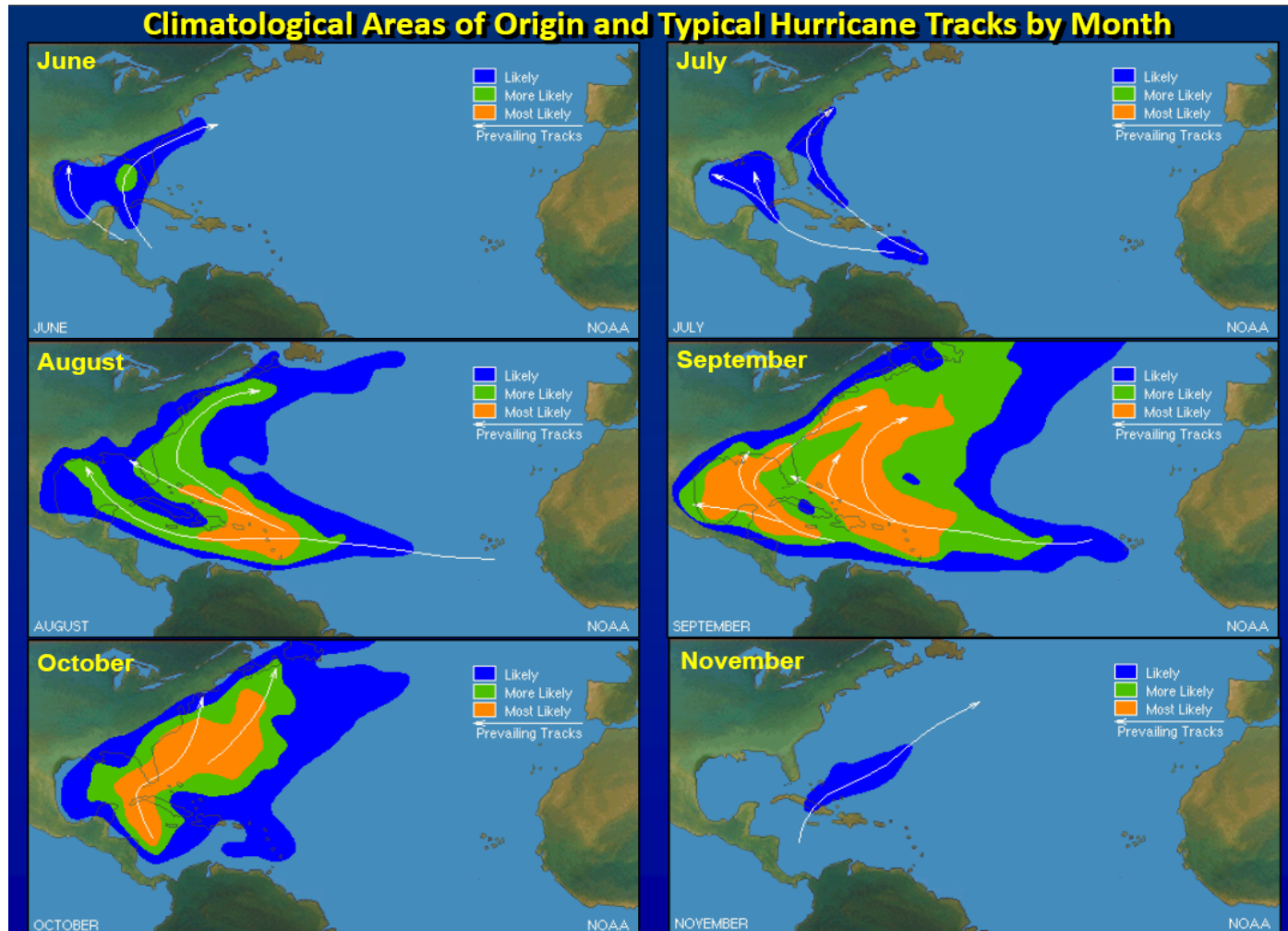


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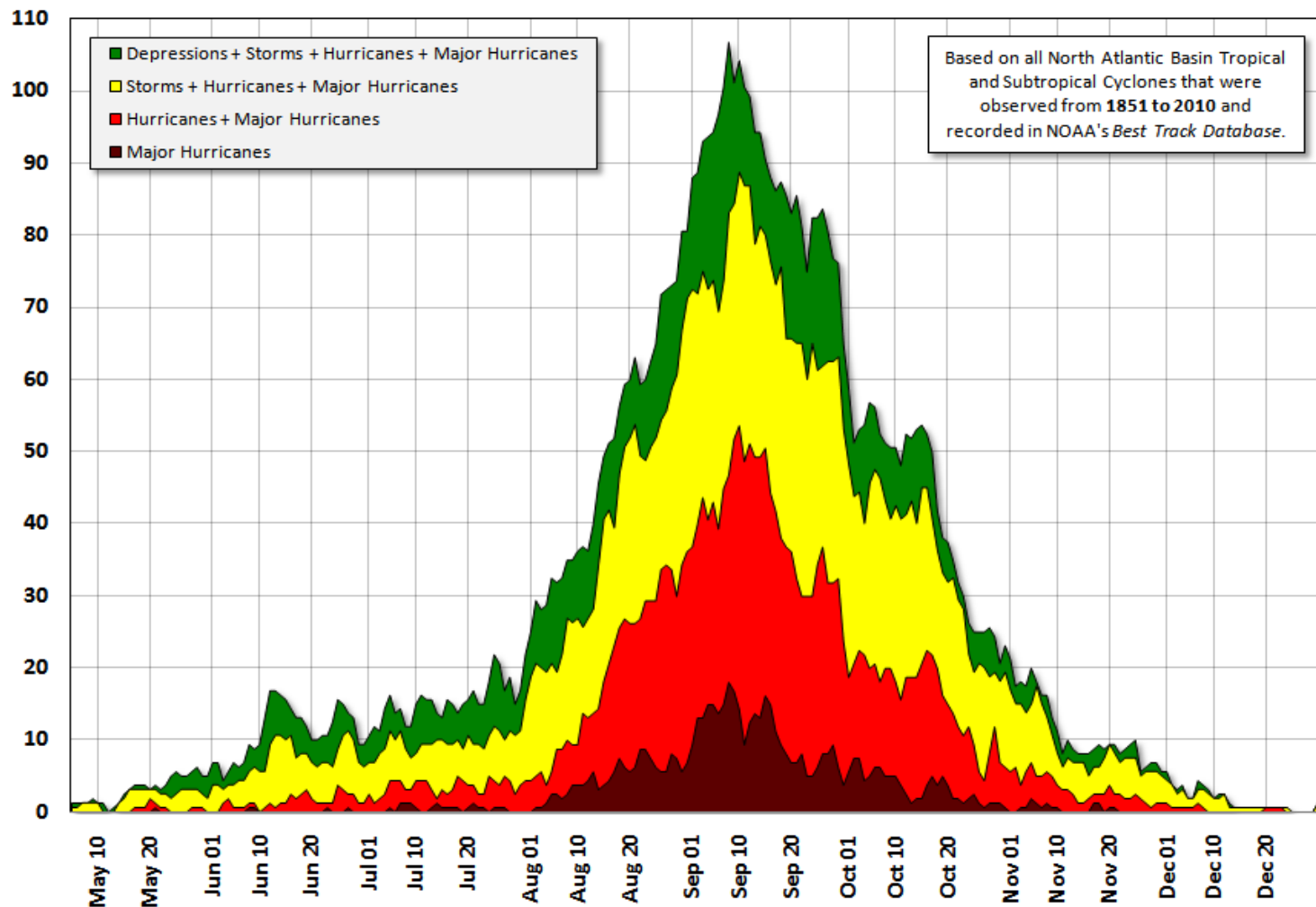
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Areas of Origin and Typical Hurricane Tracks by Month

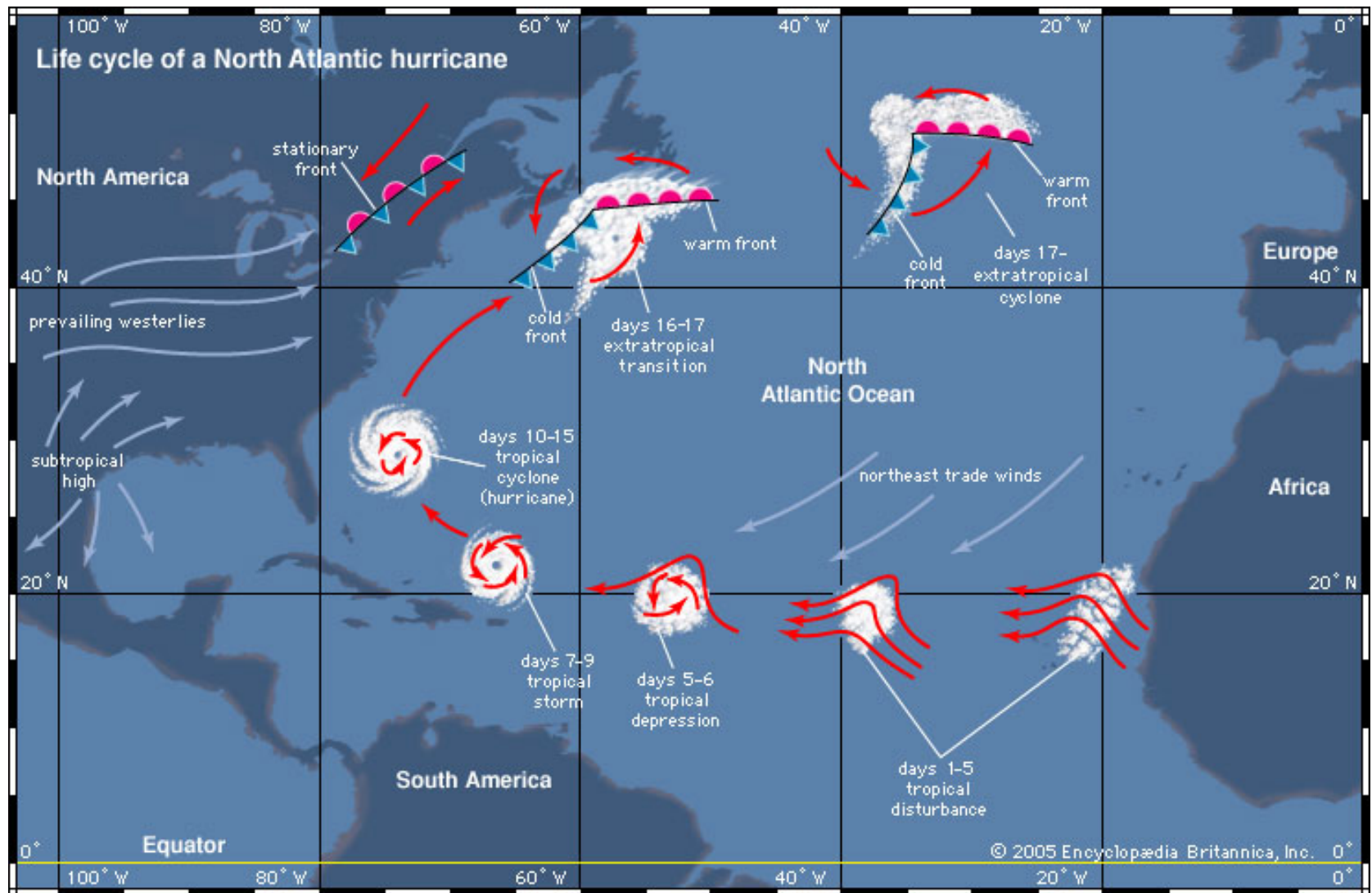


Tropical Cyclone Climatology

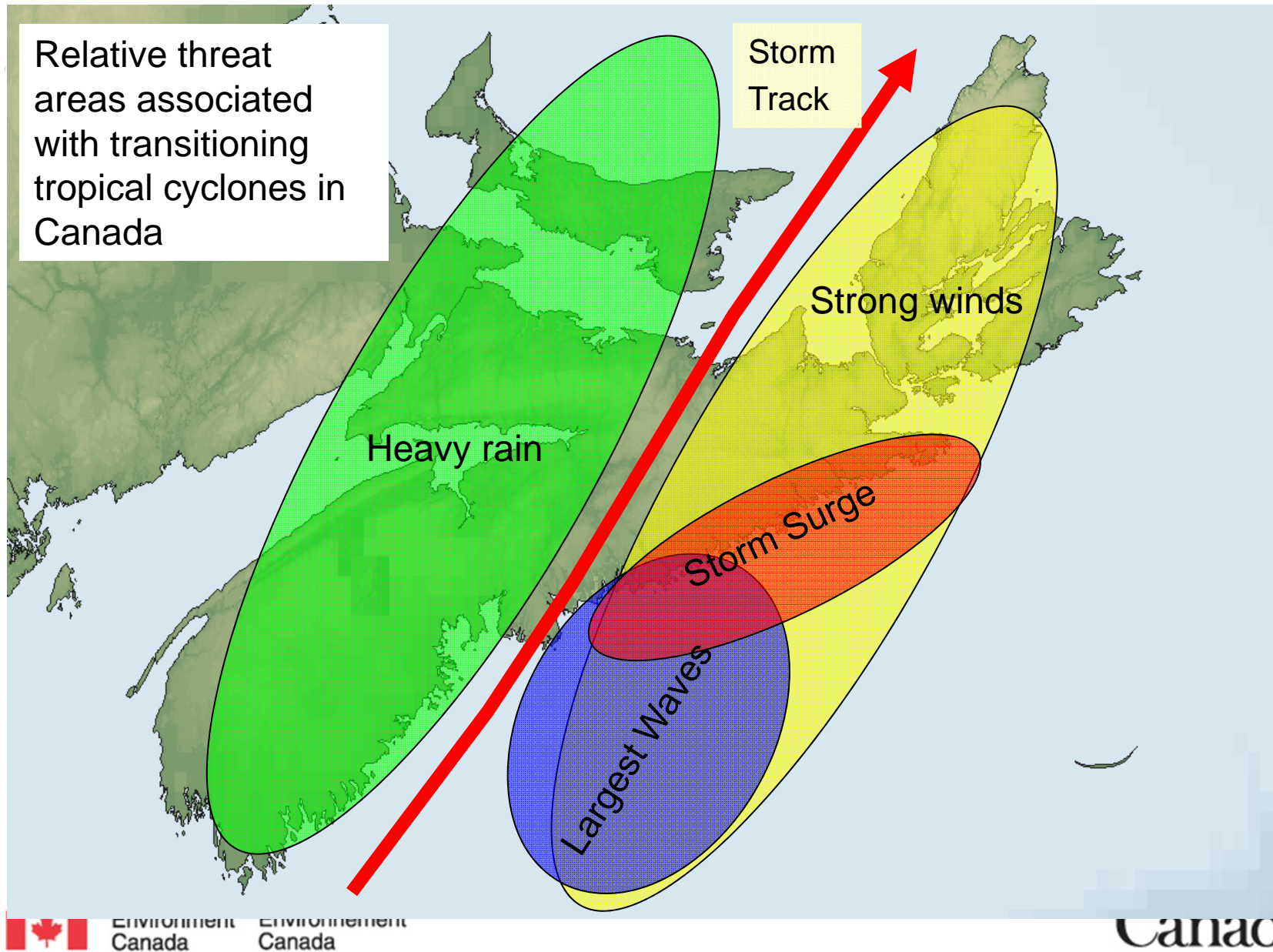
Number of North Atlantic Basin Tropical Cyclones per 100 Years



Typical life cycle of a hurricane



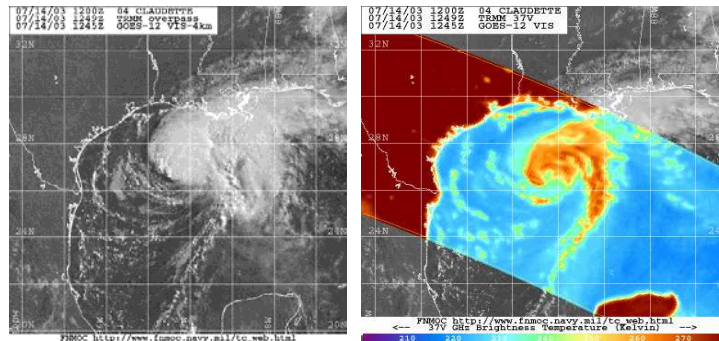
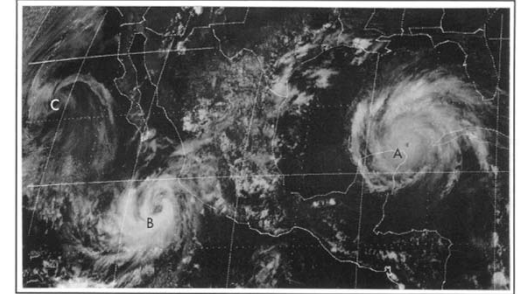
Typical Threat Areas



