

# Tropical Weather

## THE HURRICANE DANGER ZONE - A Way of Portraying Hurricanes

by

Jill F. Hasling (1)  
John C. Freeman, Ph.D. (2)

The Institute For Storm Research  
University of St. Thomas  
4104 Mt. Vernon  
Houston, Texas 77006

### FROM THE EDITORS:

To our readers: we publish this article to present an alternative view of disseminating critically important information about hurricanes and storm surge to the public. The National Hurricane Center (NHC) has spent many years developing procedures for handling such vital information. The editorial staff feels that the paper has legitimate merit, but there are some specific problems. Comments of the editorial staff are summarized at the conclusion of the article. If you have opinions about this paper, please feel free to write us a letter.

### Editorial Comments on "The Hurricane Danger Zone - A Way of Portraying Hurricanes"

1. While not always related on a one to one basis, the satellite pictures in animation give a good depiction of the size of a hurricane. However, there is a great risk of implying that a small hurricane does not present as great a danger as a large hurricane, e.g., Camille. The forecast error is taken into account while the portrayal indicates only the zone accompanying the hurricane.

2. The information depicted in the paper is all contained in the advisories. In addition, National Weather Service offices issuing Local Statements to supplement the advisories give detailed information when gales, hurricane force winds, tides, waves, etc. are expected to occur, taking into account forecast error. All coastal locations are covered.

3. The introduction of new terminology such as the Hurricane Danger Zone, Surge Line, etc. would cause difficulty with the public. As cited in the paper, there is difficulty with Hurricane Warnings and Hurricane Watch. These areas already depict the true danger zone.

4. The area of gale force winds are primarily of concern to mariners, and such information along with seas is contained in marine advisories. The main impact of a hurricane is where the hurricane winds and attendant conditions occur. Regardless, the gale information is available in the advisories and Local Statements.

5. The basic problem with the concept is the difficulty of transmitting this information to the media and having it presented the same way by all users. The second problem, as alluded to by the authors, is that the public has had difficulty in understanding the current terminology. Thus they will have equal difficulty understanding more difficult terminology, and all previous educational efforts will be compromised.

6. However, the basic concept presented in the paper has some merit. The National Hurricane Center is currently working on a similar idea: one of our qualified meteorologists actually preparing gale and hurricane areas for use on TV during hurricanes, but only available for landfalling hurricanes when TV crews are in the office to shoot it.

The staff of the Institute for Storm Research has become extremely interested in the problem of portraying hurricanes in a manner that relates to their overall physical size. Since much of the emphasis in advisories and records has been placed on storm center location, people are misled about actual hurricane size.

Through the news media's uses of satellite photos, the public has gotten a better idea of hurricane size. However, the public still seems to lack knowledge of the storm danger areas. The Institute feels that one way to combat this problem is to portray the hurricane as an area, then



