

SEASCAPES

Volume 8, Issue 2

Spring 2005

Hurricane Katrina - Lessons for Australia

The breaching of the New Orleans levies by a severe hurricane was the most anticipated natural disaster in US history. When it finally happened it seemed incredulous that the emergency management agencies at all levels universally failed to cope and the world's superpower was found seriously wanting.

New Orleans has been protecting itself from the ravages of the Mississippi River floods and hurricane surges, with varying success, since its founding in 1718. From the 1940s onwards at least, a storm surge scenario capable of inundating the city was identified. The US Army Corps of Engineers, a world leader in flood prediction and mitigation, has been modelling the impacts of hurricane surges in this region for decades and unsuccessfully argued to improve the city's defences.

On a smaller scale we have our own New Orleans scenarios in Australia - risks that have been documented for decades but starved of resources and funds to alleviate. Emergency managers claim to have the very best plans but they have never been tested in a practical way. Hurricane Katrina showed how easily the world's most sophisticated emergency management system can collapse once the magnitude and complexity reaches that critical level - and *nobody* can turn up

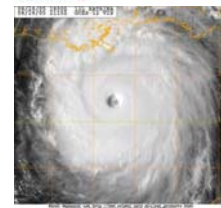
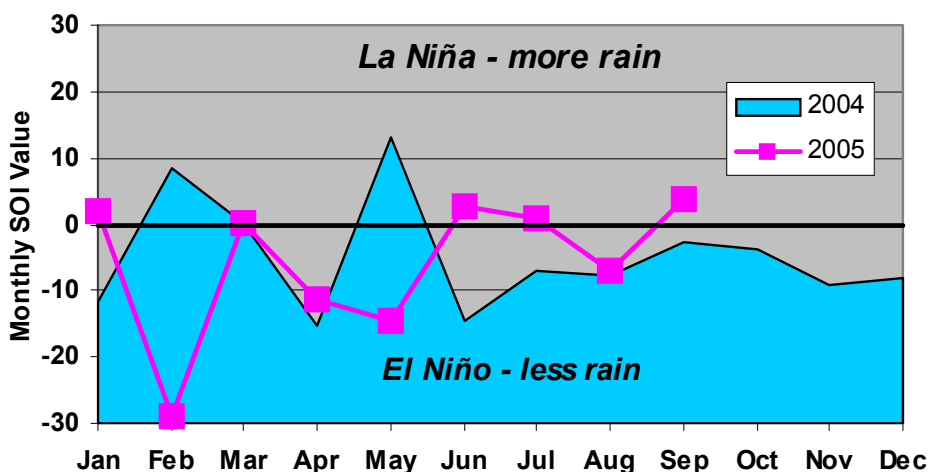


Photo Credits:

NOAA (above),
US Naval Research
Laboratory Monterey
(left)

SOI Rebuild for Season 2005/2006?

Since June the monthly SOI (Southern Oscillation Index) has been maintaining a consistently "neutral" range between ± 10 (within one standard deviation of the long term mean). The SOI index is simply ten times the ratio of the mean surface pressure between Darwin and Tahiti that has been shown to be a reasonable indicator of the El Niño Southern Oscillation (ENSO) - a tendency for the Pacific Ocean sea surface temperatures (SSTs) to fluctuate from "warm" to "cool" over a number of months or years. Near eastern Australia above-normal SSTs are associated with a so-called La Niña mode and typically more land-falling tropical cyclones, while in the reverse cooler El Niño mode there tend to be fewer tropical cyclones and less rain as a result, favouring drought conditions. If the SOI maintains a generally positive outlook there will be greater likelihood of tropical cyclones than average in the coming season. Much of the Queensland coast has experienced below-average cyclone activity for the past



SEASCAPES

SEASCAPES features the developing risk assessment capabilities of Systems Engineering Australia Pty Ltd (SEA).

Our services include coastal, ocean and offshore engineering, statistical analysis of tropical cyclone data, quantitative estimation of insurance losses, cyclone wind, wave and storm surge modelling, flood risk assessment and severe thunderstorm downbursts, hail and tornadoes. We do investigations, analysis,

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seng@uq.net.au



Is the Frequency and Intensity of Tropical Cyclones Increasing?

