

Surge in big storms rooted in science

Causes studied

Researchers struggle to pinpoint factors behind hurricanes

JAMES JANEGA

KNIGHT RIDDER NEWSPAPERS

CHICAGO – Abnormally warm seas in the Gulf of Mexico are feeding Hurricane Rita as it churns behind another monster storm, Hurricane Katrina, that passed over the same water three weeks ago. For atmospheric scientists, the twin storms are leaving deep questions in their wake.

Researchers have been watching this year as hurricanes and tropical storms spin toward the United States, one after another, with a pattern and intensity more typical of Asian typhoons.

Typically, a single Category 5 storm forms in the Atlantic every three years. But there have been four since 2003 and two in the last three weeks – although Rita's power had diminished by last night to Category 3.

Both of those hurricanes exploded as soon as they crossed south Florida and entered the Gulf of Mexico.

"What causes it? I don't know," said NASA oceanographer David Adamec. "It's one of these things that will play out in the scientific research. Is it global warming or is it part of the normal oscillation of the atmosphere? That needs to be studied."

What is undeniable, scientists say, is that the Gulf of Mexico is as warm as it has ever been measured, that upper wind patterns that would neuter tropical storms harmlessly at sea are absent and



Benny Salas rides his bike in Galveston, Tex., as Hurricane Rita approaches the shore yesterday.

RICK WILKING REUTERS

that this year's hurricanes are forming much closer to the United States than remembered.

Complicating the search to explain why is that many scientists believe there are broad cycles of intense hurricane activity every 30 to 40 years. It's possible that 2005 is just the peak of a cycle that began a decade ago. Most agree the last major hurricane cycle ended in the 1970s.

Yet the possible impact of global warming is also being explored, and proponents say it is easy to see why: Hurricanes feed on warm water, and water temperatures – particularly in the Gulf of Mexico – have been seen rising, steadily and by fractions of a degree, for more than 30 years.

Atlantic storm records seem to support the cyclical theory. While the number of tropical

storms varies widely from year to year and even between decades, the number of major hurricanes reached a peak in the 1950s and declined through the 1970s and '80s, only to emerge with brutal storms again in the mid-1990s.

But the best Atlantic hurricane measurements only began in the 1970s with satellite observations, and do not predate the 1940s, when airplanes measured the

storms. Skeptics of the cyclical theory question the validity of storm observations before that.

In the past, even suggesting global warming as a factor was quickly dismissed. But that line of thinking gained some credence this year when two studies were published linking increased duration and intensity of hurricane-strength storms with higher average temperatures in the atmosphere and water at the ocean surface.

"When you look at global hurricane activity, you really do see a trend. It's up everywhere," said climatologist Kerry Emanuel, author of one of the studies.

But to blame a single cause is a simplistic approach to one of the world's most complex and powerful phenomena, Emanuel added.

As delicate at birth as they are fearsome at maturity, hurricanes cannot form unless water temperatures are at least 26.7 degrees Celsius, hot enough to hurl moisture 16 kilometres into the atmosphere. If upper-level winds differ in speed or direction from surface winds, the storm clouds will be sheared apart.

But the shearing winds this year moved closer to Africa, for whatever reason. Storms in turn escaped the winds by forming farther west, close to the Americas. The average water temperature in the Gulf now: 29C.

"These latest years, the last 10 years in the tropical Atlantic, do seem to be unusually warm in the context of the 20th century," said Thomas R. Knutson, a research meteorologist in Princeton, N.J.

To put it another way, said Eric Blake, a meteorologist at the National Hurricane Centre, "everything that could go bad this year has gone bad."

BIG STORM
Hurricane Katrina
and strengthened
hurricanes:

Tropical storm
63

Hurricane force
119 km/h

Km/h

ANDREW

Category 5
1992

HUGO

Category 4
1989

CHARLEY

Category 4
August 2004

RITA

Category 5
September 2005

FLOYD

Category 4
1999

KATRINA

Category 5
September 2005

FRANCES

Category 4
September 2004

ISABEL

Category 4
September 2003

SOURCES: U.S. National Hurricane Centre and the Weather Channel
KNIGHT RIDDER

HURRICANE RITA

"Everything that could go bad this year has gone bad." Eric Blake, meteorologist

U.S. hurricane strikes by decade and category

	1851-1860	1861-1870	1871-1880	1881-1890	1891-1900	1901-1910	1911-1920	1921-1930	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2004	2005	Total	Winds
Category 1	8	8	7	8	8	10	10	5	4	8	8	3	6	9	3	4	1	110	119-153 km/h
Category 2	5	6	6	9	5	4	4	3	7	6	1	5	2	1	6	2	0	72	154-177 km/h
Category 3	5	1	7	4	5	4	4	3	6	9	5	4	4	4	4	2	0	71	178-209 km/h
Category 4	1	0	0	1	3	0	3	2	1	1	3	1	0	1	0	1	2	20	210-249 km/h
Category 5	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	3	249+ km/h
Total	19	15	20	22	21	18	21	13	19	24	17	14	12	15	14	9	3*	276	SOURCE: U.S. National Hurricane Center

* 2005 figures do not include Hurricane Rita, which was a category 3 storm last night.