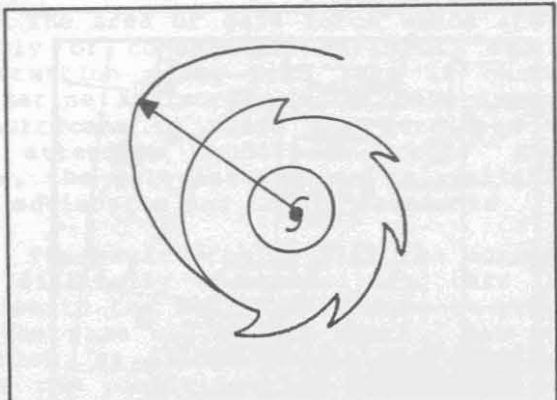
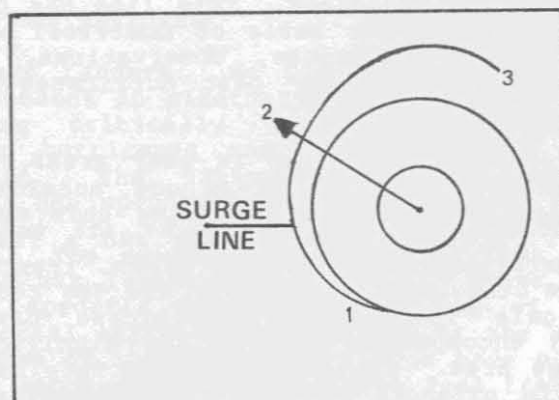
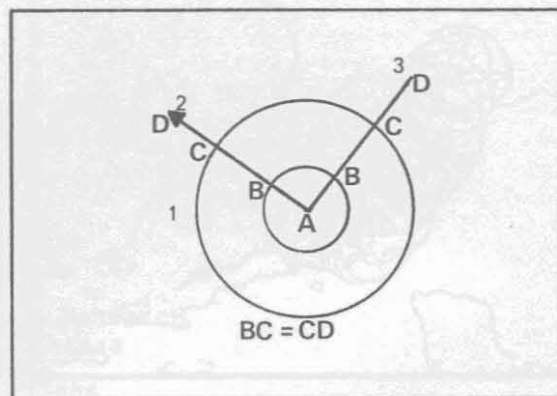
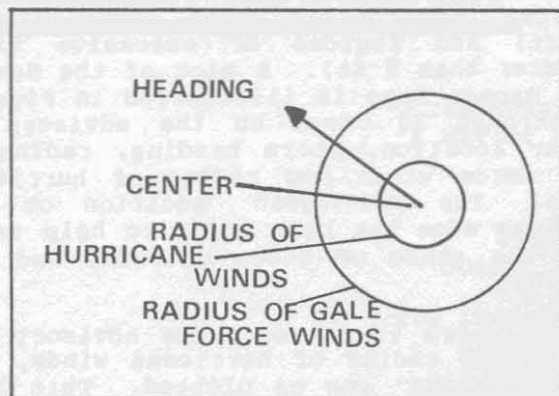


Figure 2. Schematic display showing the development of the Hurricane Danger Zone, beginning with (a), and the final picture in (d). See the following legend:

Point A is the center of the storm.

Direction 1 is 45 degrees left of the heading.

Direction 2 is the heading.

Direction 3 is 90 degrees to the right of the heading.

The radius of Hurricane Winds in the direction 2 and 3 reaches point B.

The radius of Gale Winds in direction 2 and 3 reaches point C.

The Surge line goes through D in directions 2 and 3.

D is found by making  $CD = BC$  along each direction 2 and 3.

The Surge line touches the limit of Gales in direction 1 and through D in directions 2 and 3.

The final drawing of the Hurricane is shown.

educate the public about hurricane dangers. Informed people are more apt to evacuate and seek safety when necessary.

The concept of the Hurricane Danger Zone and the Surge Line describes the existing storm. It is not intended to be used as a

forecast or an advisory. It is a tool to give graphic Hurricane description. In the past the only similar graphic depictions have been given using storm center coordinates.

