BROOKLIN, Canada - Up to 12 more tropical storms are expected to follow Hurricane Katrina, the most destructive storm to ever strike the United States, and four may be major hurricanes, according to the National Oceanographic and Atmospheric Administration (NOAA).

Katrina, which made landfall on the U.S. Gulf Coast Monday, has killed at least 110 people and left a million homeless. Preliminary damage estimates top 25 billion dollars. Refugee camps will be needed to house hundreds of thousands of people for weeks and months -- and perhaps longer, experts say. And it will be another week or two before the full extent of devastation is known.

Shockingly, there may be more storms to come. "This may well be one of the most active Atlantic hurricane seasons on record, and will be the ninth above-normal Atlantic hurricane season in the last 11 years," Brig. Gen. David L. Johnson, director of the NOAA National Weather Service, said in a statement.

NOAA forecasts a whopping 21 tropical storms -- double the norm -- before the end of hurricane season on Nov. 30. That means the U.S., Mexico and Caribbean region could still be pounded by another 10 to 12 storms, including a major hurricane on the scale of Katrina. Fortunately, not all of these will make landfall.

Warm water in the Atlantic Ocean is being blamed for what NOAA calls a "very active" hurricane season. Sea water at 27 degrees C. or higher puts enough moisture in the air to prime hurricane or cyclone formation. Once started, a hurricane needs only warm water and the right wind conditions to build and maintain its strength and intensity.

When Hurricane Katrina first hit southern Florida last week, it was just Category One on the Saffir-Simpson scale, which rates hurricanes from one to five according to wind speeds and destructive potential. Less than 24 hours after it entered the warm waters of the Gulf of Mexico, it quickly gained strength, becoming a Category Five with winds blowing continuously above 250 kilometres an hour.

While Katrina lost strength to a Category Four when it hit the U.S. Gulf Coast, it was extremely large in size, cutting a broad swath of destruction. The city of New Orleans, which missed a direct hit by the storm, has been evacuated because of severe flooding.

"There's no question that the warm waters of the Gulf provided the heat that turned Katrina into a major storm," said Ross Gelbspan, a Pulitzer Prize-winning reporter and author of two books on global warming.

The ultimate cause, however, is global warming, Gelbspan told IPS.

That's a controversial view in a country with many officials who vigorously deny the existence of global warming or climate change. But slowly, the scientific evidence -- and the numerous record-breaking storms, droughts, floods and forest fires -- reveal that the climate is indeed changing.

Climatologist David Easterling of NOAA's National Climatic Data Centre agrees that Katrina gained its destructive power from the warm waters of the Gulf.

"Warmer ocean temperatures are more likely to produce stronger, more intense storms," Easterling said in an interview.
Easterling has found that rainfall intensity in the U.S. has increased significantly, which he attributes to climate change. However, whether the currently warmer mid-Atlantic is the result of global warming or a natural cycle "is pretty hard to say", he said.

On a global scale, there is clear evidence of human-produced warming of the world's oceans, said Tim Barnett, a marine physicist at Scripps Institution of Oceanography.

"The amount of heat that has gone into the oceans is truly remarkable," Barnett said in a statement.

Over the last 40 years, the top 300 metres of the world's oceans have warmed about 0.5°C on average. Although that's not a new finding, Barnett is the first to determine that this is the result of emissions of greenhouse gases from burning fossil fuels.

Using a combination of computer models and real-world "observed" data, scientists measured for the first time the impact of global warming in the oceans.

"This is perhaps the most compelling evidence yet that global warming is happening right now," Barnett said.

And according to another landmark study the warmer ocean is pumping up the destructive power of hurricanes and typhoons. The 0.5°C global increase in ocean temperature has resulted in a doubling of the destructive power of North Atlantic hurricanes, wrote Kerry Emanuel of the Massachusetts Institute of Technology last month in the journal Nature.

This is the first definitive connection between global warming and change in hurricane activity and is bound to be controversial.

In the other region Emanuel studied, storms in the NorthWest Pacific Ocean are 75 percent more powerful than they were 30 years ago.

Emanuel measured the wind speed of storms and their duration to produce an analysis of the destructive potential of each storm. Actual destruction was not measured as the majority of all storms do not make landfall.

He found no evidence for an increase in the number of storms.

Other studies have shown that global warming is creating conditions that are more favourable for hurricanes to develop and be more severe.

Predictions made about climate change 10 years ago are coming true: sea level and temperature rise, increased air temperatures, and now increased storm intensity.

It is well past time for the U.S. to take action on climate change and follow the lead of Britain and Germany with dramatic cuts in emissions of 60 percent, says Gelbspan.

"We don't need to wait for another 10 years of studies before reducing emissions as the (George W.) Bush administration suggests," says Michael Mastrandrea, an environmental science and policy researcher at Stanford University.

"Waiting to start making major reductions in emissions runs the risk of triggering irreversible impacts," Mastrandrea told IPS.

Because there is a long lag in the climate system, the full effects of past greenhouse gas emissions are yet to come, he said. Adding ever higher levels of emissions puts future generations at risk.

"We should hedge our bets and act now," Mastrandrea said

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