How do we observe hurricanes

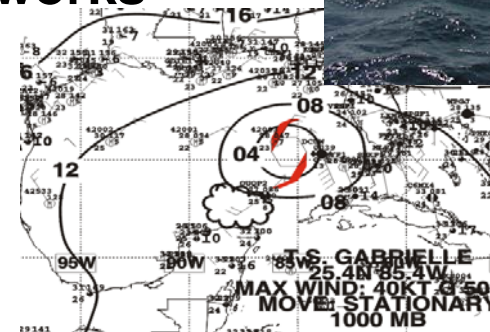
- **Satellites (primary)**

- Geostationary infrared & visible images
- Microwave imagery
- Scatterometer derived surface winds



- **Surface observations**

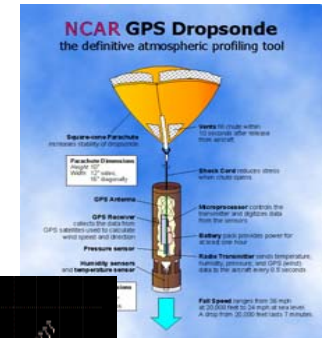
- Ships, buoys, land stations
- Volunteer amateur radio networks



How do we observe hurricanes

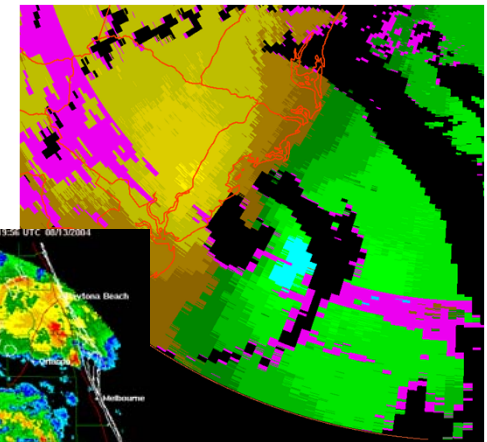
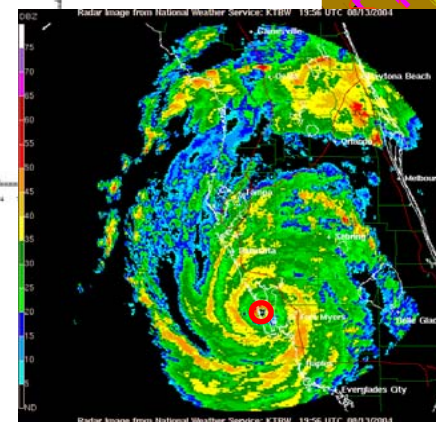
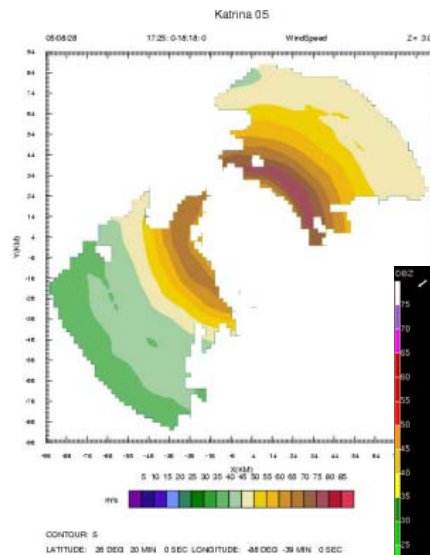
- **Aircraft reconnaissance**

- Flight-level winds
- GPS dropsondes
- Stepped-Frequency Microwave Radiometer

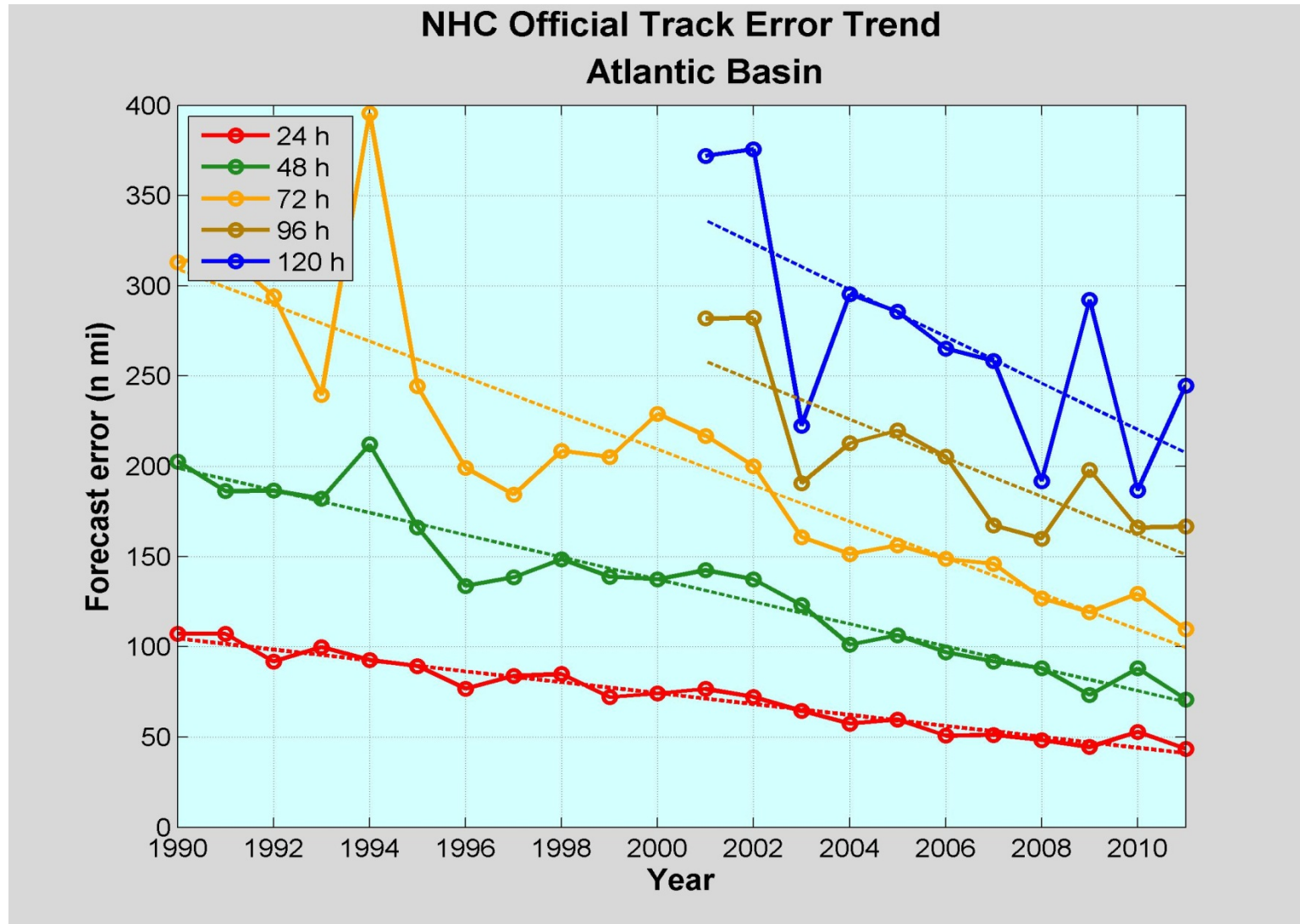


- **Doppler radar**

- Land-based
- Airborne



Hurricane Track Error Trend

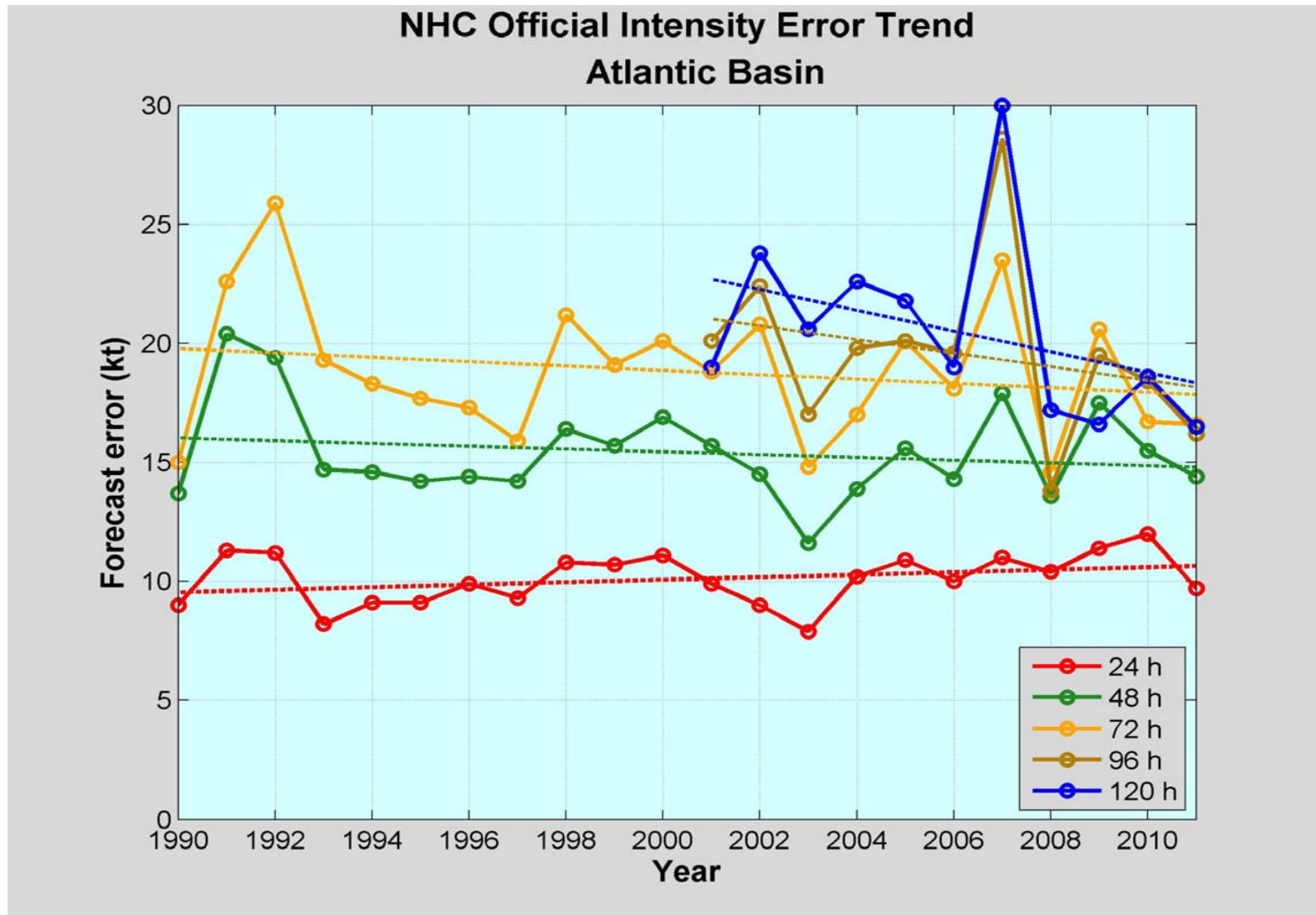


Hurricane Intensity Forecasting

- Intensity forecasting is not as advanced as track forecasting
- There is less skill for intensity forecasting than there is for track forecasting due to the many factors affecting storm intensity (water temp, wind shear, pressure patterns etc...)
- Forecasters use entirely separate models to forecast storm intensity
- Significant difficulty in forecasting rapidly intensifying and rapidly weakening storms.



Hurricane Intensity Forecast Error Trend



Hurricane Season 2011 in Review

Summary:

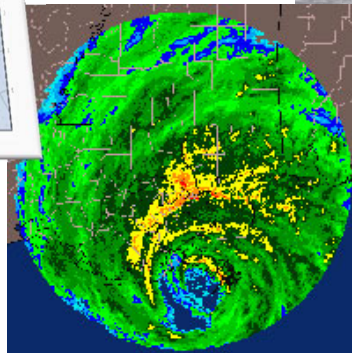
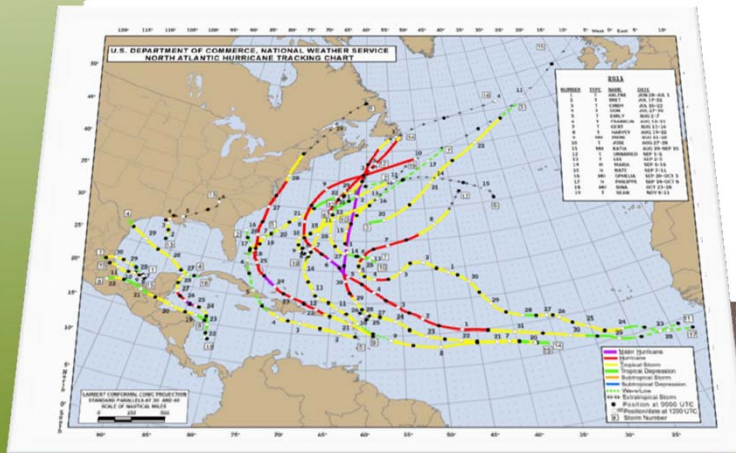
19 Named Storms

7 Hurricanes

4 Major hurricanes



**Canadian
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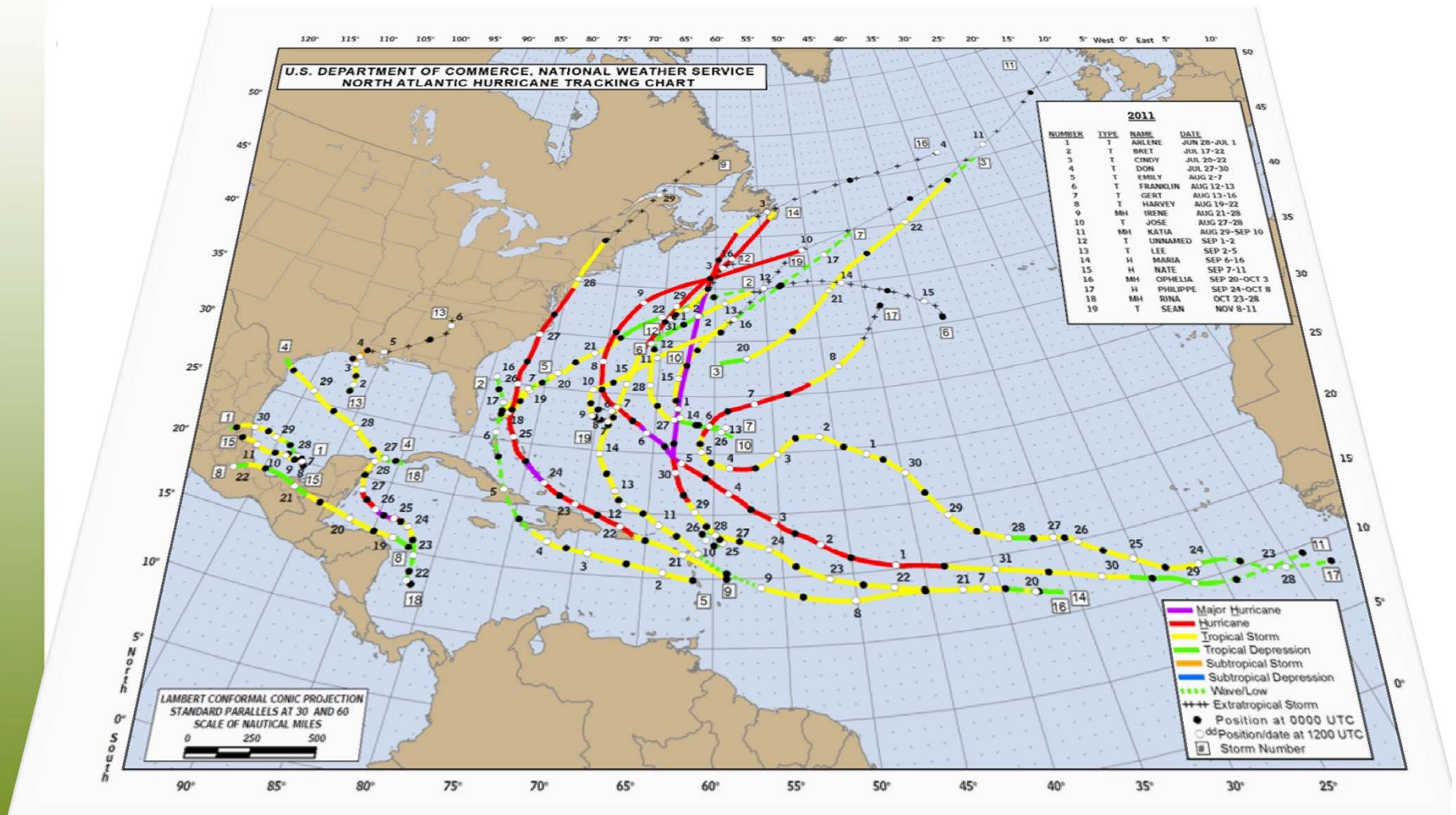
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2011 Season in Review

