

Use of GIS in Plotting Early 19th Century Hurricane Information (Part 1)

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Hurricane climate research is based largely on records from the past 100 years or so. The official Atlantic hurricane record extends back to 1851, but data prior to the middle 20th century needs to be treated with particular caution. To better understand climate mechanisms responsible for variations in hurricane activity, it is important to have long records. Here we map tropical cyclone impacts in the United States during the first half of the 19th century by combining information from historical documents using a Geographic Information System (GIS). The historical hurricane information tool (HHIT) is based on ESRI's ArcView GIS. It is available on CD-ROM and on line through the Hurricane Climate Institute at Florida State University. The HHIT contributes to greater accessibility of pre-instrumental U.S. hurricane information.

The HHIT is the culmination of our efforts to collate documental evidence of past hurricanes for the period 1800-1850. This period represents the years prior to NOAA's best-track dataset, which begins with the year 1851. The purpose is to bring together various historical archives into a single electronic reference source, and to add value to the archives by mapping the information contained within. Historical accounts of hurricane occurrence and landfall exist in a variety of documents including compendiums sorted by region and date, documents, which analyze records for individual states, and personal research. Sources of information for these accounts include personal observations and letters, ship records, newspaper stories, and governmental reports.

Storm impacts in the United States and to vessels in adjacent coastal waters are manually input onto a geographic map using callout boxes. Information from the historical accounts is transcribed verbatim inside the callouts. The information is often descriptive and includes damage reports on land and ship reports at sea. Direct

meteorological observations are transcribed where available. Each of the historical sources is treated as a separate theme with storms listed chronologically by year. A separate map showing estimated storm tracks and intensity at landfall is provided.

Information about early American hurricanes is primarily text based. The HHIT takes these documents and makes them more accessible to hurricane researchers, emergency managers, and climatologists. The cartographic nature of the transcribed information provides an enhanced perception of the spatial extent of the damage left behind by the storms. The digital nature of the HHIT makes it well suited for editing and modification. For instance, the inclusion of near-coastal ship information from the recently developed *Climatological Database for the World's Oceans: 1750-1850* (EC Framework V Project, 2003) would be a valuable addition to the electronic archive. The HHIT can serve as the basis for a reanalysis of early American hurricanes.