The Hurricanes are Coming

Researchers now know more of what causes a hurricane to form, and when they are most likely to smash powerfully into Gulf and Atlantic coastal areas.

Data indicates a number of powerful ones are likely to hit Central and North America, and this year (1995) may be the beginning of them.

Hurricanes are immense circular storms, with violent winds of more than 75 miles per hour. They revolve around a calm center (the "eye") and are accompanied by heavy rain, high tides, and flooding in coastal regions.

In the Atlantic and Gulf, they are called hurricanes; in the Pacific they are known as typhoons. In this study, we will primarily give our attention to hurricanes.

HOW THEY FORM

Hurricanes are caused by temperature and pressure differences between warm tropical waters and high cumulus clouds overhead. A strong enough variation in temperature and pressure causes moisture from the ocean to be sucked up into the sky. Gradually, an immense storm system develops.

Because the earth rotates fastest at the equator, hurricanes can only form in the ocean at or near the equator. This is because a powerful turning motion must develop.

As the storm intensifies, the faster and faster spins the column of clouds with their pouring rain. Rain pours down as hot, moist air is sucked up.

WHAT CAUSES POWERFUL HURRICANES TO DEVELOP

Hurricanes develop from what is known as "seeds"—small storms in the eastern Atlantic near the bulge of Africa. But often these storms petered out. Why did some become immense and others die out? No one was certain until William Gray (see box on page 2), working with immense masses of statistics from earlier years, figured it out.

THE SAHEL FACTOR

If you look at the African continent, you will see a large bulge of land in the northwest. The bottom part, the bulge, is a rain forest area, and normally receives a lot of rain. The top of the bulge is part of the vast Sahara Desert, and only receives a few inches of rain. It is barren desert.

Near the lower part of the bulge is an area, known as the Sahel. Sometimes this area receives a fair amount of rain; at other times, it receives almost none.

During the 1980s, the Sahel suffered a strong drought. Gray has discovered that, when the Sahel is droughty, powerful hurricanes cannot build in the Atlantic Ocean.

When there is drought in the Sahel, rapidly moving squalls are formed that quickly dissipate at sea. In addition, high altitude winds blow seaward and shear off the tops of pre-hurricane formations before they can become a true hurricane system.

But when there is wet weather in the Sahel during the months before the hurricane season begins, slow-moving, well-organized "seedlings" (pre-hurricanes) blow slowly westward. Once over the Atlantic, these slowly gain full height and

MORE ABOUT HURRICANES

The center of a hurricane is a calm area, called the "eye." It generally measures about 20 miles across. There is little wind within it, and almost no clouds.

This eye travels about 10 to 30 miles per hour. The winds around it whirl at very high speeds—often over 100 miles an hour. Sometimes they reach nearly 200 miles per hour. These high winds blow over an area many thousands of square miles. They blow at any one place for several hours.

The center usually starts moving slowly westward and, then, as the hurricane grows in size and strength, it picks up speed and turns northward.

Later, when the storm has lessened, as it enters the temperate latitudes, it generally turns eastward. The area within a hurricane has very low air pressure.

Oddly enough, the general direction the air outside the hurricane is moving determines the direction the eye moves.

The intense fury of the hurricane begins at the very edge of the eye. Huge cloud masses, several miles high, pour down heavy rain.

Terrific winds blow, building up large waves on the ocean. The high waves and strong winds can sink ships. They can also cause damage along coastal areas. The winds drive the water before them. This is called a "storm tide," and it rises along the shore line as the hurricane approaches.

If the storm tide occurs at the same time as a normal high tide, the damage is only increased. This is what happened during the 1900 Galveston, Texas, hurricane. The water rose 4 feet in a few seconds and drowned 6,000 people.

Atlantic hurricanes occur June to November.

develop into immense tropical storms, if the temperature and pressure differences between the sea and the sky overhead are just right. Then these seedlings—vast whirls of thunderhead clouds and circulating winds—form.