2011 Forecast	Named Storms	Hurricanes	Cat. 3-5 Hurricanes
<i>National Oceanographic and Atmospheric Administration (NOAA)</i>	12-18	6-10	3-6
Actual	19	7	4

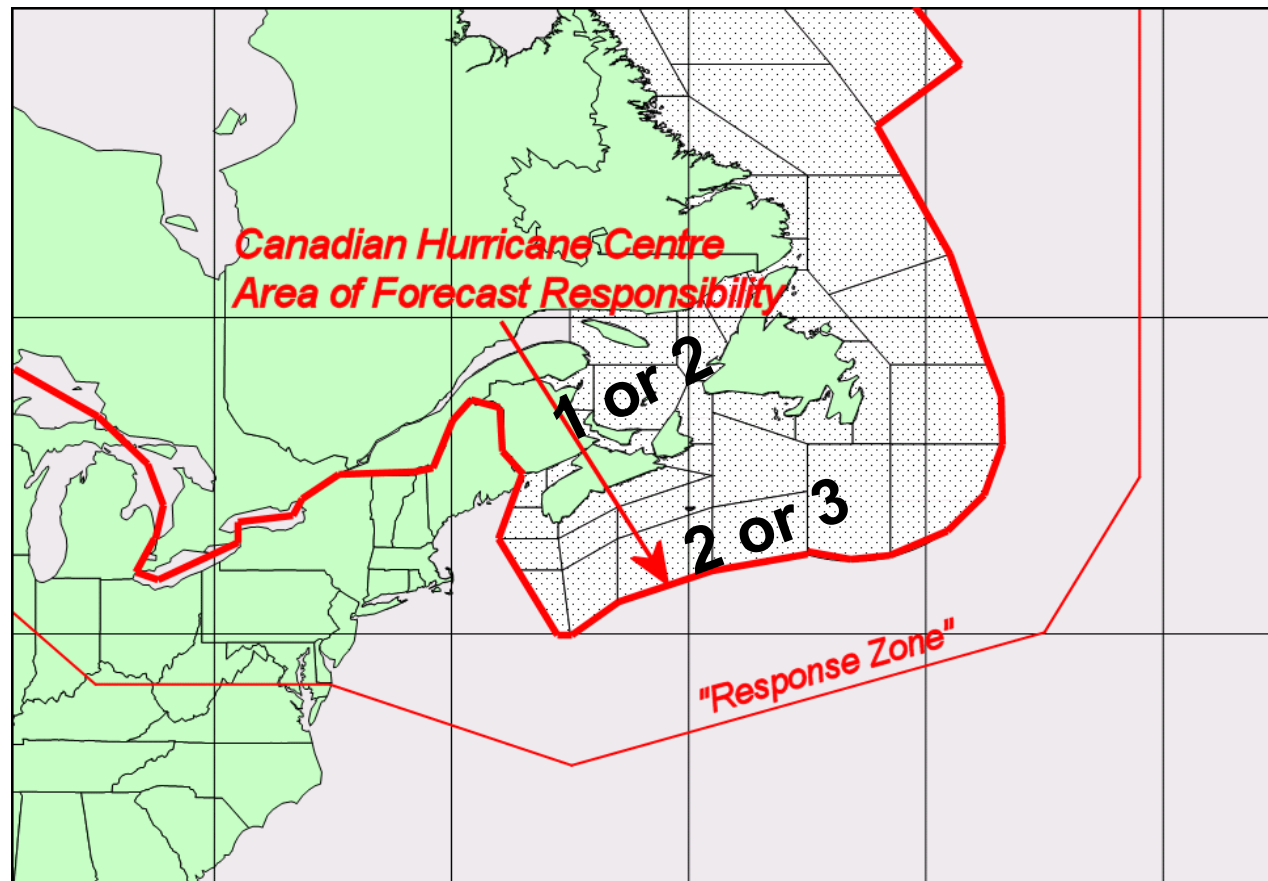
- CHC issued bulletins on 8 storms
- 8 storms entered CHC response zone
- 3 storms affecting land in Canada

2011 Season in Review



Canadian Hurricane Centre Response Zone

On average, 1 or 2 storms directly affect Canadian land regions each year. Another 2 or 3 typically threaten our offshore waters.



2011 Season in Review

2011 Hurricane Season in 4 minutes



<http://www.youtube.com/watch?v=fX7Q-0QuID4>

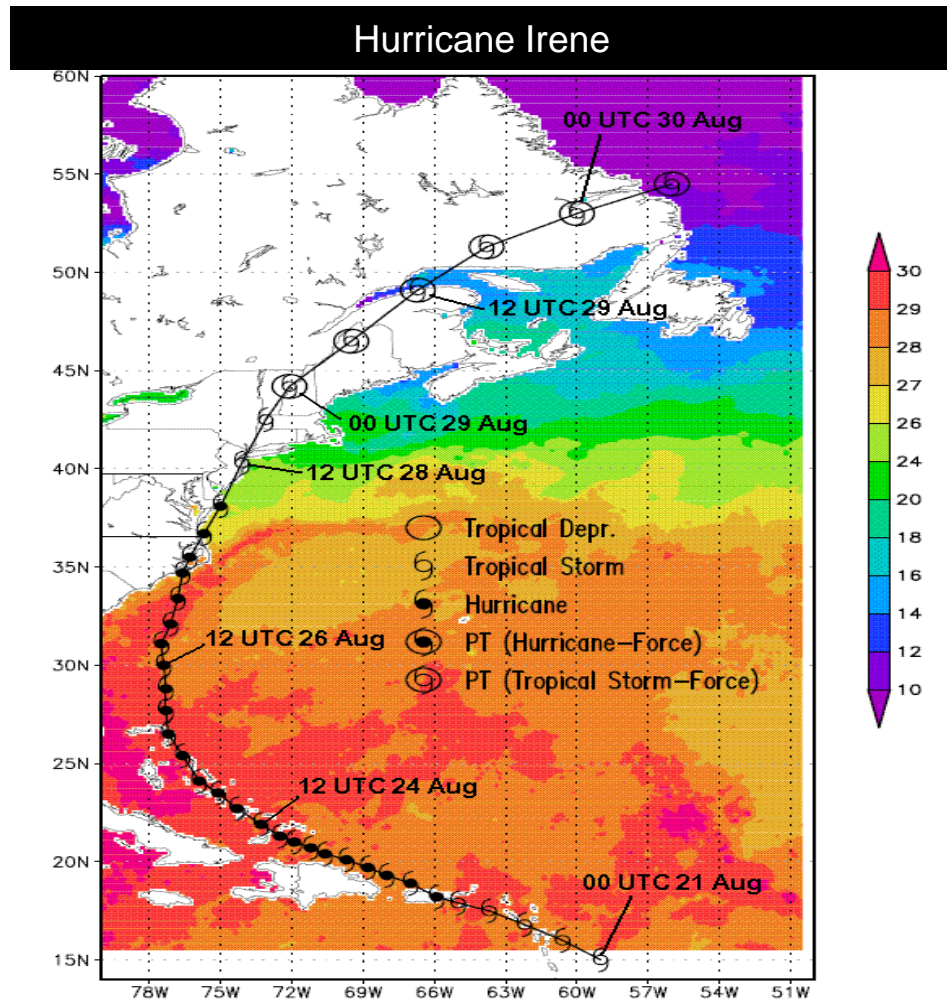


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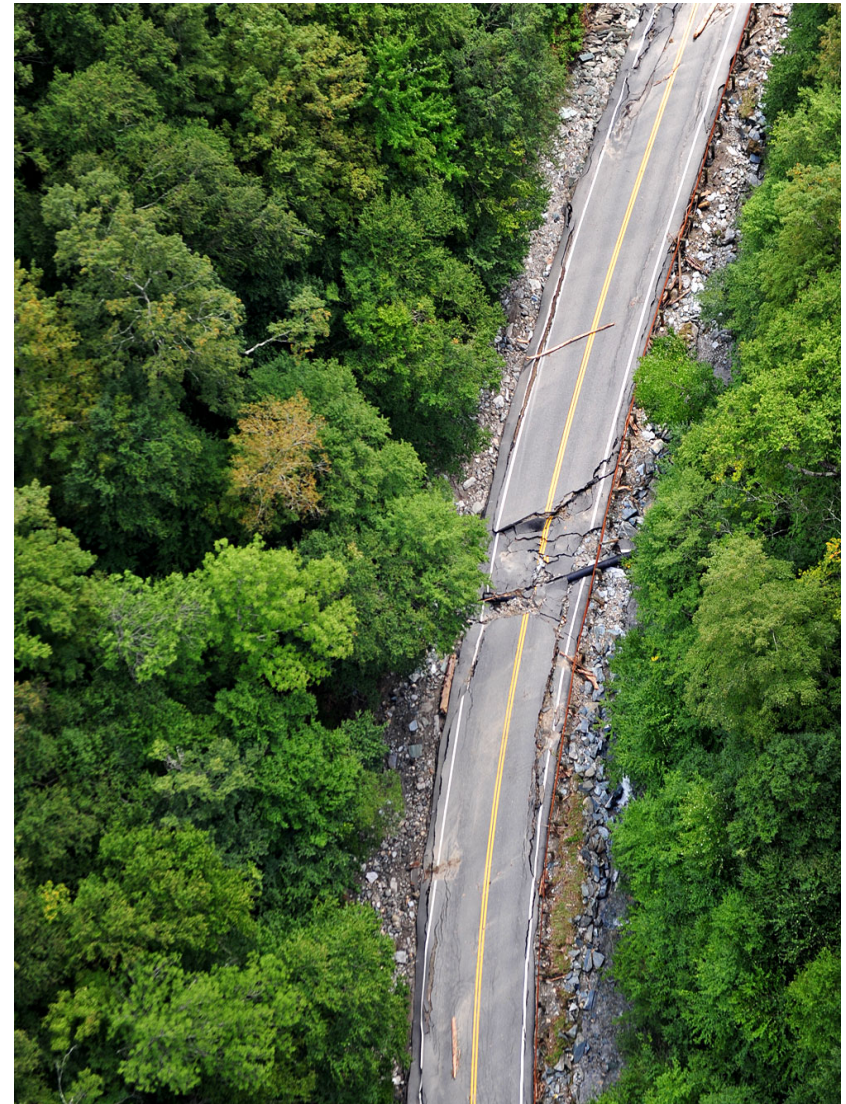
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2011 Season in Review – Hurricane Irene



- Tracked over islands in the Caribbean before heading towards the U.S., making landfall twice along the East Coast
- 50 fatalities (including 1 in Canada)
- Unprecedented data coverage for a hurricane
- Devastating flooding to left of the track
- Damaging winds and widespread power outages to the right of the track

2011 Season in Review – Hurricane Irene

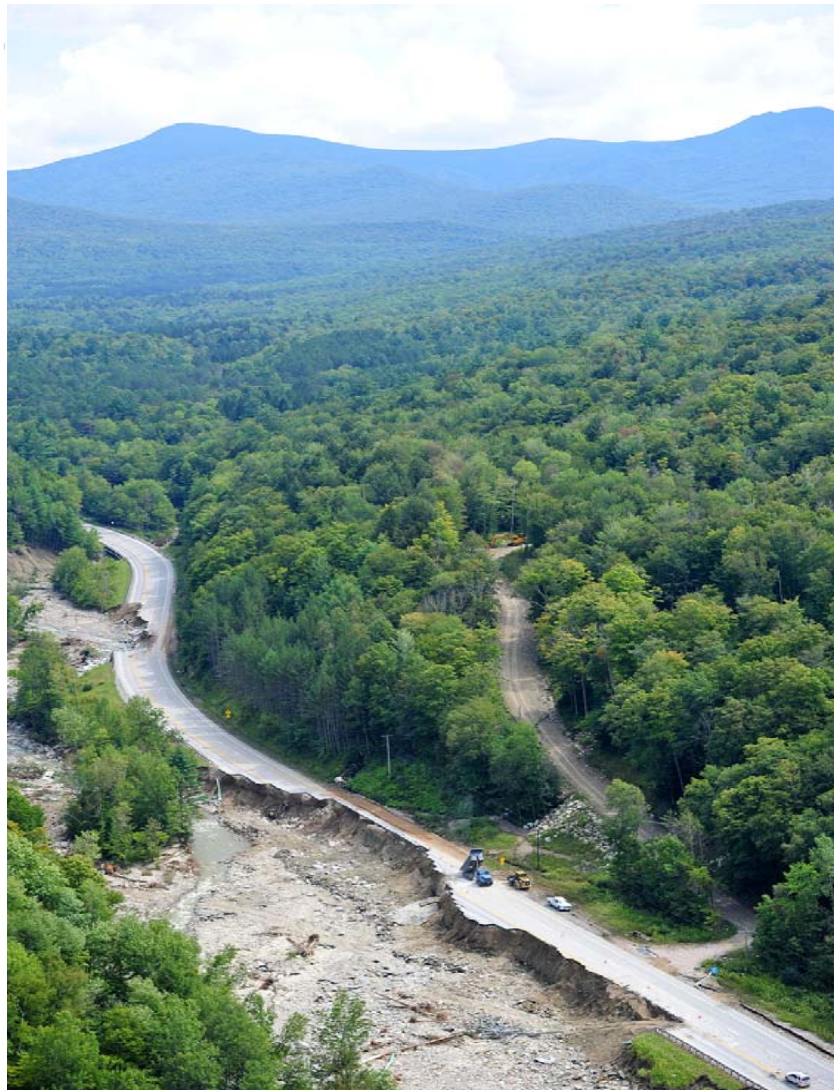


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2011 Season in Review – Hurricane Irene



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2011 Season in Review – Hurricane Irene



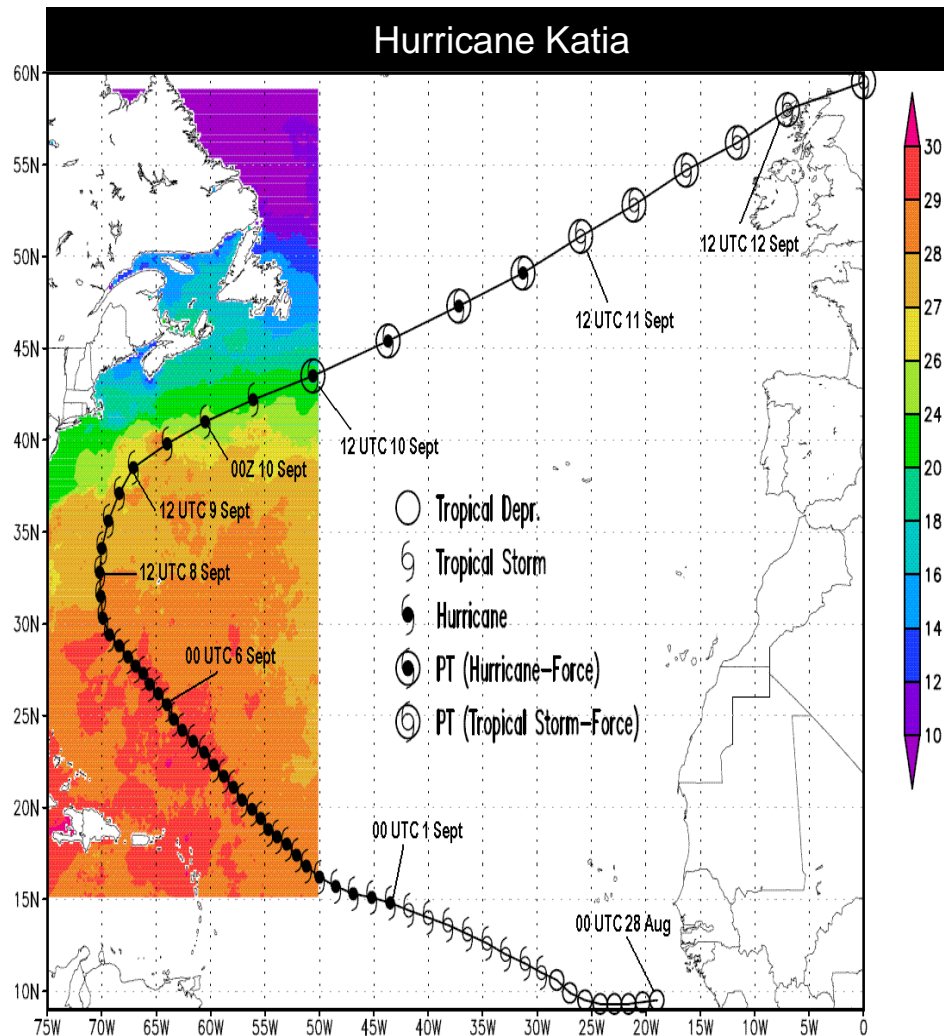
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<http://www.mansfieldheliflight.com/flood/>

