Atlantic Hurricane Season Begins As Myriad of Factors Expected To Cause Above-Average Storm Activity

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EXECUTIVE SUMMARY

The 2022 Atlantic storm season officially began on June 1, and last week the first named storm, Tropical Storm Alex, formed. Officials have predicted what would be the seventh straight above-average storm season with between 14-21 named storms forecast. This includes between six to ten storms that could become hurricanes and three to six storms that could become major hurricanes. The recent prediction comes as the 2021 season was the third costliest on record, resulting in an estimated US $80.7 billion in damages and blamed for at least 194 deaths across parts of Central America, the Caribbean, and the United States. Meteorologists have noted that multiple factors are likely to contribute to the expected above-average activity, including the ongoing La Nina weather pattern, warmer-than-normal sea surface temperatures in the Atlantic Ocean and Caribbean Sea, weaker tropical Atlantic trade winds, and an enhanced west African monsoon. Residents and businesses in countries and communities that may be impacted by storms should prepare for potential disruptions, including evacuations, flooding, power outages, road closures, supply-chain interruptions, production stoppages, air travel delays, and other potential disruptions.

KEY JUDGEMENTS

- Warming air and sea temperatures linked to climate change, coupled with the continued presence of the La Nina weather pattern, will likely produce an above-average number of named storms during the 2022 Atlantic hurricane season, continuing a trend of escalated activity.
- The Loop Current, a naturally occurring phenomenon in the Gulf of Mexico, will exacerbate what officials warn is an increasing risk of rapid intensification by storms shortly before making landfall in the Gulf of Mexico.
    - Rapid intensification of storms, especially close to landfall, can create potentially life-threatening situations thereby reducing the time available for residents to prepare and/or evacuate.

- While modern forecast models typically afford multiple days to prepare for storms, smaller countries and territories, particularly in the Caribbean, are more vulnerable to casualties, material damage, power outages, and other impacts due to underdeveloped infrastructure and a lack of early warning systems.
- Storms during the 2022 Atlantic hurricane season will cause wide-ranging supply chain and infrastructure disruptions, particularly in the United States, due to the potential shutdowns of oil and gas facilities, ports, and railroad networks.
    - Oil and gas production platforms in the Gulf of Mexico and refineries along the Gulf Coast are commonly evacuated and shut down as storms pass over, which can lead to price increases and potential shortages in the event of extended shutdowns.
    - Businesses that rely on supply chain networks in hurricane-prone areas, especially the Gulf Coast, are advised to create contingency plans in the event of extended shutdowns caused by storms this summer and fall.
- Businesses and residents in countries and communities at risk for storms are advised to formulate and review emergency response plans, including contingencies for flooding, evacuations, power outages, and productions stoppages, which could interrupt overland travel and business operations.

2021 STORM SEASON

The 2021 Atlantic storm season was the third-most active season on record, producing 21 named storms and marking the second straight year that the designated list of storm names was exhausted. The season also marked the sixth consecutive year with above-average tropical cyclone activity. Of the 21 named storms, seven developed into hurricanes and four strengthened into a major hurricane (at least Category 3 strength). The first storm was reported on May 22, while the final storm of the season dissipated on November 7. September marked the most active month with 11 storms reported throughout. The beginning of the season was especially active, with one storm forming in May before the official beginning of the storm season and three named storms forming in June, tying the record for that month. The 21 storms were blamed for at least 194 deaths and damages of at least US $80.7 billion, making the 2021 season the third costliest on record.

Hurricane Ida was the deadliest and costliest storm of the season, forming at the end of August in the Caribbean Sea. The storm strengthened into a hurricane before passing over western Cuba. Upon entering the Gulf of Mexico, the storm rapidly strengthened into a Category 4 hurricane and made landfall in Port Fourchon, LA. The hurricane caused catastrophic damage across Louisiana, including widespread infrastructure disruptions. The storm weakened into a post-tropical cyclone and moved up the East Coast of the United States, bringing extreme rainfall events to multiple communities, which caused destructive flash flooding. The storm was blamed for at least 107 deaths, including 87 in the United States. The majority of the U.S. deaths were caused by the remnants of Ida and occurred in the Mid-Atlantic and Northeast, while at least 30 deaths were reported in Louisiana. Ida is estimated to have caused at least US $75.25 billion in damages, including at least US $18 billion in Louisiana, between US $16-24 billion in the Northeast, and at least US $584 million in agricultural damages across the United States.