A "tropical storm" is a hurricane below 75 miles an hour; a "hurricane" is one over that wind speed. Slowly, these tropical storms continue to develop. Generally, they do not reach hurricane force until they near the Caribbean or Gulf and Atlantic coastal areas.

THE El NINO FACTOR

But, as the tropical storm or hurricane nears the Americas, it may be torn to pieces by powerful upper atmospheric winds—unless El Nino is not at work in the Pacific. This was a second discovery of Gray.

Every so often, warm ocean currents move up the eastern Pacific, off the coast of Chili. These are called "El Nino" (*the child*). When these currents are strong, they cause cold, high-altitude winds to blow toward the east.

When they reach the Gulf and Atlantic, they shear off the tops of any approaching hurricanes—and shear off their tops before they can strike land and cause damage.

But if El Nino is not present in the Pacific currents off Chili, then those waters are colder. Then the high-altitude winds die down, and tropical storms can develop into powerful hurricanes, which strike the Caribbean Islands, Mexico, or the Gulf and Atlantic coasts of the United States.

PUTTING IT TOGETHER

Wet-weather Sahels produce powerful tropical storms which blow northwest toward Central and North America.

Since 1949, the 20 wettest Sahel years have produced 35 destructive hurricanes, which have reached one or more of the above named areas. Since that year, the 20 driest Sahel years have produced 7 hurricanes which reached land.

Of the two, Sahel rains are more important than El Nino winds in producing destructive hurricanes which achieve landfall.

But El Nino winds are still significant for, when the currents are very warm, the winds it produces helps blow the pre-hurricanes apart.

Wet-weather Sahels tend to follow a 20-year pattern. From 1950 to 1967, the Sahel was wet, and produced many resulting hurricanes. Since 1968, the Sahel has been dry. But, because of a number of statistical factors, it is believed that it is time for rain to begin falling there.

For the past three years El Nino has been strong, and Sahel rainfall has been light. So there have been few hurricanes (even though Andrew struck during that time). Experts believe El Nino is about to change—and fade away for a time.

When the hurricanes return, the damage will be much greater than in the 1950s and 1960s. This is because of the vast coastal development which has occurred since then. One half of the people in the U.S. live in East Coast areas prone to hurricane flooding. Insurance policies on coastal properties total almost $2 trillion.

The cost of Hurricane Andrew alone was $25 billion. Yet, if it had come ashore 20 miles farther north, and had remained on the track it originally appeared to be following, the damage would have been $100 billion. That estimate is based on 1 million homes destroyed!

Gray predicts three major hurricanes for 1995, five minor hurricanes, and twelve smaller tropical storms. Allison has already hit the Florida panhandle, and, as I write, Felix is hitting Bermuda, on its way toward the U.S. mainland. Next year, there may be more hurricanes.

I send out this alert, so that those of our readers living near the Atlantic or Gulf coasts may take warning.

We are told that, as we near the end of time, storms will become worse. It is well to seek a quiet home in a mountainous area, while there is yet time to do so. We are to work the populated areas, but live in secluded country homes.

The number of people killed by hurricanes in this century is 10 times greater than the number killed by tornadoes.

WHO IS WILLIAM GRAY?

In the early 1950s, after graduating from college, William Gray entered a U.S. Air Force weather training program.

Later, after completing a doctorate in meteorology, he worked at the National Hurricane Center in Miami for over two decades.

In the 1980s, he moved to Colorado State University, and began amassing an immense collection of weather statistics—and putting them all together into a coherent pattern. Raw data continually flows into his office from satellite dishes on the roof. Studying weather patterns and ocean currents throughout the world, he has derived mathematical formuas for analyzing both hurricanes and typhoons.

He found that the most important single factor is the wetness of Sahel weather, and that it tends to vary in 20-year cycles. We are just now completing a 20-year dry cycle, when relatively few powerful hurricanes form.

In 1991, Gray predicted that only one intense hurricane would form: It did, and was named Hurricane Andrew.

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