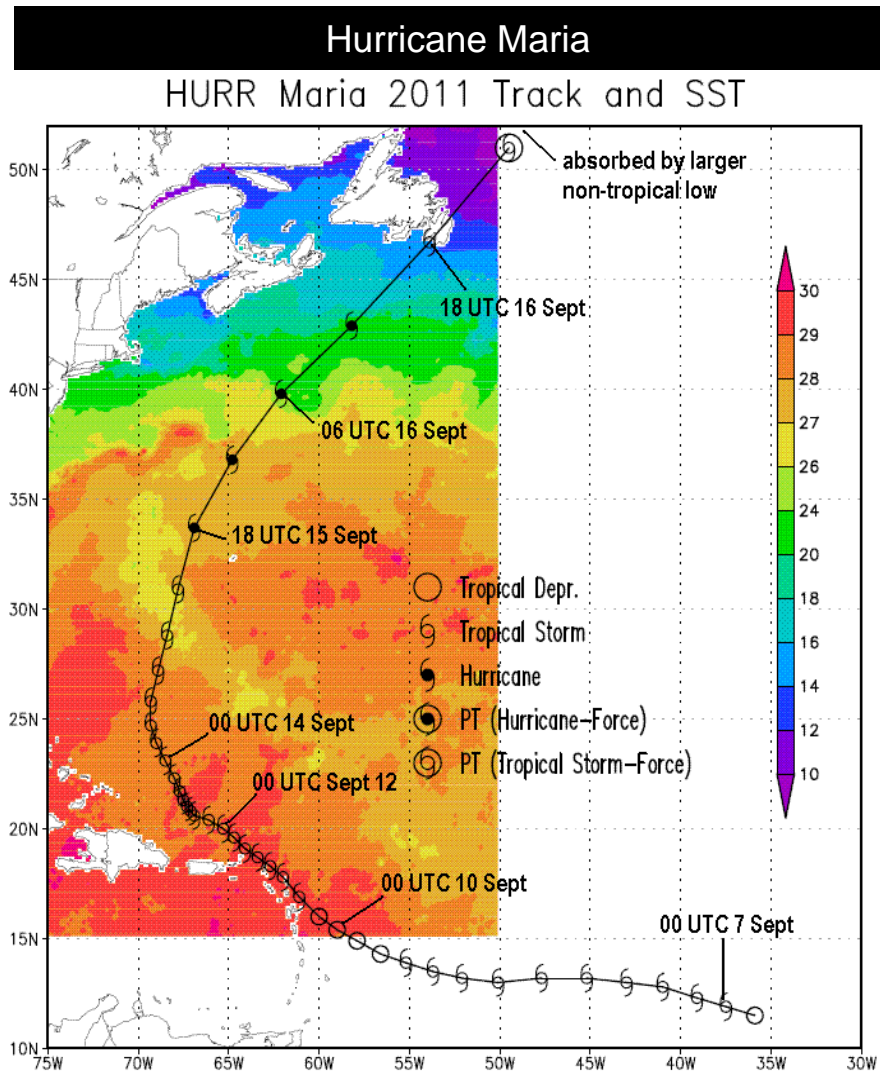
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2011 Season in Review – Hurricane Katia



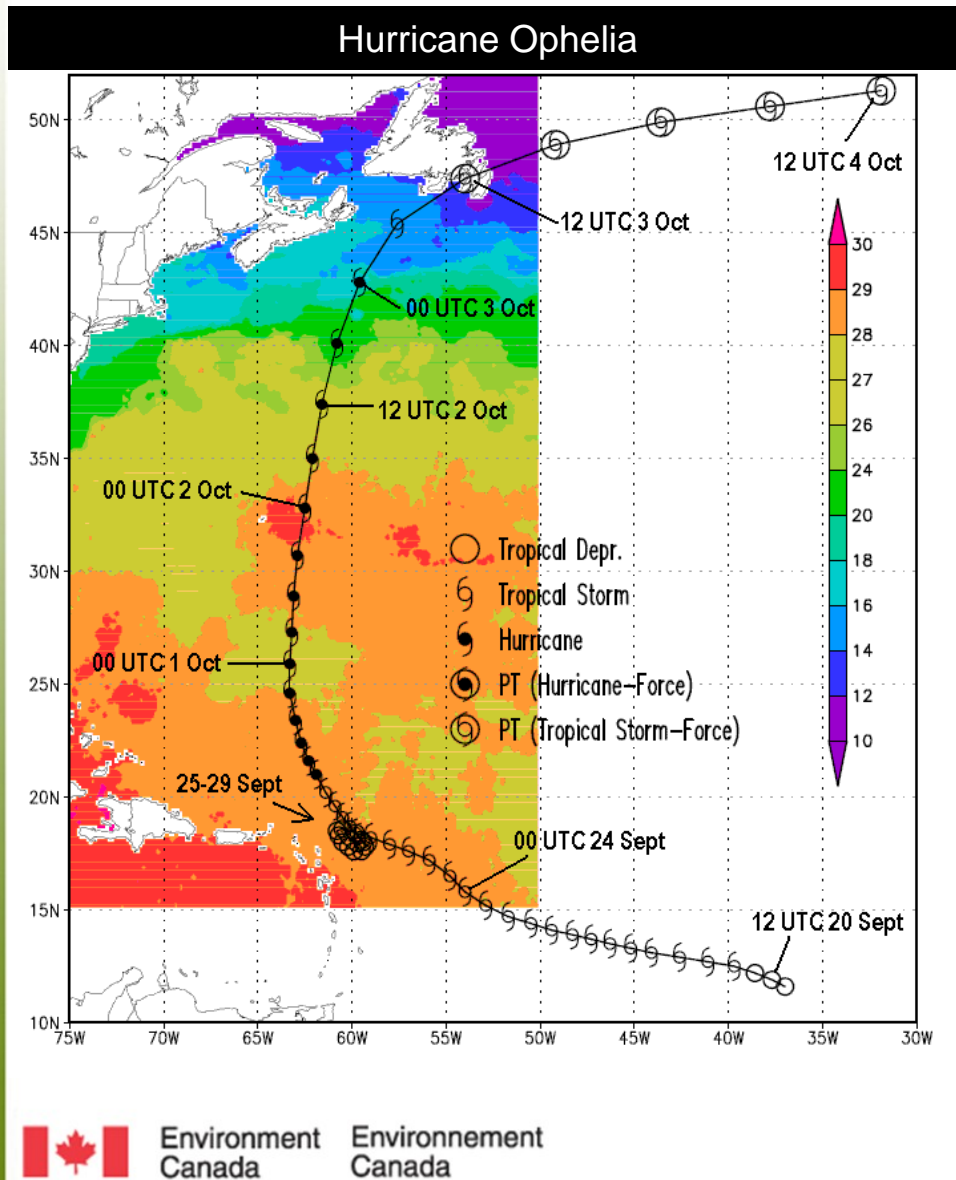
- Reached major hurricane status
- Large swell activity along the Atlantic coast of NS and South Coast Newfoundland and Labrador
- Otherwise no major impacts on Canada

2011 Season in Review – Hurricane Maria



- Formed over the eastern Atlantic
- Maria then became a category 1 hurricane late in its existence
- Made landfall in Argentia / Cape St Mary's September 16th as a strong tropical storm
- Strongest winds to the right of the track came within about 50 km of Cape Spear
- Maria then interacted with a non-tropical weather system that gave strong winds to the entire island later that evening

2011 Season in Review – Hurricane Ophelia



- Ophelia reached category 4 just after passing Bermuda as it tracked towards NL
- Rapidly weakened over colder water
- Landfall near Placentia as a post-tropical storm on October 3rd
- Wind gusts over 90 km/h were reported along with heavy rainfall to the left of the storm's track (as much as 50 mm in a 3-hour period)
- Drainage ravine overflowed in the town of Belleoram resulting in local state of emergency

2011 Season in Review – Hurricane Ophelia





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2012 Seasonal

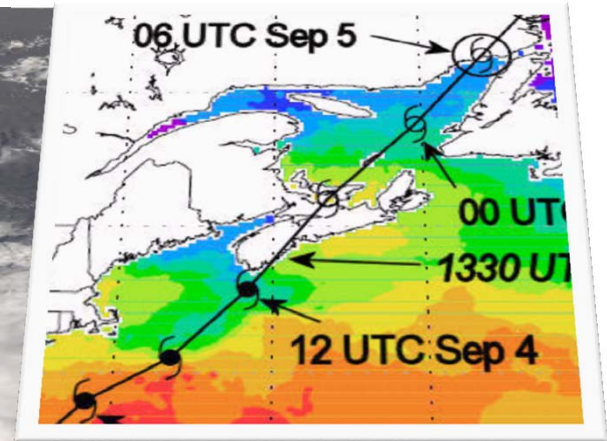
Hurricane Forecast



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Trouly on Bonaventure Peninsula (photographer unknown)



Amherst Daily News
AMHERST, N.S. WWW.AMHERSTDAILY.COM

Hit or miss?
Either way, experts are warning Maritimers to be ready as Hurricane Bill heads this way for possible Sunday strike — see STORY, page 2 & 6

YOU SAID IT
"Using digital means we can finally get out to the rest of the world. Sadly not many people know we exist!"
Bill King of the New South Wales Government

STUNNED
Highland station day after day in Amherst province...
The station was not damaged...
The station was not damaged...
The station was not damaged...

QUICK WEATHER

TEMP	HUMIDITY
High 29	High 27
Low 18	Low 21

See detailed weather on page 2
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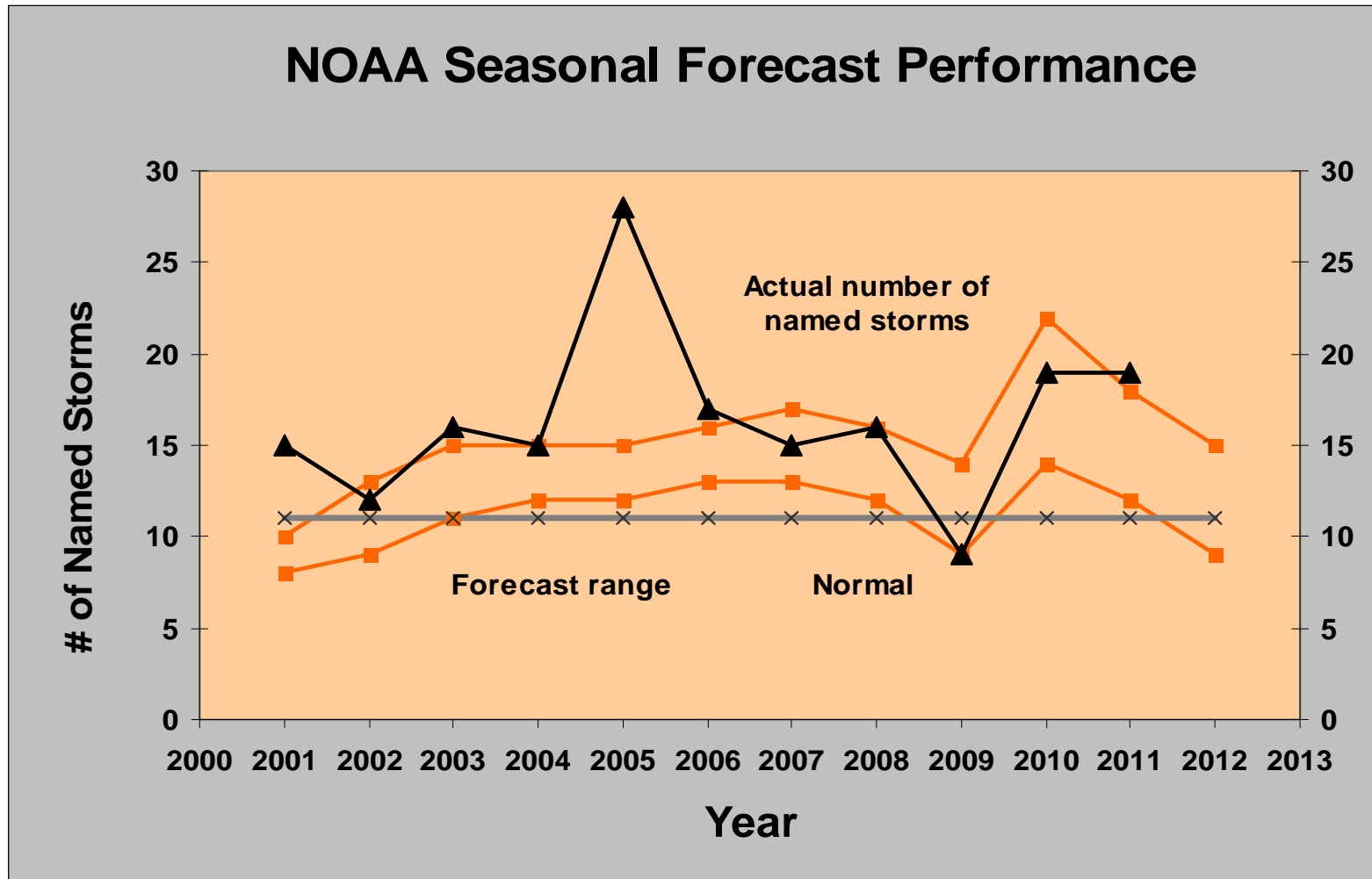
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Spring 2012 Atlantic Hurricane Forecast

	Named Storms	Hurricanes Category 1 to 5	Major Hurricanes Category 3-5
National Oceanic and Atmospheric Administration (US)	9-15	4-8	1-3
1981-2010 Average	12	6	3
1961-2010 Average	11	6	2 or 3



NOAA Seasonal Forecast

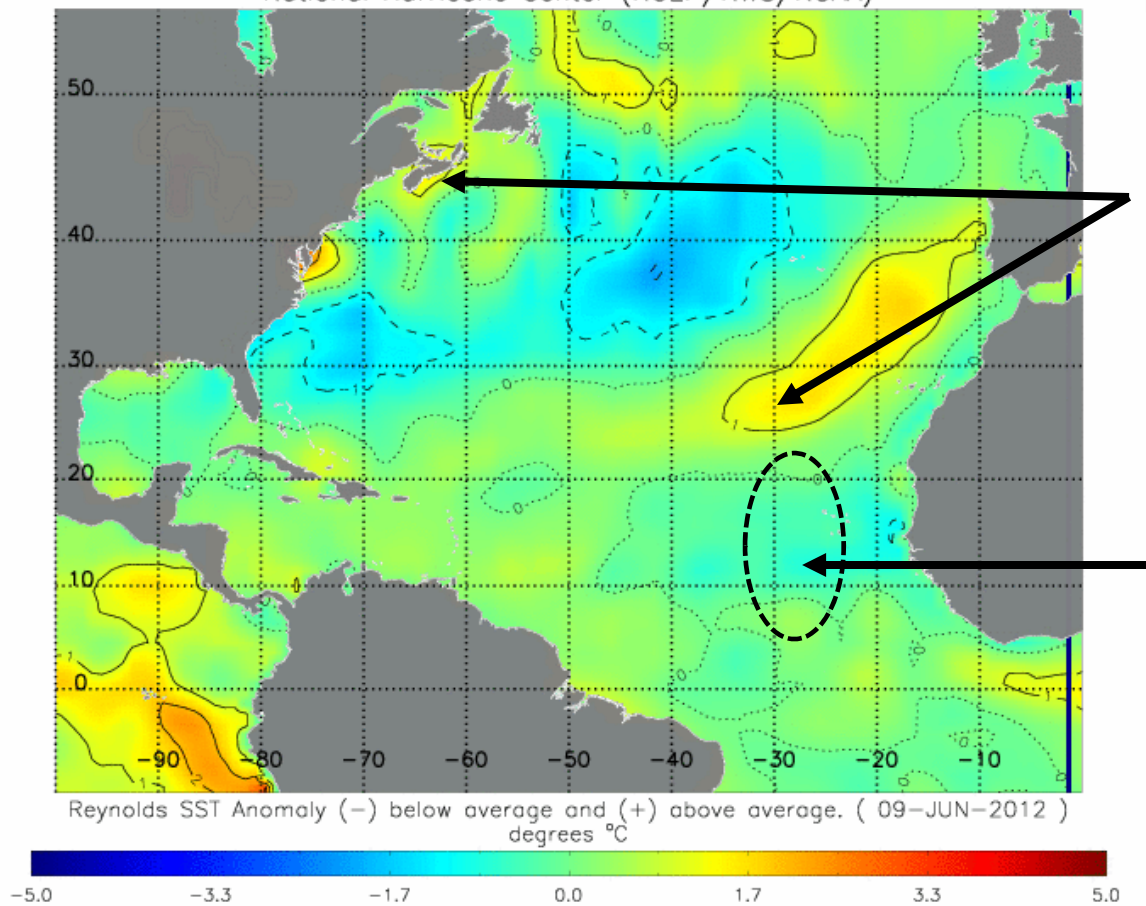


Latest Water Temperature Patterns

Water temperatures are cooler in the tropical Atlantic compared to recent years.



