

Max Mayfield and Lixion Avila
NOAA/NWS /NCEP/National Hurricane Center, Miami, Florida

1. INTRODUCTION

The 2001 hurricane season featured considerably above-normal activity. Fifteen named storms developed, of which 9 became hurricanes. Four of these became major hurricanes - Category 3 or higher on the Saffir-Simpson Hurricane Scale (SSHS; Simpson 1974). These numbers well exceeded the long-term averages of 9-10 tropical storms, 6 hurricanes, and 2-3 major hurricanes. There were also 2 tropical depressions that did not become tropical storms. For the second consecutive year there were no hurricane landfalls in the United States, although Tropical Storms Barry and Gabrielle were just under hurricane strength at landfall. Fig. 1 shows the tracks of the 2001 cyclones. There were many forecast difficulties and successes during the season. A few will be discussed in this paper.

For all tropical cyclones identified in the Atlantic basin, the National Hurricane Center (NHC) issues a forecast of the center position and the maximum 1-min sustained wind. These forecasts are issued for the periods of 12, 24, 36, 48 and 72 hours. The NHC also began to experiment with 4 and 5 day forecasts this season. Fig. 2 shows the 2001 and the 1991-2000 track forecast errors. In 2001, the errors were significantly less than the average over the past 10 years. In fact, 2001 had the lowest track errors on record for the 36, 48 and 72-h periods. This is mostly attributed to improvements in numerical weather prediction. The average intensity errors remained unchanged, however.

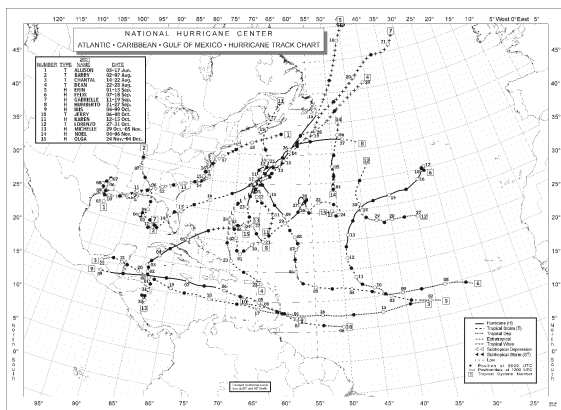


Fig.1. Tracks of tropical storms, hurricanes and subtropical storms for 2001.

Corresponding author address: Max Mayfield,
NOAA/NWS/TPC/, 11691 SW 17th Street, Miami, FL 33165;
e-mail: Max.Mayfield@noaa.gov

NHC 2001 official forecast track errors

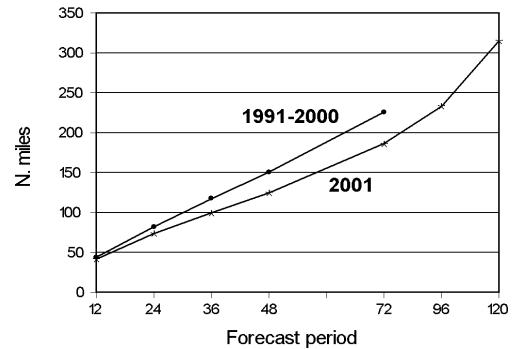


Fig.2. Average official track error in nautical miles for 2001 for 12 to 120 h and the average track errors for 1991-00.

2. DISCUSSION

Tropical Storm Allison became the first forecast challenge of the season because it formed quickly near the Texas coast and there was little warning time for the coast. A day earlier, neither surface observations nor satellite images were indicative of tropical storm formation. In fact, Allison never had the structure of a typical tropical cyclone throughout its lifetime. By the time the system became a tropical storm, it was already affecting the Texas coast. Once inland over Texas, the cyclone moved very slowly, dumping torrential rains. Houston reported over 30 inches of rain.

Hurricane Gabrielle's origin was non-tropical. This often makes the forecast difficult since little is known about that type of genesis. It formed over the southeastern Gulf of Mexico, near the westernmost Florida Keys. After making small loop, the tropical cyclone accelerated northeastward and made landfall on Florida's west coast near Venice. Initially, when Gabrielle was looping, the consensus of track guidance was not indicative that the storm was going to make landfall on the west coast of Florida. In fact most models, including the GDFL, maintained the cyclone with little motion in the Gulf of Mexico for 72 hours as indicated in Fig. 3. Another significant aspect of Gabrielle was its intensification trend just prior to landfall. A reconnaissance plane around 0000 UTC 14 September measured a minimum pressure of 995 mb and maximum winds of 40 to 45 knots. Because Gabrielle was within a sheared environment and no significant change in strength was anticipated, a hurricane warning was not issued for the area. However, additional data from the aircraft at 0733 UTC indicated that the minimum pressure had dropped to 980 mb and flight-level winds