Category 3 and Above Hurricanes in Atlantic Basin During Peak Season 2016-2021						
Year	**Date**	**Name**	**Category**	**States Affected**	**Other Countries and Territories Affected**	**Estimated Damages (US)**
2016	September 28 – October 9	Matthew	5	FL, GA, NC, SC, VA	Bahamas, Cuba, Dominican Republic, Jamaica, Windward Islands	$16.47 Billion
2016	October 4 – 18	Nicole	4	-	Bermuda	$15 Million
2016	November 20 – 25	Otto	3	-	Colombia, Costa Rica, Panama, Nicaragua	$192.2 Million
2017	August 17 – September 1	Harvey	4	LA, TX	Belize, Cayman Islands, Guyana, Honduras, Nicaragua, Suriname, Windward Islands	$125 Billion
2017	August 30 – September 12	Irma	5	FL, GA, NC, SC, TN	Cuba, Haiti, Leeward Islands, Puerto Rico, Turks and Caicos Islands, U.S. Virgin Islands	$77.16 Billion
2017	September 16 – 30	Maria	5	NC	Bahamas, Dominican Republic, Haiti, Lesser Antilles, Puerto Rico, Turks and Caicos Islands	$91.61 Billion
2017	October 9 – 15	Ophelia	3	-	Azores, Estonia, Finland, France, Ireland, Norway, Portugal,	$87.7 Million

Category 3 and Above Hurricanes in Atlantic Basin During Peak Season 2016-2021						
Year	**Date**	**Name**	**Category**	**States Affected**	**Other Countries and Territories Affected**	**Estimated Damages (US)**
					Russia, Spain, Sweden, United Kingdom	
2018	August 31 – September 17	Florence	4	NC, SC, VA	Bermuda	$24.2 Billion
2018	October 7 – 11	Michael	5	FL, GA, NC, VA, MD	Cuba, Honduras, Nicaragua, El Salvador	$25.5 Billion
2019	August 24 – September 7	Dorian	5	FL, GA, SC	Bahamas, Canada, Lesser Antilles, Puerto Rico	$5.07 Billion
2019	September 13 – 19	Humberto	3	-	Bermuda	$25 Million
2019	September 23 – October 2	Lorenzo	5	-	Azores, Ireland, Lesser Antilles, United Kingdom	$362 Million
2020	August 20-29	Laura	4	FL, LA, TX, MS, AR, OK, TN	Lesser Antilles, Dominican Republic, Haiti, Cuba, Jamaica, Cayman Islands, Puerto Rico	$19.1 Billion
2020	September 12 –23	Teddy	4	SC, NC, NJ, ME	Puerto Rico, Bermuda, Canada	$35 Million
2020	October 4-10	Delta	4	TX, LA, MS, AL, GA, SC, NC	Mexico	$3.09 Billion
2020	October 19-26	Epsilon	3	FL	Bermuda	N/A
2020	October 24-29	Zeta	3	LA, MS, AL, GA, NC, VA, MD, NY, MA	Cayman Islands, Jamaica, Mexico, United Kingdom	$4.4 Billion

Category 3 and Above Hurricanes in Atlantic Basin During Peak Season 2016-2021						
Year	**Date**	**Name**	**Category**	**States Affected**	**Other Countries and Territories Affected**	**Estimated Damages (US)**
2020	October 31-November 13	Eta	4	FL, SC, NC, VA	Colombia, Nicaragua, Honduras, Guatemala, El Salvador, Coast Rica, Panama, Belize, Mexico, Cayman Islands, Cuba	$8.3 Billion
2020	November 13-18	Iota	4	-	Venezuela, Colombia, Nicaragua, Honduras, Panama, Mexico	$1.4 Billion
2021	August 13-21	Grace	3	-	Dominican Republic, Haiti, Jamaica, Cayman Islands, Mexico	$513 Million
2021	August 26-September 1	Ida	4	LA, MS, AL, TN, FL, VA, MD, DE, PA, NJ, NY, CT, RI, MA	Venezuela, Cuba, Canada	$75.25 Billion
2021	August 31-September 11	Larry	3	FL, SC, VA	Bermuda, US Virgin Islands, Puerto Rico, Canada, Greenland	$80 Million
2021	September 22- October 5	Sam	4	-	Puerto Rico, Lesser Antilles, Bermuda	N/A

2022 OUTLOOK

On May 24, the U.S. National Oceanic and Atmospheric Administration (NOAA) issued its 2022 storm predictions. NOAA forecasts that there is a 65 percent chance of an above-average storm season, a 25 percent chance of a normal season, and a ten percent chance of a below-normal season. NOAA has forecasted a range of 14 to 21 named storms, including between six to ten that could become hurricanes, and three to six storms that could become major hurricanes. NOAA attributes the expected above-average activity to several factors, including the ongoing La Nina weather pattern, warmer-than-normal surface temperatures in the Atlantic Ocean and Caribbean Sea, weaker tropical Atlantic trade winds, and an enhanced west African monsoon.

The storm season officially began last week on June 1, and a disturbance immediately began impacting parts of the U.S. and Cuba. What eventually became Tropical Storm Alex formed from the remnants of an eastern Pacific storm, named Hurricane Agatha, which caused widespread disruptions and numerous casualties in southern Mexico. The remnants helped to form a tropical disturbance in the Caribbean Sea, which caused flooding in parts of southern Florida and western Cuba. Alex did not form until it crossed over Florida into the Atlantic Ocean; however, the system still brought over a foot of rain for parts of southern Florida, including the Miami area, which led to significant flooding across the city. The storm system was also blamed for at least two deaths in Cuba, where heavy rains were also reported, in addition to infrastructure disruptions from the storm.