National Hurricane Center (NCEP/NWS/NOAA)



Warmer than normal water temperature

Cooler than normal water temperature

Reynolds SST Anomaly (-) below average and (+) above average. (09-JUN-2012)
degrees °C



source: CPC/NCEP/NOAA



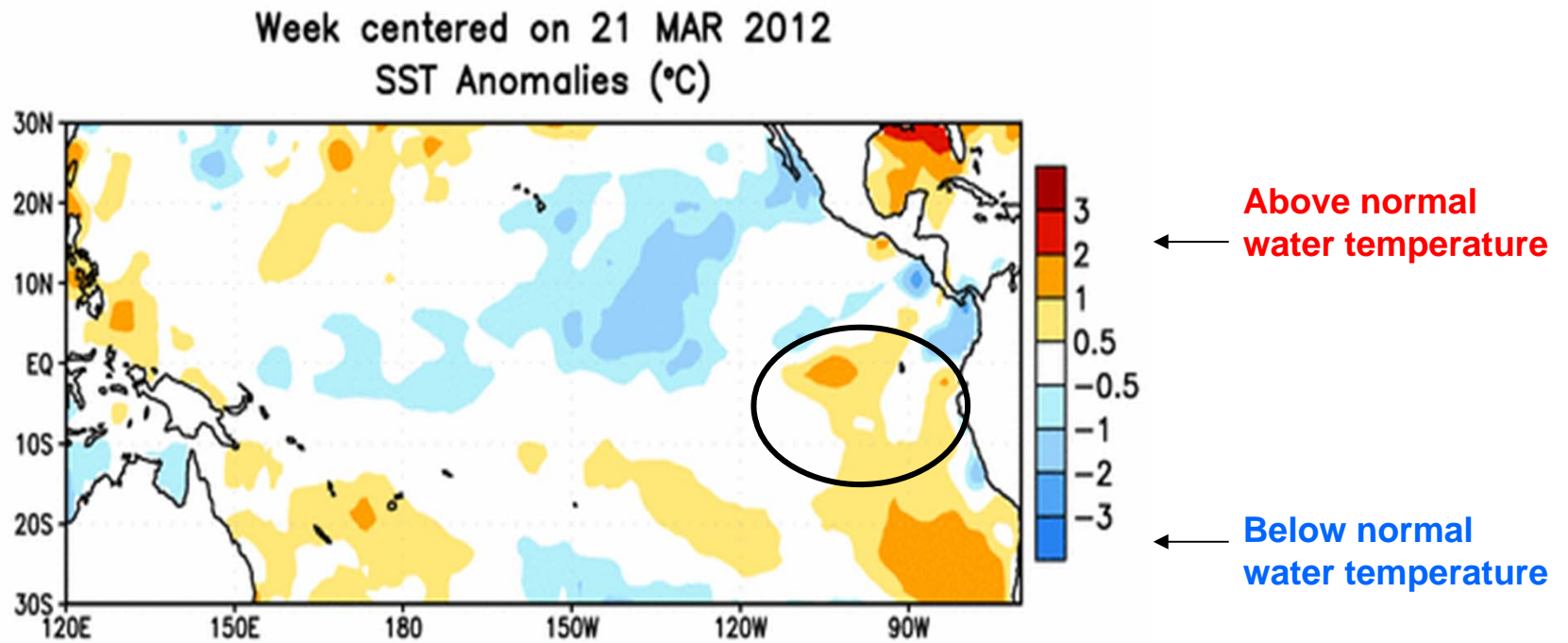
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East Pacific Ocean Water Temperatures

Water temperatures in the circled area indicate El Nino or La Nina.

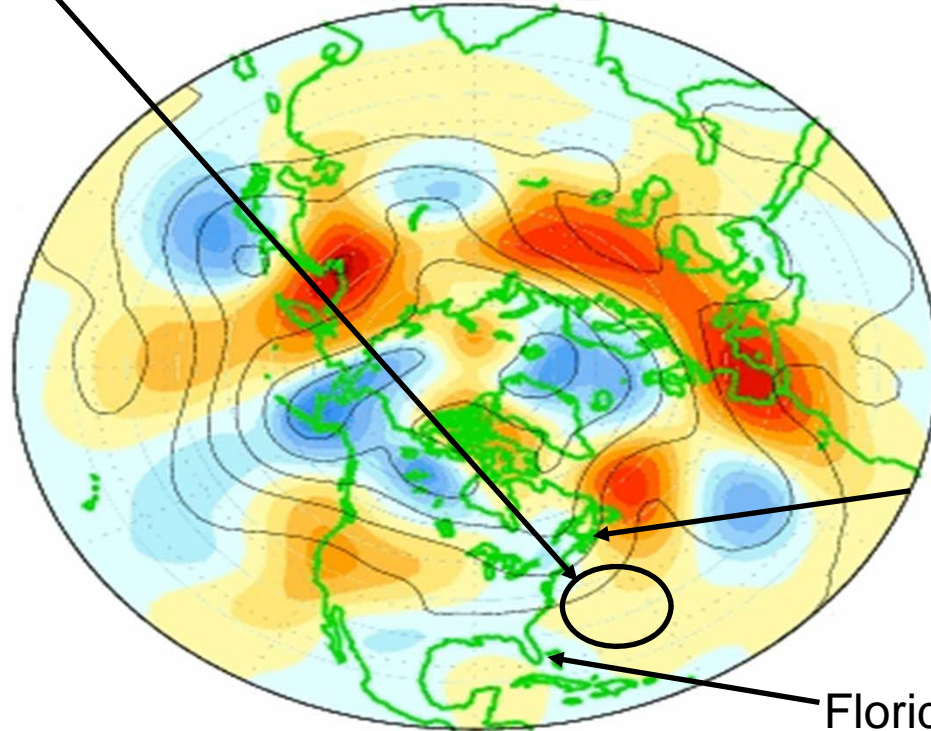


Water temperatures in the East Pacific Ocean near equator

Eastern Canada/Northern U.S. Pressure Patterns

If this area is blue during May and June, our risk of storms increases

CDAS 500-hPa HT Anoms (5d rm)
11MAY2012



Maritimes

Florida



Below normal air pressure

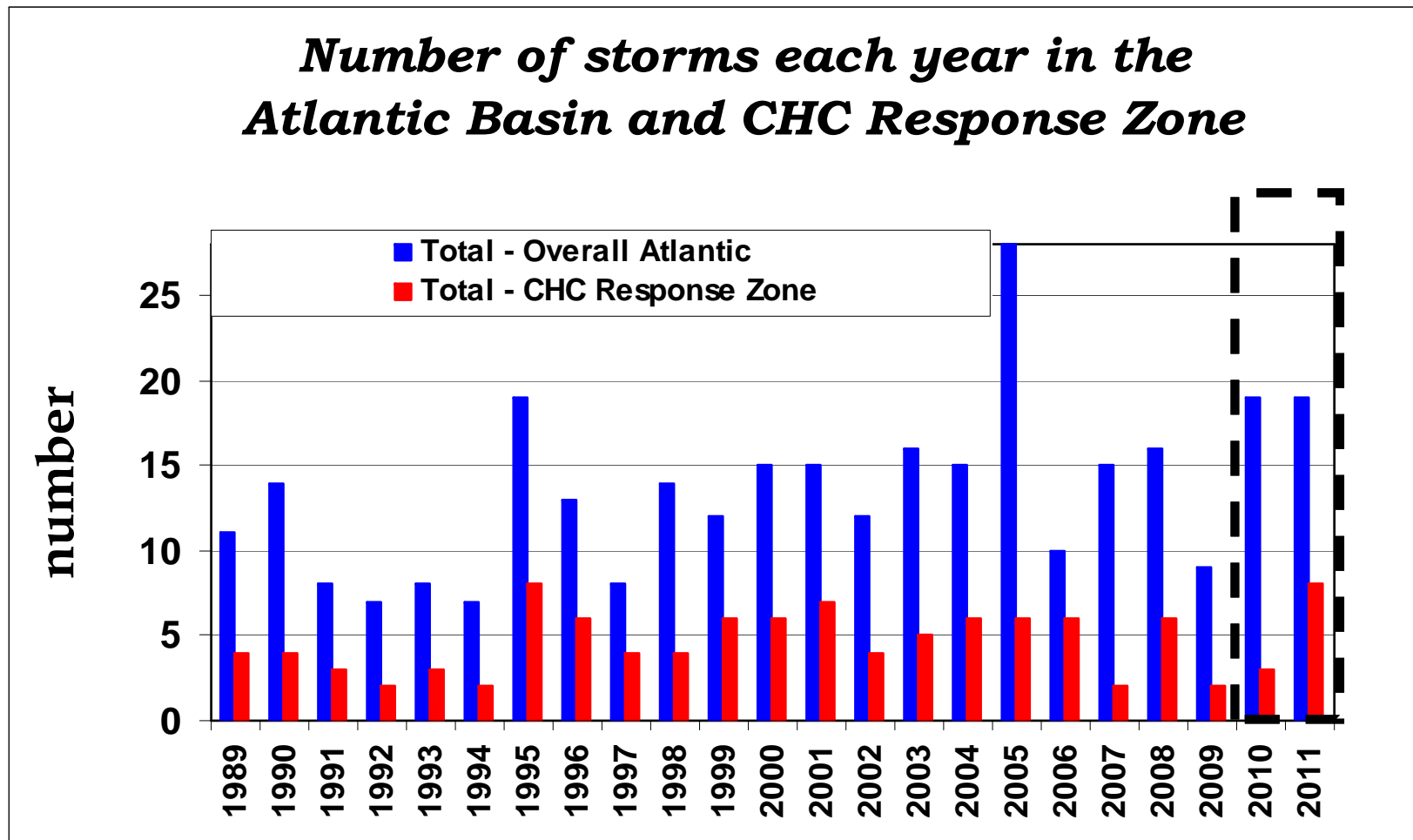
Above normal air pressure



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Number of Storms per Year



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Significant Tropical Storms and Hurricanes in Canada Since 2001

Year	Hurricane	Wind	Rain	Seasonal Activity
2001	Gabrielle		✓	Above
2002	Gustav	✓	✓	Near normal
2003	Juan	✓	✓	Well above
2004	Frances		✓	Well above
	Ivan	✓		
2005	Rita		✓	Well above
2006	Florence	✓		Near normal
2007	Chantal		✓	Near normal
	Noel	✓		
2008	Cristobal		✓	Well above
	Hanna		✓	
	Kyle	✓	✓	
2009	Bill		✓	Below
2010	Earl	✓		Well above
	Igor	✓	✓	
2011	Irene	✓	✓	Well above



List of Atlantic Storm Names

2012	2013	2014	2015	2016	2017
Alberto	Andrea	Arthur	Ana	Alex	Arlene
Beryl	Barry	Bertha	Bill	Bonnie	Bret
Chris	Chantal	Cristobal	Claudette	Colin	Cindy
Debby	Dorian	Dolly	Danny	Danielle	Don
Ernesto	Erin	Edouard	Erika	Earl	Emily
Florence	Fernand	Fay	Fred	Fiona	Franklin
Gordon	Gabrielle	Gonzalo	Grace	Gaston	Gert
Helene	Humberto	Hanna	Henri	Hermine	Harvey
Isaac	Ingrid	Isaias	Ida	Ian	Irma *
Joyce	Jerry	Josephine	Joaquin	Julia	Jose
Kirk	Karen	Kyle	Kate	Karl	Katia
Leslie	Lorenzo	Laura	Larry	Lisa	Lee
Michael	Melissa	Marco	Mindy	Matthew	Maria
Nadine	Nestor	Nana	Nicholas	Nicole	Nate
Oscar	Olga	Omar	Odette	Otto	Ophelia
Patty	Pablo	Paulette	Peter	Paula	Philippe
Rafael	Rebekah	Rene	Rose	Richard	Rina
Sandy	Sebastien	Sally	Sam	Shary	Sean
Tony	Tanya	Teddy	Teresa	Tobias	Tammy
Valerie	Van	Vicky	Victor	Virginie	Vince
William	Wendy	Wilfred	Wanda	Walter	Whitney

** Irene was replaced with Irma



Canadian Hurricane Centre Forecast Products

General bulletin (all users)

Technical bulletin

Bulletins and Track Maps
Issued every 6 hours

0300 ADT
0900 ADT
1500 ADT
2100 ADT

000331 CWEX 201200
TROPICAL CYCLONE INFORMATION STATEMENT ISSUED BY THE CANADIAN
HURRICANE CENTRE OF ENVIRONMENT CANADA AT 9:00 AM ADT MONDAY
20 SEPTEMBER 2010.

INFORMATION STATEMENT FOR:
NEW NEWFOUNDLAND.

HURRICANE IGOR.

THE NEXT STATEMENT WILL BE ISSUED BY 3:00 PM ADT.

IGOR NORTH OF BERMUDA, EXPECTED TO CROSS THE GRAND BANKS AND
GIVE HEAVY RAIN AND GUSTY WINDS TO NEWFOUNDLAND ON TUESDAY.

"DISCUSSION"
1. SUMMARY OF BASIC INFORMATION AT 9:00 AM ADT

LOCATION: 35.2 N 64.0 W
ABOUT 320 KM NORTH NORTHEAST OF BERMUDA
MAXIMUM SUSTAINED WINDS: 120 KM/H
PRESENT MOVEMENT: NORTH NORTHEAST AT 33 KM/H
MINIMUM CENTRAL PRESSURE: 957 MB.

2. PUBLIC WEATHER IMPACTS AND WARNINGS SUMMARY

WHILE THE CENTRE OF IGOR IS EXPECTED TO PASS WELL SOUTHEAST OF THE
AVALON PENINSULA LATER ON TUESDAY, IT IS EXPECTED TO SPREAD HEAVY
RAIN ACROSS CENTRAL AND EASTERN PORTIONS OF THE PROVINCE TUESDAY
MORNING. IN ADDITION, A TROUGH OF LOW PRESSURE UNRELATED TO IGOR WILL
CROSS NEWFOUNDLAND TODAY AND TONIGHT AND SPREAD PERIODS OF RAIN
ALONG THE SOUTH COAST. THE MET WEATHER OFFICE HAS ISSUED RAINFALL WARNINGS
TO THIS TROUGH. ON THE
TROPICAL MOISTURE FROM
NEWFOUNDLAND. TOTAL RAIN
50 TO 100 MILLIMETRES IN
AVALON PENINSULA WILL
AMOUNTS ON THE AVALON
RESULT THE NLWO HAS EXT
EASTERN NEWFOUNDLAND.

A. WIND

WIND GUSTS POSSIBLY EXCEED
PARTS OF THE AVALON PEN
AND EVENING. THE CHC HAS
FOR THESE AREAS. THERE
EXTENDED TO THE BONAVIN

B. RAINFALL

EXCESSIVE RAINFALL WILL
AND RIVERS COMING OVER
SHOULD BE PREPARED FOR
DAMAGE.

C. SURGE/WAVES

LONG PERIOD SWELLS OF UP TO 2 TO 3 METRES SPREADING OUT AHEAD OF
IGOR WILL CONTINUE TO AFFECT THE ATLANTIC COASTS OF NEW SCOTIA
AND NEWFOUNDLAND. IN ADDITION HIGHER THAN NORMAL WATER LEVELS AND HEAVY
FOUNDED SHIP CAN BE EXPECTED ALONG THE NORTHEAST AND WEST COASTS OF
NEWFOUNDLAND LATER IN THE DAY TUESDAY AS IGOR MOVES EAST OF THE GRAND
BANKS.

