Storm Data and Verification Program Overview

NOAA’s National Weather Service
Office of Climate, Water, and Weather Services
Verification Unit

Brenton MacAloney
March 4th, 2005
Presentation Outline

• Storm Data
  • What is Storm Data?
  • History of Storm Data
  • Storm Data Entry and the StormDat Software
  • Uses of Storm Data
  • Future of the Storm Data Program

• Verification
  • Program Overview
  • Matching of Events and Warnings
  • Verification Data
  • Products to be Verified in the Future
What is Storm Data?

- Storm data is the official collection of severe and unusual weather events.
- Event information contained in storm data is collected, quality controlled, and logged by forecasters at National Weather Service forecast offices (WFOs).
History of Storm Data

1850 – Earliest known storm data reports
  – Data documented in memos by the military

1959 – First NCDC published *Storm Data* publication
  – Data documented using typewriter

1993 – First electronic version of storm data collection
  – Data documented using Corel WordPerfect 5.0 (DOS)

1996 – StormDat program created
  – Data documented using Corel Paradox database software
• Each of the NWS’s 123 WFOs is responsible for collecting events. They collect these reports from:
  • Official NWS storm surveys
  • Emergency managers
  • Official NWS observations
  • Amateur radio operators
  • Newspaper clippings / Media outlets
  • Other sources

• Events are logged using the StormDat program

• WFOs have up to 60 days from the end of a month to transmit storm data to NWS HQ
Fields Collected by StormDat

- Event Type (ex. tornado, winter storm, flood)
- Beginning and Ending Time
- Beginning and Ending Location (state, county, location)
- Report Source
- Event Magnitude (ex. hail size, tornado f-scale, wind speed)
- Injuries and Deaths Associated w/Event
- Crop and Property Damage Estimates
- Narrative Description of Event
Quality Control Features

- Finite list of severe and unusual weather events
- The StormDat program has an extensive quality control check when events are saved
- The StormDat program also runs a database integrity check on startup
- Event tracking numbers are used so events may be amended and/or deleted from the database
Uses of Storm Data

- NCDC’s *Storm Data* publication
- SPC’s official severe weather database (tornado, hail, wind)
- NWS’s short fused warning verification statistics
- NWS’s internal service assessments
- Army Corps of Engineers
- Academic research studies
- Disaster reports
- Congressional and other government data requests
- Public data requests
OUTSTANDING STORMS OF THE MONTH

1. Freezing Temperatures Reach Florida
Following a cold frontal passage across the Florida peninsula on December 31, 2000, a large high pressure system moved from Canada southward toward the Southeast U.S. and northern Gulf of Mexico. The surface high pressure system brought widespread sub-freezing temperatures to Florida in early January 2001. Also affected were the West-Central and Southwest portions of the peninsula. Temperatures remained below freezing for six to nine hours. Many locations reported temperature minimums in the middle twenties. Early damage estimates were at nearly five million dollars over West-Central and Southwest Florida.

Left: Photo depicts a closeup of oranges encased in ice after a storm on January 1, 2001. The orange tree was next to a strawberry field being sprayed with water to protect the crop from sub-freezing temperatures. This photo was taken in Dover, Florida.

(Right: Photo shows a common scene across the interior portions of Florida in early January as farmers try to protect their crops.)
NCDC’s *Storm Data* Publication

If you are interested in purchasing a subscription to the NCDC’s Storm Data publication, please contact Stuart Hinson via e-mail at: Stuart.Hinson@noaa.gov

**Storm Data and Unusual Weather Phenomena**

**January 2001**

<table>
<thead>
<tr>
<th>Location</th>
<th>Time Local/Standard</th>
<th>Path Length (Miles)</th>
<th>Width (Yards)</th>
<th>Number of Persons</th>
<th>Estimated Damage</th>
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<tbody>
<tr>
<td><strong>ALABAMA, Central</strong></td>
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<tr>
<td>Lowndes County</td>
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<td>Hayneville</td>
<td>19 0850CST 0905CST</td>
<td>0</td>
<td>0</td>
<td>3K</td>
<td>Thunderstorm Wind (G50)</td>
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<tr>
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<td></td>
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<tr>
<td>Montgomery County</td>
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<tr>
<td>Maxwell Afb</td>
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<td>0</td>
<td>10K</td>
<td>Thunderstorm Wind (G53)</td>
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<tr>
<td>Wind was measured at 61 mph at Maxwell Air Force Base as a bow echo moved through the area.</td>
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Future of Storm Data

• Over the new couple years the NWS plans on upgrading the StormDat program

• Planned enhancements:
  • turn the software into a web based program
  • map based entry screen (GIS)
  • upgrade database to mySQL
  • enhanced report generation

• Planned release: Late 2006
Verification Program Overview

• The NWS uses select events in storm data for the purpose of its short fused warning verification program

• Short fused warning products verified:
  • Severe Thunderstorm Warnings (SVR)
  • Tornado Warnings (TOR)
  • Flash Flood Warnings (FFW)
  • Special Marine Warning (SMW)

• Events are matched with warnings and scores such as probability of detection, false alarm ratio, and event lead time are generated
Events Used for Verification

- Severe Thunderstorm Verification
  - 50kt winds and greater
  - ¾ inch hail

- Tornado Verification
  - all tornado events

- Flash Flood Verification
  - all flash flood events (not flood)

- Special Marine Verification
  - 34kt winds and greater over marine waters
  - ¾ inch hail over marine waters
  - waterspout events
Matching of events and warnings is done on the first business day of every month.

The matching process takes approximately 5-7 hours.
**Sample Verification Report**

**NATIONAL WEATHER SERVICE SEVERE WEATHER STATISTICS**

**Period:** 1/1/03 - 12/31/03

**Summaries:**

<table>
<thead>
<tr>
<th>TORNADO WARNINGS ONLY</th>
<th>TORNADO EVENTS ONLY</th>
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<tr>
<td><strong>TORNADOS ONLY</strong></td>
<td><strong>TORNADOS ONLY</strong></td>
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<tr>
<td>Tornado warnings issued</td>
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### Sample Verification Report

NATIONAL WEATHER SERVICE SEVERE WEATHER STATISTICS

**Period:** 1/1/02 - 9/13/04  
**Counties:** PRINCE GEORGES(MD) - MONTGOMERY(MD)

Severe Local Storms Verification Report for: LWX - BALTIMORE/WASHINGTON, VA

#### TORNADO WARNINGS ONLY

<table>
<thead>
<tr>
<th>YR</th>
<th>MTH</th>
<th>DAY</th>
<th>ISSUE</th>
<th>EXPIRE</th>
<th>COUNTY</th>
<th>STATE</th>
<th>TYPE BASIS</th>
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<td>1311</td>
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<td>1828</td>
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<td>PRINCE GEORGES</td>
<td>MD</td>
<td>TORN-RAD</td>
<td>NOT VERIFIED</td>
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</table>

#### TORNADO EVENTS ONLY

<table>
<thead>
<tr>
<th>YR</th>
<th>MTH</th>
<th>DAY</th>
<th>TIME</th>
<th>COUNTY</th>
<th>STATE</th>
<th>EVENT</th>
<th>WARN TIME</th>
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<td>TORN-RAD</td>
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Future of Verification

The NWS plans on creating verification statistics for the following products in the near future:

- Winter Storm Warnings and Watches
- High Wind Warnings and Watches
- Flood Warnings
- Coastal Flood Warnings

We will be using events logged in storm data for the purpose of verifying observations.
Storm Data Program Overview

Contact Information

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