Impact Of Hurricanes In Florida Essay, Research Paper

IMPACT OF HURRICANES IN FLORIDA

INTRODUCTION

According to the National Hurricane Center, a hurricane releases heat energy at a rate of 50 trillion to 200 trillion watts, which is equivalent to the energy from exploding 10 megaton bombs every 20 minutes. With such strength, it is no wonder why these natural disasters have such large destructive impacts on the environment. Furthermore, hurricanes are of extreme importance to Florida, since they have historically plagued the state, especially in 1992 with Hurricane Andrew. Since it is certain that hurricanes will hit Florida and equally certain that biological populations (including people) will exist in Florida, there is a need for researching methods to coexist with these monstrous storms.

IMPACTS OF HURRICANES

First, to be able to create solutions to hurricane damage, experts must understand the physical manner in which hurricanes actually cause damage. Roger Pielke, in his hurricane book, The Hurricane, identifies four impacts of a hurricane: storm surge, extreme winds, tornadoes, and rainfall. These impacts are not completely separate from each other; they interact, but are different in scope.

Storm surge refers to the rapid rise of sea level as a storm approaches a coastline. This is the biggest impact of a hurricane and accounts for 90% of hurricane deaths (Pielke 1990). Storm surges are caused by three factors. First, the overlying atmosphere pressure drops. Second, strong onshore winds cause a piling up of water at the coast. Third, the decreasing sea depths as the ocean approaches the coast causes the surge to get steeper. A storm surge of 15 feet corresponds to a level 5 hurricane, and a surge greater than 5 feet can cause major damage and loss of life. Since surges diminish as they move inland, surges are mostly destructive to beaches.

Extreme winds, which carry a lot of kinetic energy, can cause significant structural damage and even endanger life with dangerous debris. The damage of winds is proportional to the kinetic flow, which is exponential. For example, a wind of 50 ms-1 is four times greater than winds of 25 ms-1. In addition, winds are not restricted to the coasts; extreme winds appear and are destructive far inland.

Tornadoes are connected with extreme winds. Although hurricane induced tornadoes are not as strong as the ?normal? ones that appear in the Midwest, they still cause a lot of damage and are dangerous to life. Tornadoes are mysterious, but there are theories on their causes. Tornadoes form as a response to large vertical shears of horizontal wind that develop as lower level wind is slowed by ground friction. The large velocity shears tilt due to spatially varying vertical motion, which causes circulation to complete the tornado. Tornadoes can form far inland.

Rainfall is the mildest impact, although it still causes major damage and erosion. Even weak tropical disturbances can cause extreme rainfall. This extreme rainfall can cause flash floods or cause body of waters to flood. Rainfall becomes excessive at and after the hurricane hits land.

FLORIDA PROBLEMS WITH HURRICANES

According to the National Oceanic and Atmospheric Administration (NOAA), Florida had the most hurricane strikes from 1900 to 1996 of any other state in the United States with 57 hurricanes. Texas was a far second with 36. With such an intense hurricane history, it is no wonder why hurricanes are a major environmental problem facing Florida. For examples, a 1928 hurricane hit Lake Okeechobe and killed 1800 people (Stormfax Weather Almanac 1997), and 1994 Hurricane Gordon caused significant beach erosion along Florida?s east coast and $275 million in agricultural damage by flooding Dade and Collier counties (NHC Hurricane Andrew 1994).

The best example of the powerful destruction of hurricanes to Florida is hurricane Andrew. According to the National Hurricane Center?s report on hurricane Andrew, total damage was estimated at $25 billion! Fortunately, good preparation prevented major loss of life as 26 people died directly from the hurricane. Over $2 billion dollars was needed to cope with environmental damage from the storm. Also, Ocean Oil reported that there were seven incidents of pollution from the hurricane destroying oil structures in the Gulf of Mexico. Perhaps worst of all, the $15 billion of damage to private property left many people homeless, with most of their possessions destroyed. This hurricane caused major economical, sociological, and environmental problems in Florida.

SOLUTION BY FORCE

The problem of hurricanes must be dealt with by finding a solution. One approach to eliminating the impact of hurricanes is to try eliminating hurricanes themselves with brute force. Although this might seem fantastic and impossible, it is actually a legitimate scenario that has been studied since the early 1960s. The possibilities range from importing icebergs to using nuclear bombs. The most famous attempt to alter hurricanes was the STORMFURY experiments.

STORMFURY, as explained by Robert Simpson in The Hurricane and Its Impact, started in 1961 in the attempt to alter hurricane Esther. The project?s goal was to reduce maximum wind speed (which exponentially reduces wind force) by causing the eye wall to expand. This was accomplished by using generators to ?seed? clouds in the eye wall with silver-iodide-crystal smoke. Silver iodide forces supercooled water, water that is below 32 degrees F but is still liquid, to freeze. This release of latent heat would upset the balance of forces in the vortex, causing the eye wall to expand farther away from the center. The conservation principle for absolute angular momentum proves that the further maximum winds are from the center, the slower their speeds will be.

Cloud-seeding and STORMFURY had their most success with hurricane Debbie in 1969 when winds fell 30% on the first day of seeding. However, poor observation equipment of the day can not distinguish the difference from wind reduction caused by seeding and wind reduction caused by natural formation changes in the hurricane. Also, there is now evidence that altering a hurricanes wind power would also alter its course (NEWSWEEK ONLINE 1998). An altered hurricane that redirects and hits Cuba would cause major foreign policy problems. Furthermore, hurricanes help balance the Earth?s heat budget. Trying to change hurricanes to save Florida could have undesired global effects. Such uncertainties have convinced scientists to be more cautious about hurricane experimentation. However, since technology is growing exponentially, perhaps this approach can be reevaluated in the future.

SOLUTIONS BY COEXISTENCE

Since, for the time being, hurricanes are here to stay, Florida must develop better methods to coexist with hurricanes. There is an aesthetic quality to the coastal beauty of Florida (that is represented in economic quantities) that will keep populations growing, even though it is a great hurricane risk. Public policies to help the coexistence are further complicated by legal and political reasons. Many policies have failed because of a balance of power between individual and governmental rights. For example, ordinances to require more hurricane proof buildings fail because of costs involved and the politics of business persuading legislature. Although hurricane Andrew expanded public awareness to the dangers of hurricanes (including insurance companies? awareness to not cover Florida residents), there are still problems with public cooperation. An example of this is public responses to evacuation orders.

Earl Baker, in his essay, ?Coping With Hurricane Evacuation Difficulties,? explains how the public can be confused on whether there are official ?orders? to evacuate or just ?advice? to evacuate. Even in cases where there are clear official orders, 6 to 50% of the public might not respond. There are several ways to combat this problem. First, the government can expand funds on hurricane prevention education. Second, infrastructures can be improved to allow easier evacuations. Third, better sensing equipment and tracking methods can be developed to better predict hurricane paths and danger.

SUMMARY

Improving evacuation procedures and increasing hurricane protection public policy are the only available methods Florida residents can use to better coexist with the impacts of hurricanes.

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