3. MARINE WEATHER IMPACTS AND WARNINGS SUMMARY

HURRICANE FORCE WINDS ARE EXPECTED CLOSE TO THE TRACK OF IGOR AS
IT TRACKS NEAR LABRETIAN FAN TUESDAY MORNING AND CROSS THE GRAND
BANKS TUESDAY AFTERNOON. STORM FORCE WINDS WILL AFFECT MOST OFFSHORE
WATERS. GALES ARE EXPECTED TO EXTEND FAR FROM IGOR AS IT PASSES BY ON
TUESDAY. HURRICANE FORCE WIND WARNINGS HAVE BEEN ISSUED FOR THE
SOUTHEASTERN HALF OF LABRETIAN FAN AND MOST OF THE GRAND BANKS. STORM
WARNINGS HAVE BEEN ISSUED FOR ADJACENT WATERS. GALE WARNINGS HAVE ALSO
BEEN POSTED FOR ALL REMAINING MARITIME SLOPE WATERS, AS WELL AS FROM
EASTERN BARKS TO THE SOUTH AND EAST COASTS OF NEWFOUNDLAND.

AN AREA OF 9 TO 10 METRE SIGNIFICANT WAVE HEIGHTS (HIGHEST 1/3 OF THE
WAVE) CAN BE EXPECTED NEAR AND CLOSE TO THE RIGHT-HAND-SIDE OF IGOR'S
TRACK.

VISIT [HTTP://WEATHEROFFICE.GC.CA/HURRICANE/INDEX_E.HTML](http://weatheroffice.gc.ca/hurricane/index_e.html) (IN LOWER CASE)
FOR THE LATEST:

- FORECAST POSITION, CENTRAL PRESSURE TABLE
- STRENGTH AND PREDICTED WIND RADII TABLE
- HURRICANE TRACK INFORMATION MAP
- TECHNICAL DISCUSSION

PLEASE REFER TO THE PUBLIC AND MARINE FORECASTS AND WARNINGS ISSUED BY
ENVIRONMENT CANADA FOR YOUR AREA.

END EKAN/HATT/FOGARTY

FXCN31 CWEX 201200
TROPICAL CYCLONE TECHNICAL INFORMATION STATEMENT ISSUED BY THE CANADIAN
HURRICANE CENTRE OF ENVIRONMENT CANADA AT 9:00 AM ADT MONDAY
20 SEPTEMBER 2010.

THE NEXT TECHNICAL STATEMENT WILL BE ISSUED BY 3:00 PM ADT

1. CURRENT POSITION, STRENGTH, CENTRAL PRESSURE AND MOTION

AT 9:00 AM ADT, HURRICANE IGOR WAS LOCATED NEAR LATITUDE 35.2 N
AND LONGITUDE 64.0 W, ABOUT 175 NAUTICAL MILES OR 320 KM
NORTH NORTHEAST OF BERMUDA. MAXIMUM SUSTAINED WINDS ARE
ESTIMATED AT 65 KNOTS (120 KM/H) AND CENTRAL PRESSURE AT 957
MB. IGOR IS MOVING NORTH NORTHEAST AT 10 KNOTS (19 KM/H).

2. FORECAST POSITION, CENTRAL PRESSURE AND STRENGTH

DATE	TIME	LAT	LONG	MSLP	MAX WIND
ADT		MB	KTS	KMH	
SEP 20	9:00 AM	35.2N	63.7W	957	65 120
SEP 20	9:00 PM	38.0N	60.1W	955	65 120 TRANSITIONING
SEP 21	9:00 AM	42.5N	55.2W	953	70 130 TRANSITIONING
SEP 21	9:00 PM	46.0N	49.5W	956	70 130 POST-TROPICAL
SEP 22	9:00 AM	48.5N	43.9W	960	65 120 POST-TROPICAL
SEP 22	9:00 PM	51.0N	39.3W	964	60 111 POST-TROPICAL

3. TECHNICAL DISCUSSION

A. ANALYSIS

SATELLITE IMAGERY STILL
OUTFLOW PATTERN TO THE
VAPOUR IMAGERY INDICAT
IN ADDITION, CONVECTIO
SIDE OF IGOR BECOMING
RADAR DATA FROM BERMU
OVER 26C SSTs AND IS F
TERM. SHEAR OVER IGOR
INCREASE IN INTENSITY

OBSERVATIONS INDICATE
FORCE WINDS EXTENDING
BERMUDA AIRPORT REPORT
ITS WEST. WINDS HAVE S
HOWEVER AT 1052 SOUTH
ATMOSPHERIC PRESSURE H
OF THE ISLAND.

DEFECT A SIGNIFICANT INTERACTION BETWEEN TRANSITIONING POST-TROPICAL
IGOR AND THE SHORT WAVE OVER NEWFOUNDLAND IN THE 24 TO 36 HOUR TIME
FRAME. THERE IS LARGE TRACK UNCERTAINTY. IGOR COULD TRACK AS FAR NORTH
AS JUST SOUTH OF CAPE RACE TO AS MUCH AS 40 KILOMETRES SOUTH OF
CAPE RACE.

IGOR WILL REMAIN OVER VERY WARM SSTs FOR ANOTHER 12 TO 24 HOURS.
SHEAR WILL THEN INCREASE AND GRADUAL WEAKENING OF IGOR
IS EXPECTED BEYOND THE 36 TO 48 HOUR TIME PERIOD.

CYCLONE PHASE SPACE DEPICTIONS SHOW EXTRATROPICAL TRANSITION
BEGINNING TONIGHT, ALTHOUGH MOST OF THE MODELS ARE
SUGGESTING THAT THE TRANSITION PROCESS WILL BE SLOW. THE TIRING OF
THIS TRANSITION, SPECIFICALLY HOW QUICKLY IGOR'S RAINFALL PATTERN
WILL BECOME ASYMMETRICAL AND SHIFT TO LEFT OF TRACK, COULD
COME INTO PLAY WITH THE SHORT WAVE INTERACTION OVER NEWFOUNDLAND
ON TUESDAY.

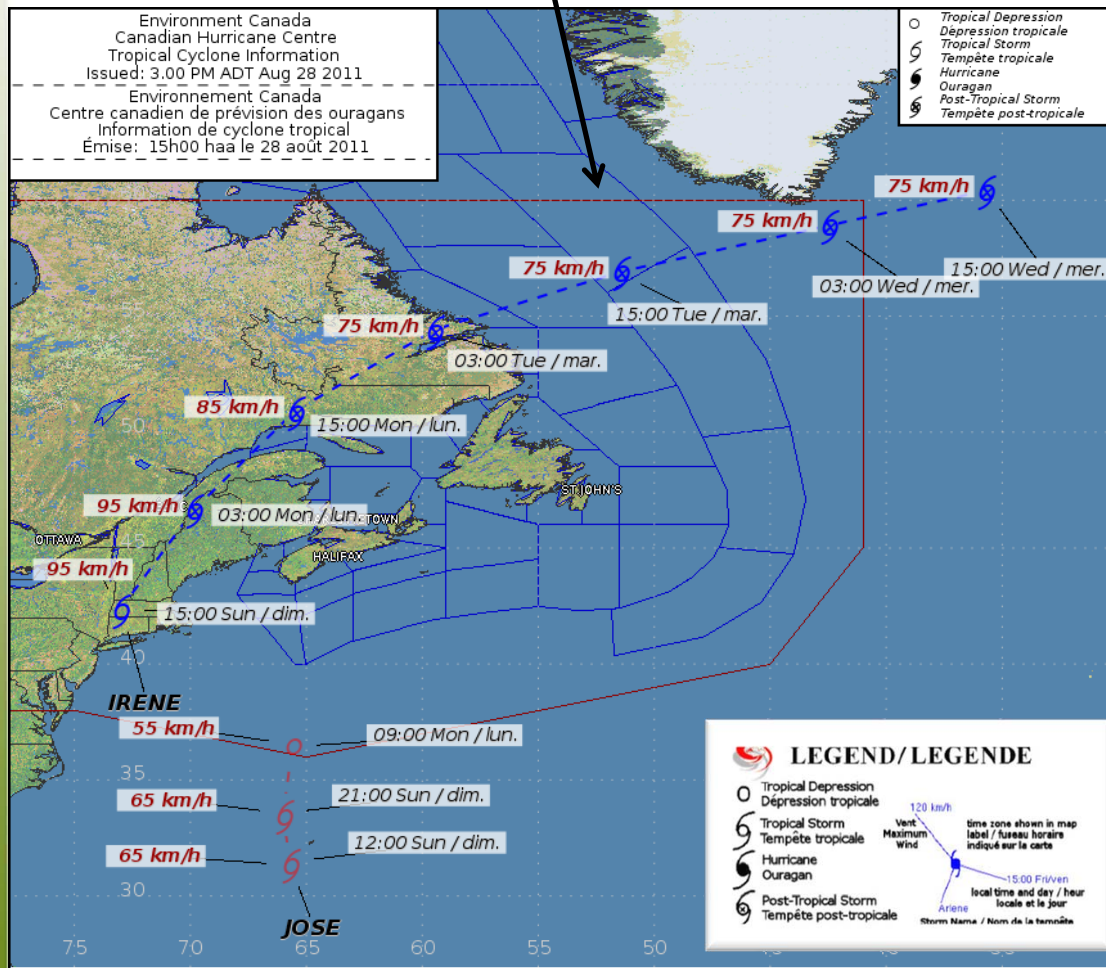
C. PREDICTED WIND RADII (NM)

TIME	GALES				STORMS				HURRICANE			
	NE	SE	SW	NW	NE	SE	SW	NW	NE	SE	SW	NW
20/12Z	300	285	200	260	180	150	120	135	130	90	50	50
21/00Z	310	295	205	250	180	150	110	115	130	90	50	50
21/12Z	320	315	215	250	180	150	110	100	100	60	30	20
22/00Z	335	335	230	250	160	155	110	95	60	60	15	10
22/12Z	350	350	255	250	165	165	110	95	10	10	0	0
23/00Z	360	360	295	260	175	175	110	105	0	0	0	0

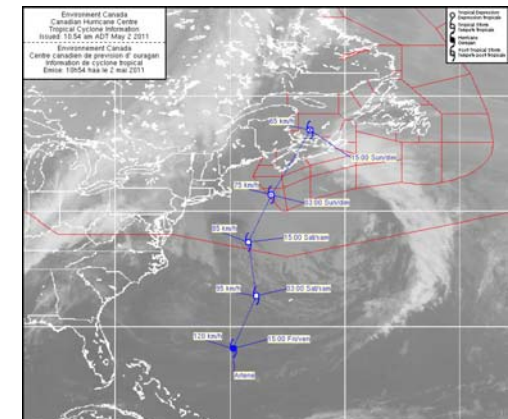
END EKAN/HATT/FOGARTY

Canadian Hurricane Centre Forecast Products

New-look Hurricane track map



Old Hurricane track map

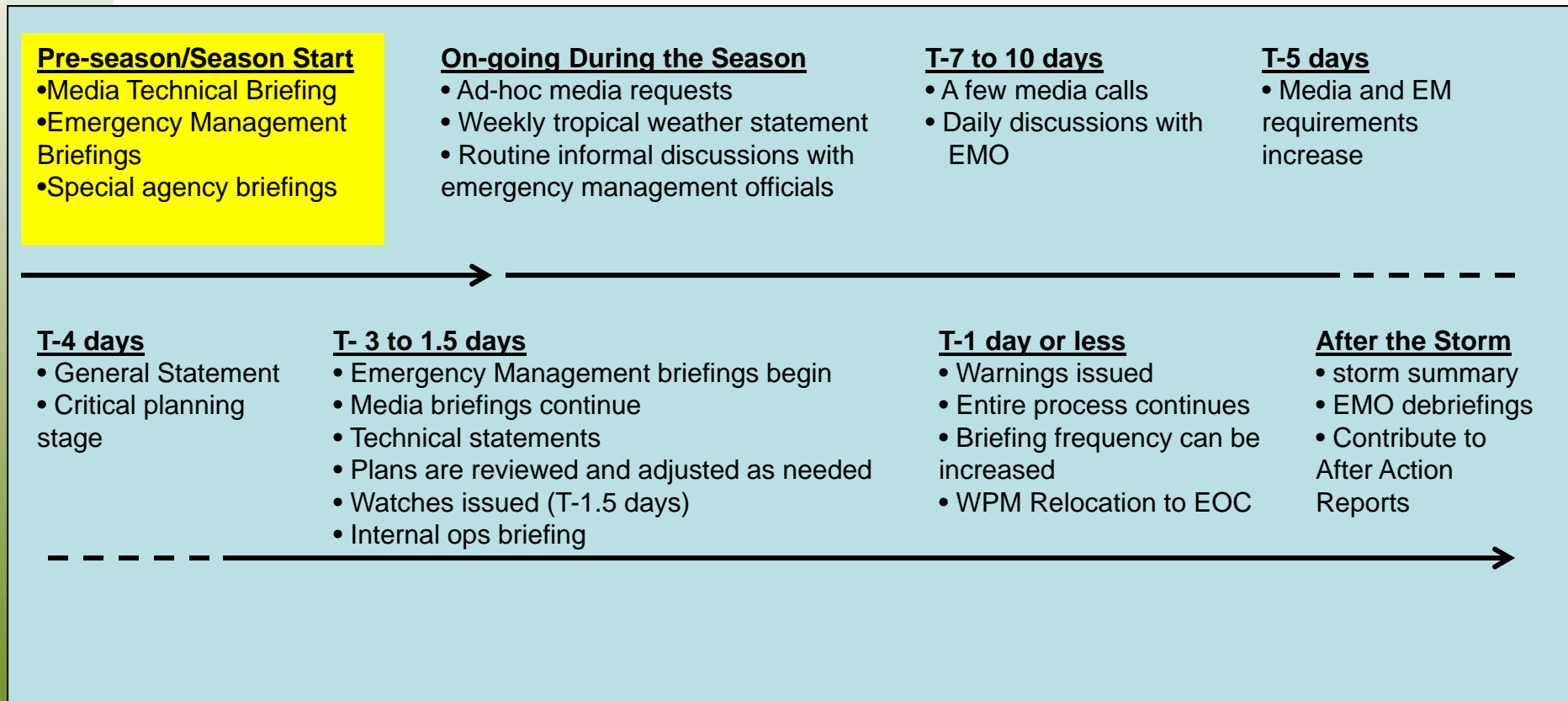


Canadian Hurricane Centre Warning Products

- **Tropical Storm:** winds 70 km/h to 117 km/h
- **Hurricane:** winds 118 km/h or more
- **A Watch:** wind conditions *possible* within **36 hours**
- **A Warning:** wind conditions *expected* within **24 hours**

Operational Notes

Communications/Briefing Timelines:



Environment
Canada

Environnement
Canada

Canada

Pre/Start-Season

Emergency Management Briefing

- Briefings tailored for emergency managers
- Typically around the start of the season
- Sessions are coordinated by Public Safety Canada who invites provincial EMO and other Federal Departments
- Occasionally we will deliver a full-day or ½-day training session



Media Technical Briefing

- Timed with the release of the NOAA Hurricane Season Forecast
- Forecast numbers are not known prior to our technical briefing
- Emergency management officials invited to speak to enhance the preparedness messages