The US has just experienced a record-matching hurricane season with 22 named systems (at time of press), with Tropical Storm *Alpha* requiring the extension of the naming system into the "reserve" Greek alphabet. *Beta* is also a possibility. In addition to matching the record number of named storms, this year has seen a new record of 4 major (Cat 3, 4 or 5) storms making US landfall. The previous annual record of 3 occurred in 1909, 1933, 1954, and 1955. Incredibly, this season also resulted in a record measured Atlantic basin central pressure of 882 hPa during Hurricane *Wilma* when it was approaching the Yucatan Peninsula. These types of statistics are normally associated with the Western North Pacific "typhoon alley". So - is it possibly climate change?

Well, it could be, but it doesn't need to be to explain these types of events. A high level of variability has been the hallmark of tropical cyclone behaviour around the world for decades. In Australia, similar periods of high and low activity have come and gone. The bad news is that, like the US until recently, our annual tropical cyclone numbers have also been *below average*, especially on the Queensland coast. While there are few direct similarities between the Atlantic and South West Pacific basins, the upswing in Atlantic hurricanes could be a precursor to increased activity in our region if only because it emphasises further the occurrence of inter-decadal trends. This experience also confirms the scientific theory that, if conditions are right, any tropical cyclone can rapidly reach its maximum potential intensity i.e. Cat 5+, if there is enough energy in the ocean. Thankfully, there are usually atmospheric interruptions to this situation but under certain conditions, cyclones can get a free ride throughout an entire season. The possibility that we might be returning to the heady days of the 1970s is a sobering thought, with the ballooning growth and development in northern areas having exposed greater community vulnerability.

The graph below shows the variation in the incidence of Queensland tropical cyclones since official records began in 1906. Prior to satellite coverage in the late 1950s, many storms went undetected and that data is biased low. Periods

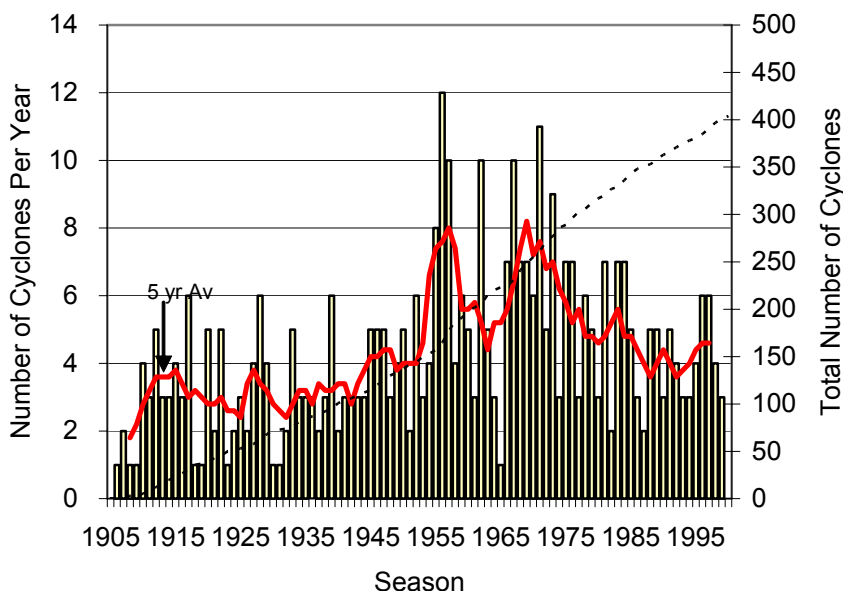
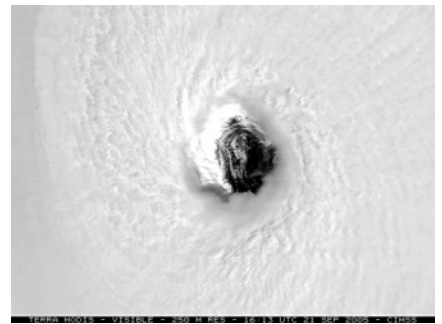


Figure 3.1 from Harper et al (2001) *Queensland Climate Change and Community Vulnerability to Tropical Cyclones, Stage 1*; <http://www.longpaddock.qld.gov.au/ClimateChanges/pub/OceanHazardsStage1.html>



Looking Hurricane Rita in the Eye:
University of Wisconsin CIMMS

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- Powerlink Queensland

Flood Risks:

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Research:

- Risk Prediction Initiative, Bermuda.
- James Cook University CTS

Guidelines:

- World Meteorological Organisation
- Engineers Australia

For more information please contact:

Dr Bruce Harper

Systems Engineering Australia Pty Ltd

ABN 065 073 544 439

7 Mercury Court

Bridgeman Downs, Qld 4035, Australia

Tel/Fax:
(07) 3353-0288

Email:
seng@uq.net.au



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