

Past hurricanes

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S. LEROY

Brunel University, UK; suzanne.leroy@brunel.ac.uk

An update of what is known about past hurricanes (large storms, typhoons, tropical cyclones) and their impact on humans is direly necessary in order to improve preparedness plans. This effort is really timely as a controversy about the nature of the impact of global warming on the number and magnitude of hurricanes in the Gulf Coast area is ongoing. The hurricane season of 2005 in the Gulf Coast was intense, while 2006 was calm. In order to obtain a record longer than the instrumental one, a combination of historical sources and geological sequences need to be tackled. They each bring their own type of information and each has their limitations. The impact of these natural hazards on past ecosystems and societies, and how they recovered, is an integral part of the project.

PAGES and UNESCO-IGCP 490 (The role of Holocene environmental catastrophes in human history) workshops at the last Gulf Coast Association of Geological Societies meeting (25-28 September 2006) in Lafayette, Louisiana, USA, brought together 20 of the best scientists in the field from 13 different countries. Three oral sessions, one poster session and two days of field trips (the Mississippi delta and New Orleans itself) illustrated the difficulty and relevance of this research from a multidisciplinary perspective (within the fields of history, meteorology, geology, geography, geomorphology and anthropology). Different parts of the world were represented in the talks, including the Gulf Coast, Atlantic coasts of Europe and North America, Mediterranean Sea, South Pacific Ocean and Indian Ocean.

We had a fruitful workshop with debate on six key topics:

(1) Signature of hurricanes in the sedimentary record

In the geological record, the distinction of deposits left by hurricanes and tsunamis remains difficult. It is of primary importance to study parts of the world where both phenomena occur in order to increase the establishment of a specific signature.

(2) Paleo-frequency of hurricanes

The frequency reconstruction can be tackled by the study of available high-resolution records, such as historical data, corals, stalagmites and lacustrine varves. Most of those proxies are under-exploited.



Figure 1: Sand and debris accumulation against a house, caused a levee breach (by Hurricane Katrina in 2005 in New Orleans, USA). People's heads at the back for scale. Photo taken one year after the event. (Photo: S. Warny).

(3) Paleo-intensity of hurricanes

Intensity reconstruction is a more difficult issue than frequency. It is probably impossible to reconstruct absolute intensities. However, the relative intensity in one spot is usually what is reconstructed. Historical archives may offer a valuable contribution, since often the destructive impact is recorded.

(4) Geographical extent of hurricanes

Reconstruction of geographical extent is very arduous because of the fairly small geographical extent of storms. Some historical archives, in the form of letters from affected towns that have contacted the metropolis to receive aid, exist.

(5) Forecast of hurricanes

At present, the forecast of individual events beyond a few days in advance is impossible but there is more promise to work at the level of hurricane seasons and periods of higher energy, for example ENSO in the Southern Pacific.

(6) Effect of hurricanes on past populations

In some countries, there is little long-term impact from large storms, while in others, where food and water resources are affected, the impact is much larger and longer lasting. In some places, tradition has integrated the danger of hurricanes and people do not settle in unsafe places.

The need for the creation of a scientific association dealing with past large storms was expressed, since no multidisciplinary international association exists. Possible future venues for special sessions and meetings were proposed, such as a special session at the next INQUA congress in Cairns, 2007, and a contribution to the IYPE.

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