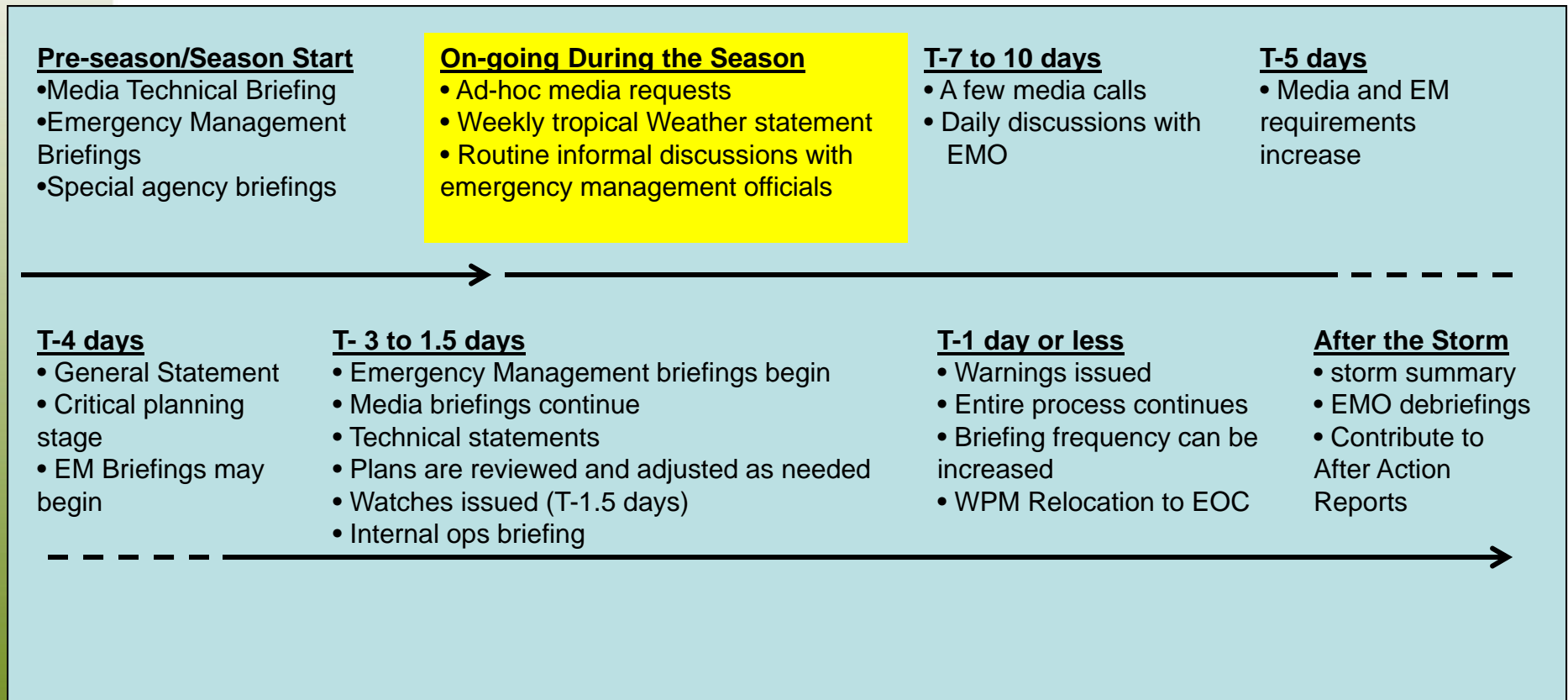
Special Agency Briefings

- ICLR
- DFAIT



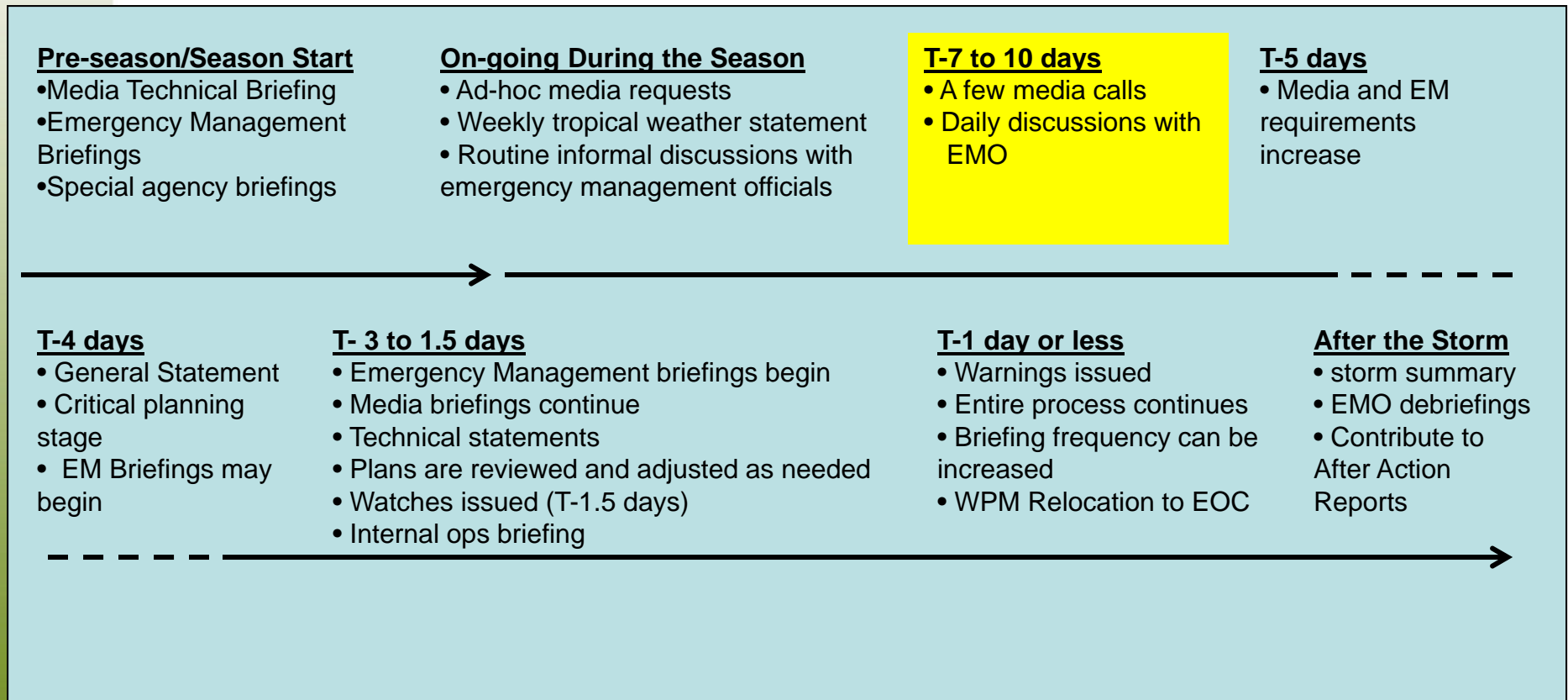
Operational Notes

Communications/Briefing Timelines:



Operational Notes

Communication/Briefing Timelines:



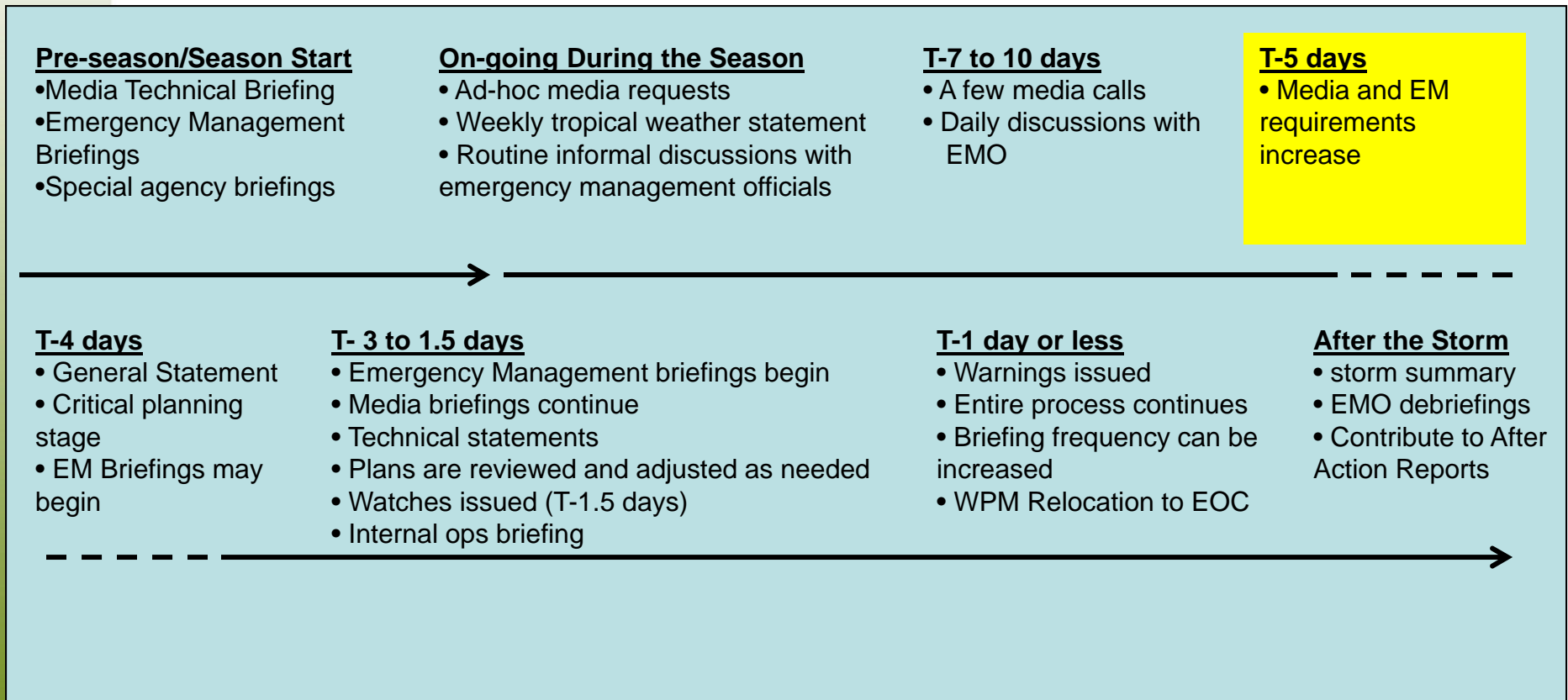
Environment
Canada

Environnement
Canada

Canada

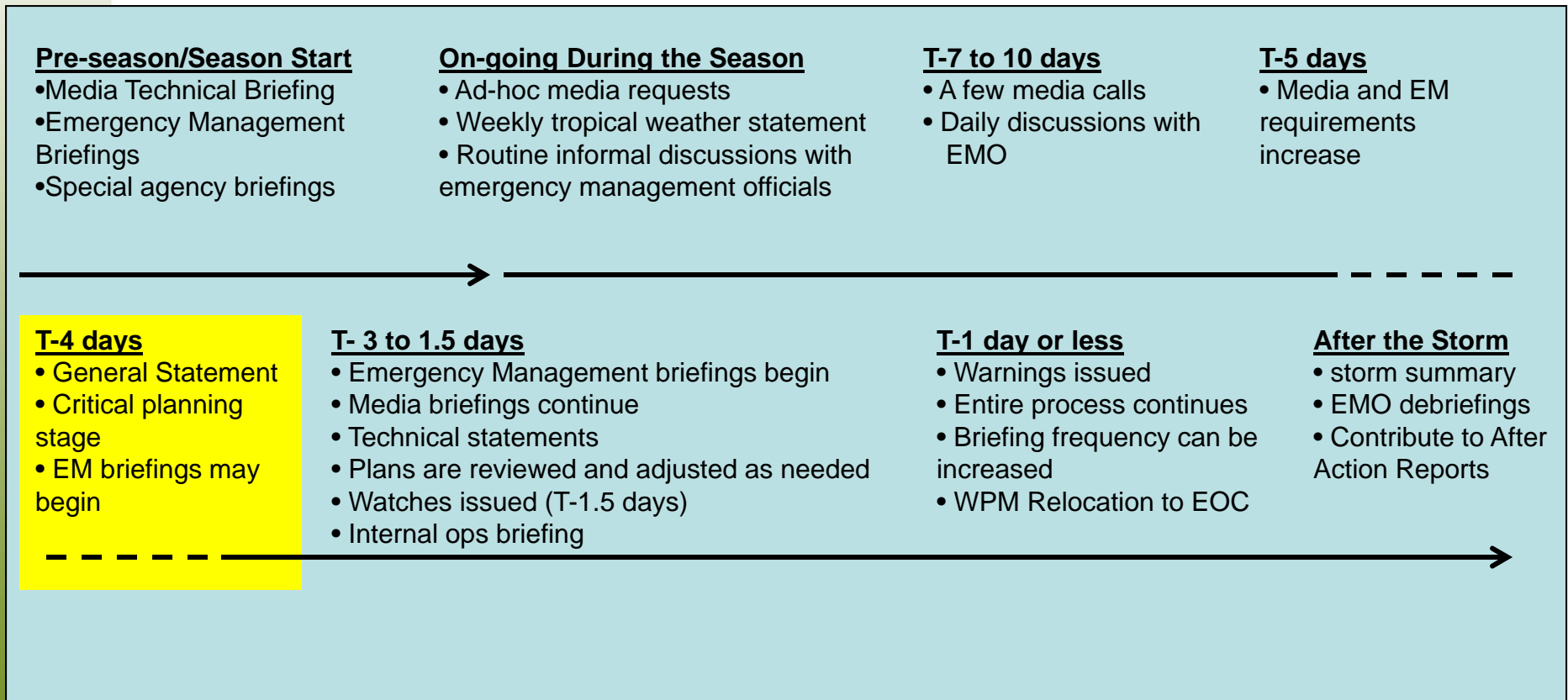
Operational Notes

Communication/Briefing Timelines:



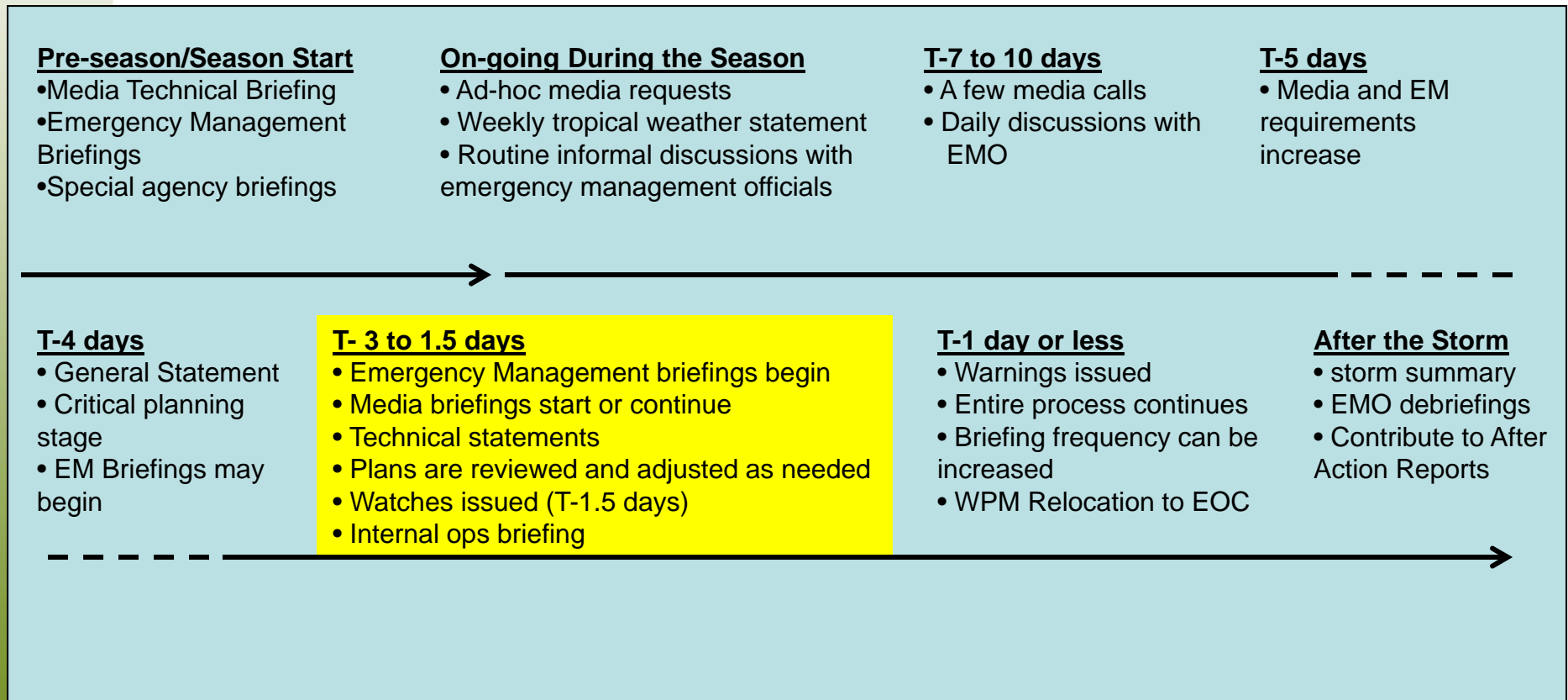
Operational Notes

Communication/Briefing Timelines:



Operational Notes

Communication/Briefing Timelines:



Emergency Management Briefings

- Storm specific briefings tailored for Federal and Provincial emergency management agencies
- We use WebEx and hold a daily briefings at the request of any EM agency OR when CHC deemed appropriate
- Cover an overview of the current status, forecast and any thoughts/concerns by CHC
- Briefing followed by questions and an opportunity for the EMOs to present their concerns
- Broader provincial briefings are held shortly after the morning CHC briefing