ASSESSMENT

The 2021 storm season continued what has become the standard over the past few years, with an above-average number of storms, including major hurricanes. Moreover, Hurricane Ida, the deadliest and most destructive storm from last year, highlighted the wide-ranging impacts that can come from a major storm. Ida caused extensive destruction both as a Category 4 hurricane as it made landfall in Louisiana and as a post-tropical cyclone as it traveled inland and up the U.S. East Coast. Given the current predictions, it appears that the 2022 storm season will have similar results, with an active Atlantic basin producing multiple potentially catastrophic storms in the coming months, which could affect parts of the United States, Atlantic Canada, Central America, and the Caribbean.

While the forecasts for this year do not guarantee a specific number of storms or widespread damage, forecasters have pointed to a number of factors that suggest the 2022 storm season could match previous records. These include the ongoing La Nina weather pattern, climate change and increasing water and air temperatures, among others. The warmer air and sea temperatures, combined with the lessened wind shear and increased motion created by La Nina, not only create conditions that are conducive for storm formation, but also create ideal conditions for the formation of major hurricanes and storms that can rapidly intensify. In addition, meteorologists have noted that a natural phenomenon in the Gulf of Mexico, known as the Loop Current, may portend a particularly strong storm season. The Loop Current causes warm water to run much deeper than normal and this year's current is located farther north and appears to be stronger than normal, with the temperature of the current 1.8 degrees Fahrenheit (one degree Celsius) warmer than average.

Typically, hurricanes cause cold, deep water to come towards the surface, which can limit the strength of storms; however, the Loop Current may allow for more storms to continue strengthening as they pass through the Gulf this year.

The continuing warming of air and sea temperatures, as well as the stronger-than-normal Loop Current this year, may also portend an increased risk of storms that rapidly intensify. According to the NHC, rapid intensification occurs when a storm has an increase in wind speed of at least 35 miles per hour in a 24-hour period. This phenomenon has become more common in recent years, in part due to rising water temperatures. The rapid intensification of storms can be particularly dangerous for coastal communities as the potential impacts from a storm can change in a short time, making it more difficult for residents to safely evacuate or prepare in enough time.

Hurricanes and tropical storms can bring a myriad of impacts as they travel across hundreds or potentially thousands of miles. Even so, there are typically multiple days of notice to prepare for potential impacts unlike some other natural disasters, which can provide little to no preparation time. Because of the typical preparation time, evacuations of potentially affected areas are common in anticipation of storms, especially in the United States. However, smaller countries, especially island nations in the Caribbean, have limited means of evacuation, which can leave populations more susceptible to storm impacts and can increase casualty numbers. Additionally, there are many communities throughout the Caribbean region where infrastructure remains largely underdeveloped. This can significantly exacerbate the impacts of strong storms. Unpaved roads are prone to washouts during strong downpours, and homes that are not built to modern safety codes are especially vulnerable to damage or collapse. In some areas, storm drains are frequently clogged by excessive litter, which can render them ineffective and leave low-lying areas vulnerable to flash flooding.

While the U.S. generally has more robust and standardized infrastructure, it is not immune to widespread destruction from storms, especially major hurricanes. Indeed, several major storms in the last few years have caused power outages in Louisiana that lasted several months for some customers. U.S. cities also are not immune to major flooding effects, especially in the event of extreme rainfall caused by storms, such as what occurred in Houston, TX, with Hurricane Harvey in 2017 or last year with the remnants of Hurricane Ida. Moreover, for U.S. residents and businesses, storms that travel through the Gulf of Mexico can cause significant energy infrastructure disruptions due to the numerous oil and gas production platforms and rigs located throughout the Gulf. When storms pass through, they often lead to the platforms being evacuated and facilities shutdown as a precaution. Extended shutdowns can lead to fuel price increases and potential shortages, especially if nearby refineries along the Gulf Coast are also shut down. Other aspects of U.S. supply chains can also be impacted by storms, including ports and railroads. Storms often cause the temporary closure of ports in the path of storms, which in turn can cause the temporary shutdown of the transportation of goods into the rest of the country. This problem is likely to be exacerbated this year as port traffic at Gulf Coast and East Coast ports has significantly increased as retailers look for alternatives to relying on West Coast ports, which experienced massive backlogs the last few years due to COVID-19. Similarly, railroads may also be temporarily disrupted as storms travel inland. New Orleans, LA, represents a major connection hub for east and west coast rail operations and shutdowns there could cause significant disruptions to rail networks across the United States.

Due to the numerous potential impacts from hurricanes and tropical storms, individuals and businesses in countries and communities that may be threatened by storms should create and review emergency plans and evacuation routes. Businesses are also advised to include contingencies in preparation for power outages and supply chain disruptions, including fuel shortages and transportation and shipping disruptions, which could occur with little notice and last extended periods of time. The U.S. Department of Homeland Security (DHS) has created guidelines to help individuals and businesses prepare for potential storm impacts, which can be viewed at the following link: https://www.ready.gov/hurricanes. The public is reminded to heed all instruction and evacuation orders from local authorities. The RIMC has a dedicated special event entitled 2022 Atlantic Storms where all related events to Atlantic storms can be tracked and relevant information such as maps of evacuations or power outages will be included.

ABOUT THE AUTHOR

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