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BIG STORMS

Hurricane Katrina and strength with hurricanes:

Tropical storm
63-118 km/h

Hurricane force
119 km/h or more

Km 1

ANDREW

Category 5
1992

HUGO

Category 4
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CHARLEY

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August 2004

RITA

Category 3
September 2005

FLOYD

Category 4
1999

KATRINA

Category 5

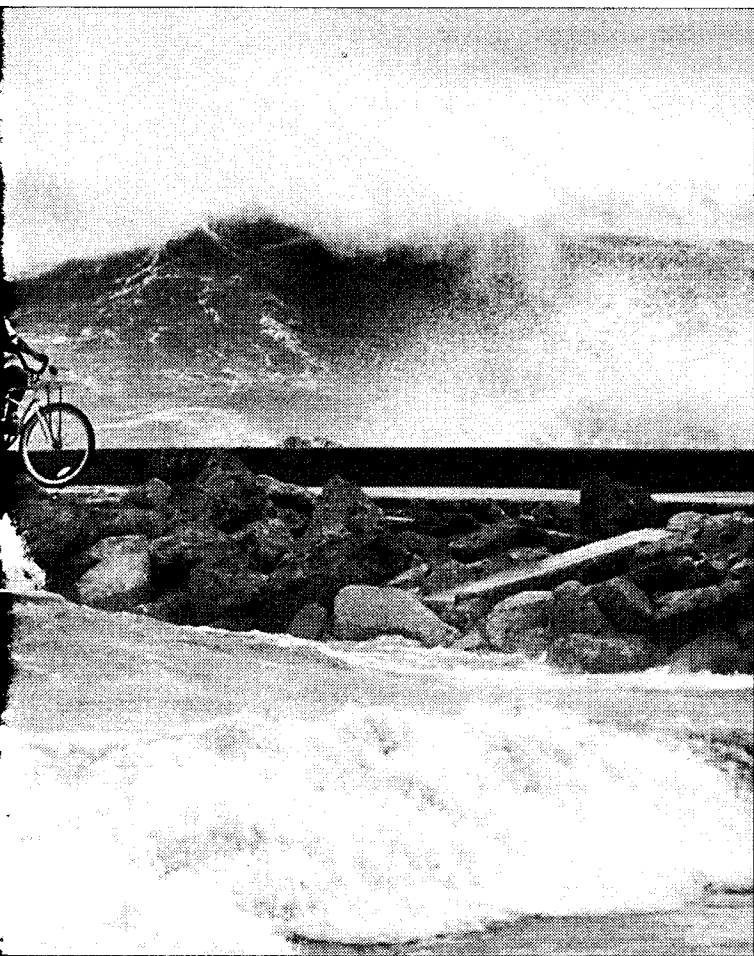
RITA

"Everything that could go bad this year has gone bad." Eric Blake, meteorologist

1911-1920	1921-1930	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2004	2005	Total	Winds	Storm surge
10	5	4	8	8	3	6	9	3	4	1	110	119-153 km/h	1.2-1.5 metres
4	3	7	6	1	5	2	1	6	2	0	72	154-177 km/h	1.8-2.4 metres
4	3	6	9	5	4	4	4	4	2	0	71	178-209 km/h	2.7-3.6 metres
3	2	1	1	3	1	0	1	0	1	2	20	210-249 km/h	4-5.5 metres
0	0	1	0	0	1	0	0	1	0	0	3	249+	5.5+ metres
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THE GAZETTE

storms rooted in science



RICK WILKING REUTERS

Galveston, Tex., as Hurricane Rita approaches the shore yesterday.

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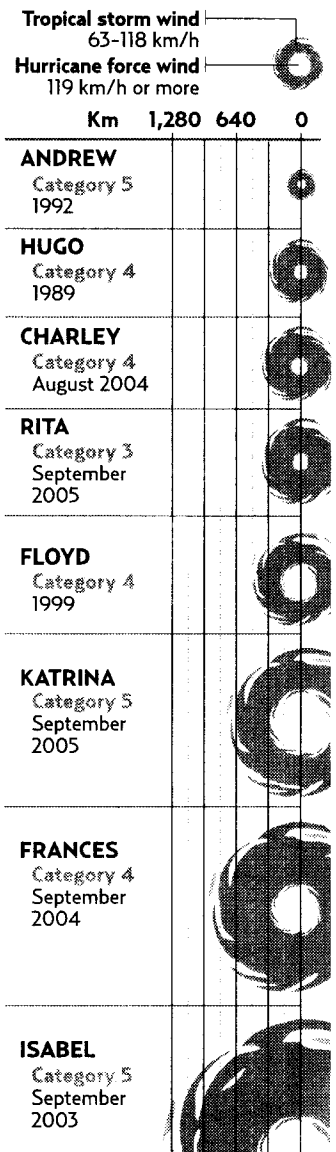
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BIG STORMS

Hurricane Katrina compared in size and strength with other major hurricanes:



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