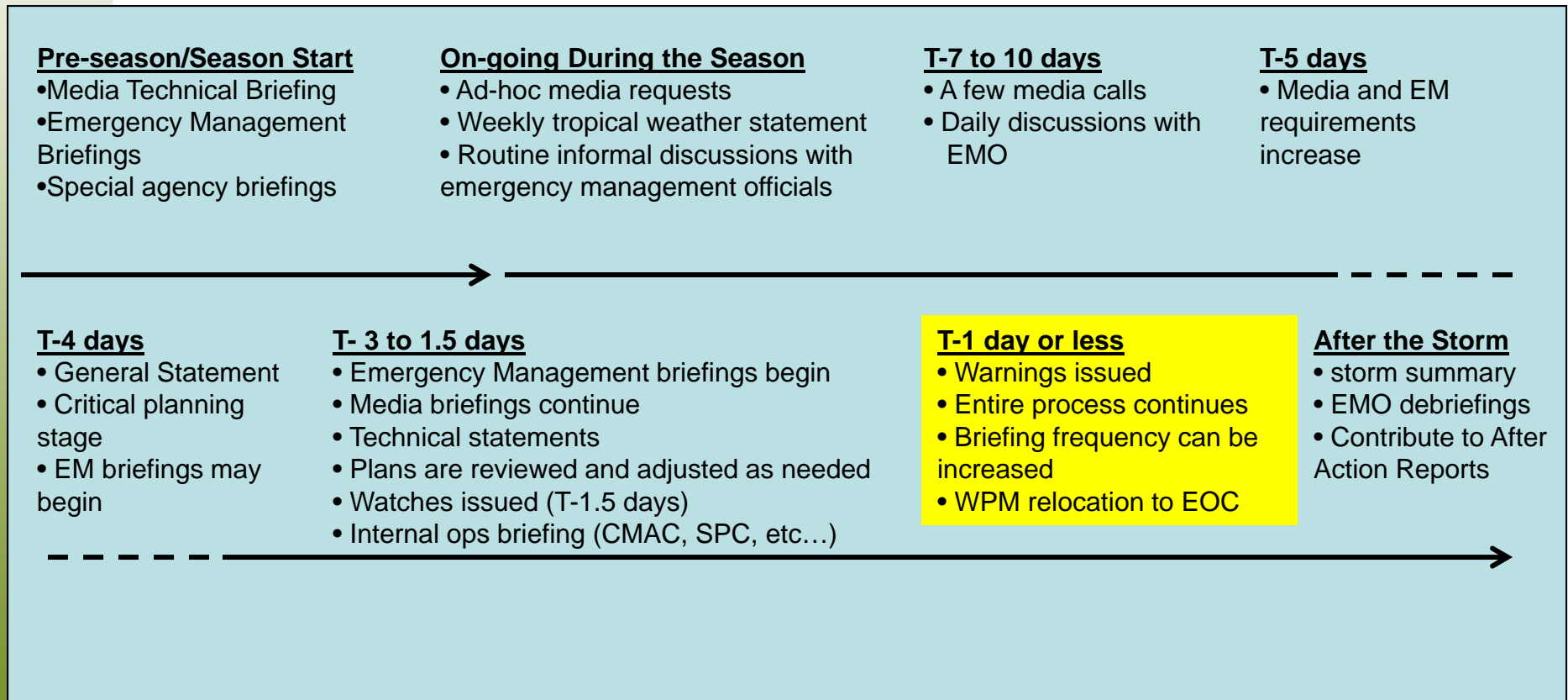
What is done with this information?

- Various preparedness and response activities
- News releases to inform the public
- Decisions made on closing municipal, provincial or federal facilities (schools and parks)
- Pre-positioning resources
- Emergency staff scheduling

The image shows two overlapping screenshots of government websites. The background screenshot is from the Newfoundland Labrador website, titled 'News Releases', with a date of September 16, 2011. It contains text about Municipal Affairs, Fire and Emergency Services, and Environment Canada's advice on the isthmus of the Avalon Peninsula. The foreground screenshot is from the Nova Scotia Canada website, titled 'Hurricane Irene Remains a Concern', dated August 26, 2011. It features a navigation menu with categories like Residents, Visitors, Businesses, Government, News, and Search. The main content includes a title, the Emergency Management Office's name and date, and several paragraphs of text explaining the situation with Hurricane Irene, the projected track, and advice for residents to be prepared.

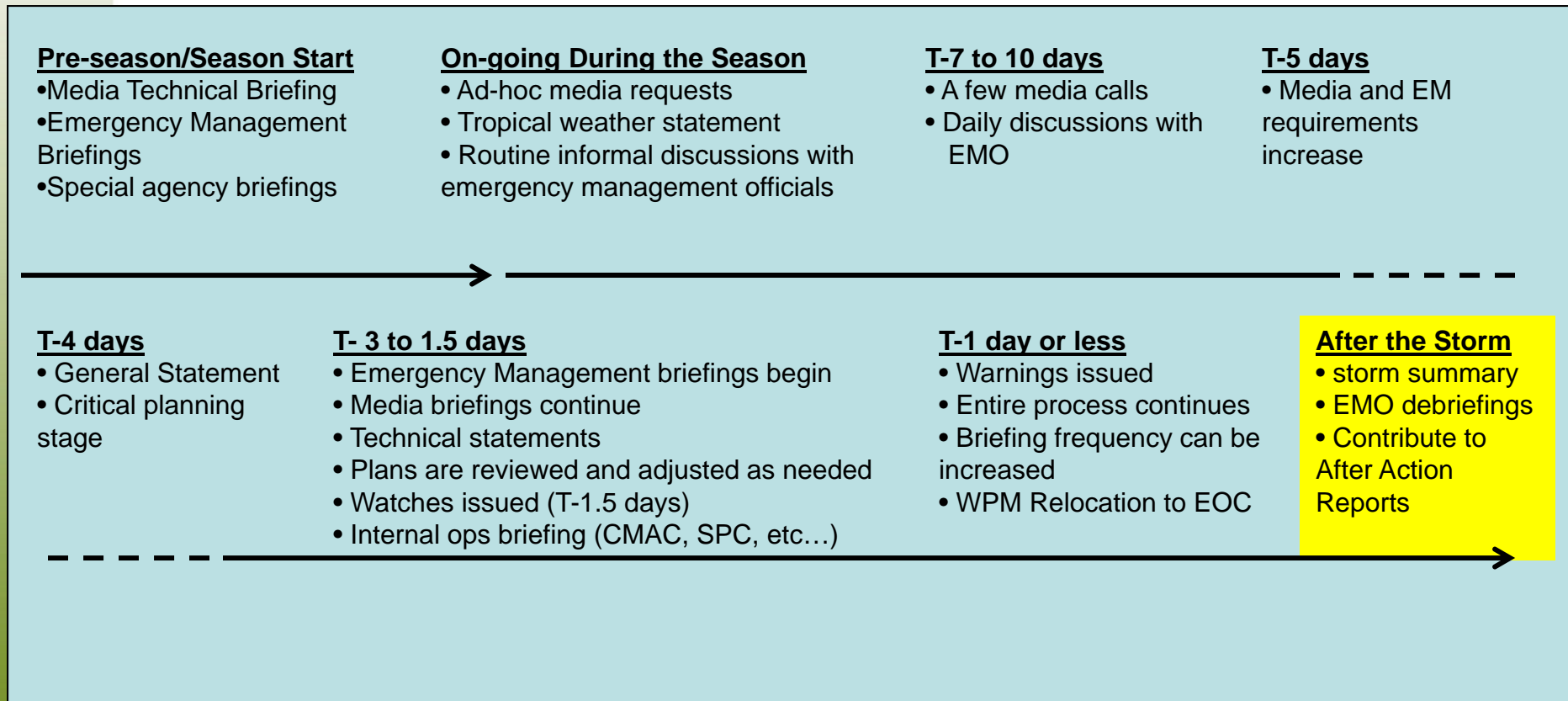
Operational Notes

Communication/Briefing Timelines:



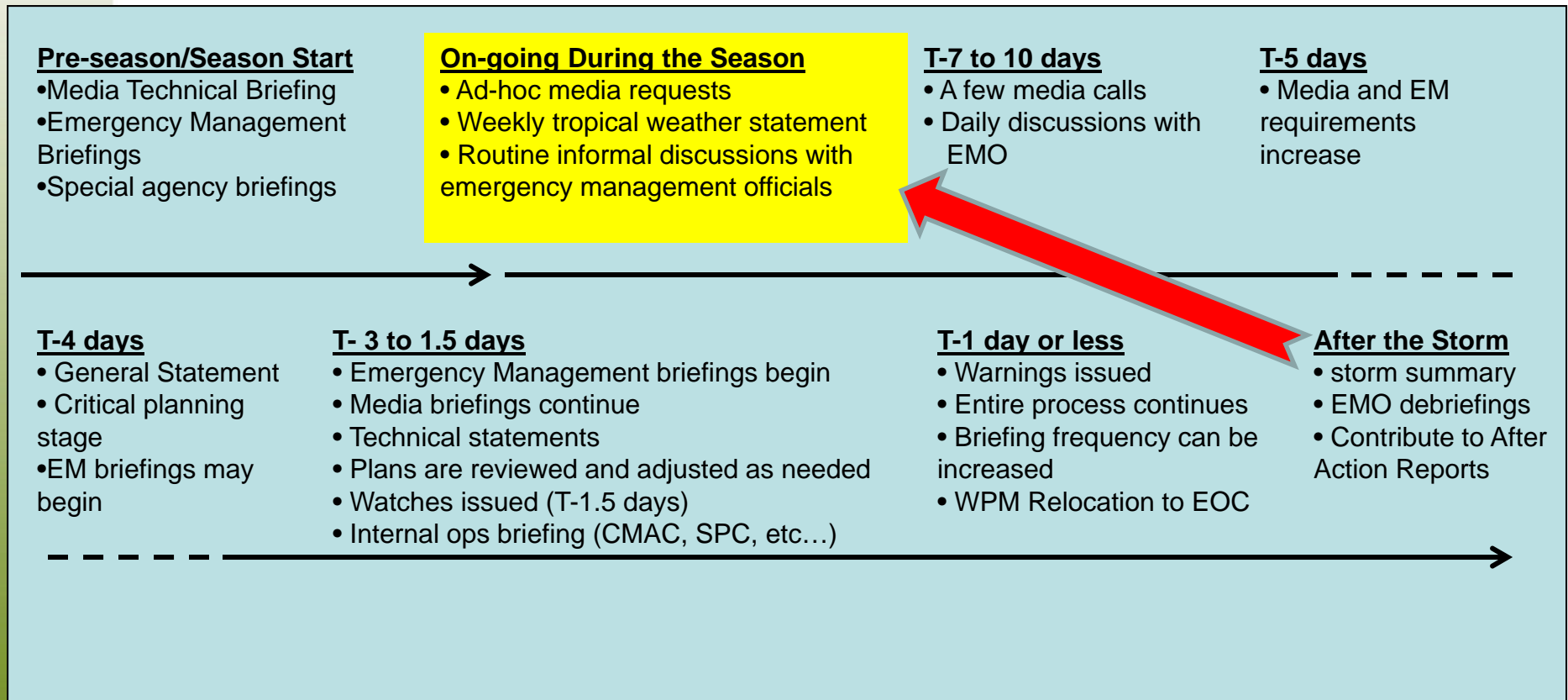
Operational Notes

Communication/Briefing Timelines:



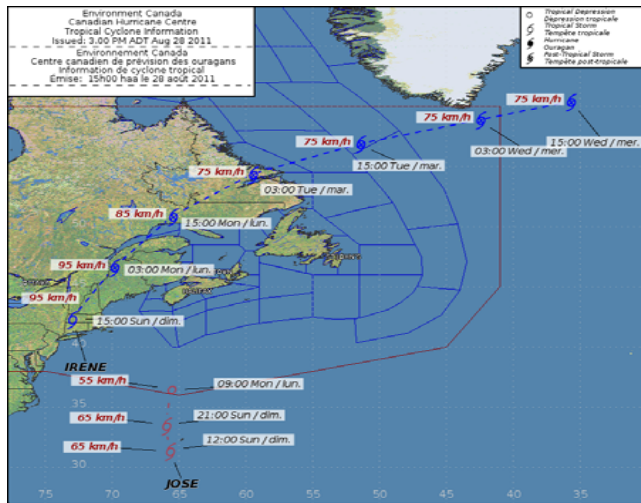
Partner Communications

Operational Briefing Timelines:



Canadian Hurricane Centre Products

CHC Website



Environment Canada
www.ec.gc.ca

Franglais Home Contact Us Help Search canada.gc.ca

Home > Forecast and Products > Hurricane Bulletin E-Services > Email Subscription Service Sign Up

Hurricane Bulletins Email Subscription Service Sign Up

- Home
- Forecasts and Products
- Hurricane Bulletin E-Services**
- Email Subscription Service Sign Up

Subscribe to Canadian hurricane and tropical storm information, watches and warnings by filling out the following form. You will be sent an email requesting confirmation to active your subscription.

New Subscriber Sign Up Form

Your email address:

Your name (optional):

Next we ask that you submit a password for your subscription. If you choose not to enter a password, one will be automatically generated for you, and it will be sent to you once you've confirmed your subscription.

Pick a password:

Re-enter password to confirm:

Subscribe to Email Service

www.hurricanes.ca

WORKS OVER 1000
TROPICAL CYCLONE INFORMATION STATEMENT ISSUED BY THE CANADIAN HURRICANE CENTRE OF ENVIRONMENT CANADA AT 9:00 AM ADT MONDAY 20 SEPTEMBER 2011.
INFORMATION STATEMENT FOR:
-NEW- HURRICANE IRENE.

HURRICANE IRENE:
THE NEXT STATEMENT WILL BE ISSUED BY 1:00 PM ADT.
1000 MILES OF HURRICANE, EXPECTED TO CROSS THE GRAND BARRÉ AND GIVE HEAVY RAIN AND QUICY WINDS TO NEWFOUNDLAND ON THURSDAY.

1. FORECAST OF BASIC INFORMATION AT 9:00 AM ADT
-LOCATION-
LOCATION: 11.1 N 64.0 W
ABOUT 100 KM NORTH-NORTHWEST OF BERNIA
RAZOR CONTINUED WINDS: 100 KM/H
PRESENT MOVEMENT: NORTH-NORTHWEST AT 10 KM/H
PREDICTED POSITION: NORTH-NORTHWEST AT 10 KM/H
PREDICTED WINDS: NORTH-NORTHWEST AT 10 KM/H

2. PUBLIC WEATHER IMPACTS AND HAZARD SUMMARY
WHILE THE CENTRE OF IRENE IS EXPECTED TO PASS WELL OUTRIGHT OF THE NEWFOUNDLAND LATE IN THE EVENING, IT IS EXPECTED TO BRING HEAVY RAIN ACROSS CENTRAL AND EASTERN PORTIONS OF THE PROVINCE THURSDAY MORNING. IN ADDITION, A THUNDER OF LOW PRESSURE, RELATED TO IRENE WILL BRING HEAVY RAIN TO THE WESTERN PORTION OF THE PROVINCE THURSDAY MORNING. THE SOUTH COAST OF THE PROVINCE WILL EXPERIENCE PERIODS OF RAIN TO THE SOUTH COAST OF THE PROVINCE.

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4. WIND
1000 MILES SHORTLY EAST PARTS OF THE GRAND BARRÉ AND EXTENDING TO THE GRAND BARRÉ FOR THREE DAYS. THESE EXTENDED TO THE GRAND BARRÉ.

5. RAINFALL
EXTENSIVE RAINFALL WILL BE EXTENSIVE OVER THE GRAND BARRÉ AND EXTENDING TO THE GRAND BARRÉ.

PLEASE REFER TO THE PRESS AND MEDIA FORECASTS AND HAZARD SUMMARY BY ENVIRONMENT CANADA FOR THE LATEST.
END

WORKS OVER 1000
TROPICAL CYCLONE INFORMATION STATEMENT ISSUED BY THE CANADIAN HURRICANE CENTRE OF ENVIRONMENT CANADA AT 9:00 AM ADT MONDAY 20 SEPTEMBER 2011.
INFORMATION STATEMENT FOR:
-NEW- HURRICANE JOSE.

HURRICANE JOSE:
THE NEXT STATEMENT WILL BE ISSUED BY 1:00 PM ADT.
1000 MILES OF HURRICANE, EXPECTED TO CROSS THE GRAND BARRÉ AND GIVE HEAVY RAIN AND QUICY WINDS TO NEWFOUNDLAND ON THURSDAY.

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LOCATION: 11.1 N 64.0 W
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PLEASE REFER TO THE PRESS AND MEDIA FORECASTS AND HAZARD SUMMARY BY ENVIRONMENT CANADA FOR THE LATEST.
END

What's on the horizon?

- Continued reduction of track and intensity errors from day 1 through day 5 (50% in the next 10 years)
- Better forecasts of rapid intensity change
- CHC is planning to introduce “cone of error” in 2013
- NHC to extend the lead time for hurricane forecasts out to Day 7



....it only takes one storm!
Are you prepared?



Environment Canada
Environnement Canada

Canada

Thank you!

Bob Robichaud

Warning Preparedness Meteorologist

Canadian Hurricane Centre

Dartmouth, NS



Environment
Canada

Environnement
Canada

Canada 