The Hurricane Danger Zone should be used



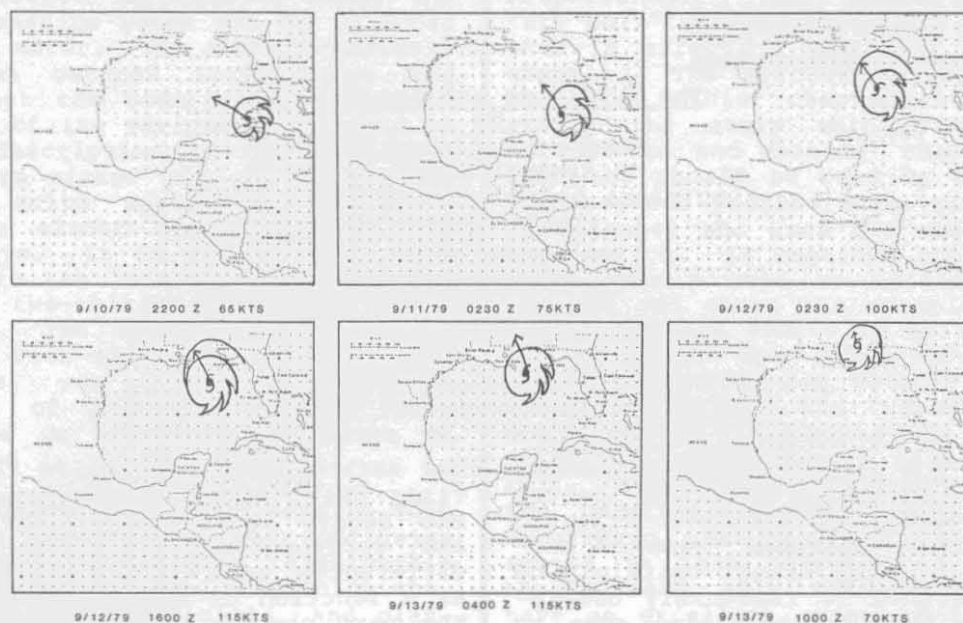


Figure 3. Pictorial representation of Hurricane Frederic, the surge line is shown in the 0230Z and 1600Z plots.

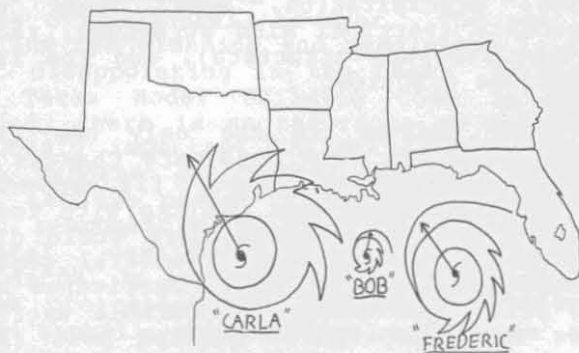


Figure 4. Graphic illustrations of three hurricanes to illustrate the concept of the "Hurricane Danger Zone" and surge line.

by the news media and other public awareness groups to portray areas where loss of life and property are most threatened.

To emphasize the significance of the concept, depictions of three familiar hurricanes are shown in Figure 4. Hurricane Bob illustrates a small storm while Hurricane Carla illustrates a large storm. It is important to have a way of talking about hurricanes as well as a way of drawing them. This procedure accomplishes both aspects.

#### REFERENCES AND FOOTNOTES

1. Jill Hasling obtained her B.A. in Mathematics from the University of St. Thomas in Houston, TX in 1975, and followed with several courses in meteorology. She joined the Institute for Storm Research in 1974, and became Vice President in 1979. She does extensive work in computer applications and report preparation, and has authored numerous publications.
2. John Freeman received his Ph.D. in Meteorology from the University of Chicago in 1952, with other degrees in Mathematics and Physics. He belongs to numerous professional organizations, including the NWA and AMS. He led the development for the Institute for Storm Research in 1966, where he is the President. The Institute studies severe storms and provides forecasting support for weather dependent operations.
3. Hasling, Jill F. and John C. Freeman, 1981: "Computed Directional Wave Spectra in Hurricane Allen, 1980". Presented at the IUCRM Symposium on Wave Dynamics and Radio Probing of the Ocean Surface, May 13-20, 1980, Miami Beach, Florida.
4. Pierson, W.J., L.J. Tick, and L. Baer, 1966: "Computer-based Procedures for Preparing Global Wave Forecasts and Wind Field Analyses Capable of Using Wave Data Obtained by a Spacecraft," *Proceedings of the Sixth Naval Hydrodynamics Symposium Publication*, ACR-136, Office of Naval Research, Department of the Navy, Washington, D.C. (1966).
5. Freeman, J.C., L. Baer and G.H. Jung, 1957: "The Bathystrophic Storm Tide", *J. Marine Research*, Vol. 16, No. 1.
6. Bretschneider, C.L. and J.I. Collins, 1963: "Prediction of Hurricane Surge: An Investigation for Corpus Christi, Texas, and Vicinity." NESCO Tech. Report SN-120.
7. Jelesnianski, C.P., 1965: A Numerical Calculation of Storm Tides Induced by a Tropical Storm Impinging on a Continental Shelf, *Monthly Weather Review*, Vol. 95, No. 6.