

SEASCAPES

Volume 12, Issue 1

Autumn 2009

An Active Summer: Cyclones and Wild Storms

This past summer has seen some significant weather impacts across Queensland from severe thunderstorms and also tropical cyclones, the latter becoming reminiscent of the activity during the active period of the 1970s.

In November, severe thunderstorms were active across much of Queensland due to the favourable situation of inland troughs and onshore moist inflows. The most significant period in SE Queensland was from the 16 to the 20th and "The Gap" storm on the 16th was especially damaging across Brisbane, cutting a 40 km long and 10 km wide swath of mainly wind damage from Redbank Plains in the south to Kallangur in the north. The leafy suburb of The Gap was the worst hit, followed by Keperra and Arana Hills. A building damage survey was undertaken by the James Cook Cyclone Testing Station and SEA assisted in analysis of the available radar and meteorological data. It would appear that a microburst imbedded in a rear flank downdraft may have been responsible for the specifically damaging winds at The Gap, likely aided by the topographic conditions. The estimated peak gust wind speed near ground level was about 45 m/s (160

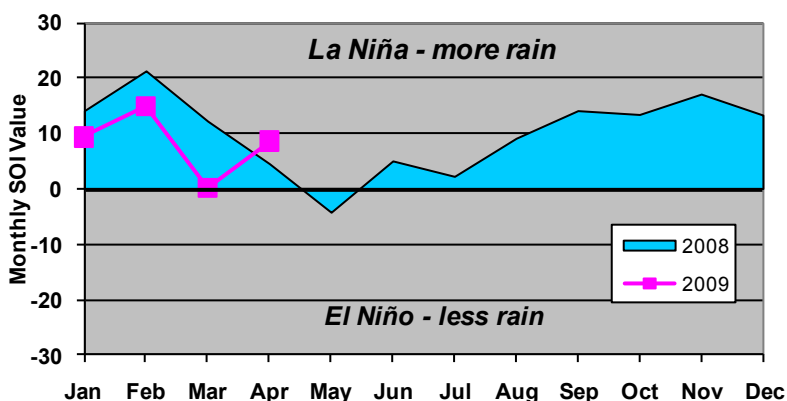
(Continued on page 2)



Photos (L to R): Arana Hills, escarpment home with "exposed beams"; The Gap, new house roof; Keperra, extensive tree damage.

An (Unofficial) La Niña Recedes ...

As commented in the previous newsletter leading into summer, the ENSO state (El Niño Southern Oscillation) was an unusual mix of high SOI pressure anomalies yet near-average ocean equatorial temperatures. This situation continued and became more pronounced as the SOI (10 times the normalised ratio of the mean surface pressure between Darwin and Tahiti) was mostly more than one standard deviation above the long-term mean from August through to mid-March. It was not an official La Niña, because it failed the ocean temperature test, but the monsoon was strong and persistent and the Coral Sea responded with a significant period of cyclonic activity reminiscent of the active 1970s. *[Data and comments based on Bureau of Meteorology sources.]*



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, consulting, peer review and research.

Visit us on the web:
<http://www.uq.net.au/seng>
seng@uq.net.au



(Continued from page 1)

kph). As with all damage investigations, there were a number of likely design and construction deficiencies identified. Severe storms also impacted many other isolated areas of the State.

Meanwhile, the tropical cyclone (TC) season was also very active, with four storms in the Queensland region (*Charlotte, Ellie, Hamish* and *Jasper*); three having coastal impacts. *Charlotte* was an unassuming storm that made landfall in the SE Gulf of Carpentaria but had impacts on the east coast far from its centre. Its outer circulation created a low level storm surge that coincided with the "king tide" period. With this year's "king tides" already at an epoch high, *Charlotte* caused considerable coastal damage from Lucinda to Townsville. It even slightly

exceeded the peak tide gauge level at Townsville that was recorded during TC *Althea* in 1971. Next, *Ellie* formed just off the coast of Ingham and caused extensive and persistent flooding in that region over several weeks. Throughout February the monsoon trough descended well south over the continent and provided many opportunities for further TC development. This spawned TC *Freddy* off Western Australia and produced above average rainfall across most of the northern part of the continent, leading to the first significant inflows into Lake Eyre for almost a decade.

In March, Category 5 *Hamish* moved steadily southwards parallel

to the Queensland coast for almost a week, creating significant concern for emergency response managers. Thankfully the steering currents ensured that it did not come onshore but if it had made landfall in Hervey Bay, would have produced a very significant storm surge and destructive winds. *Hamish* was the most significant TC since *Larry* in 2006 and has become one of the "top 10" most intense cyclones in the Queensland historical record.

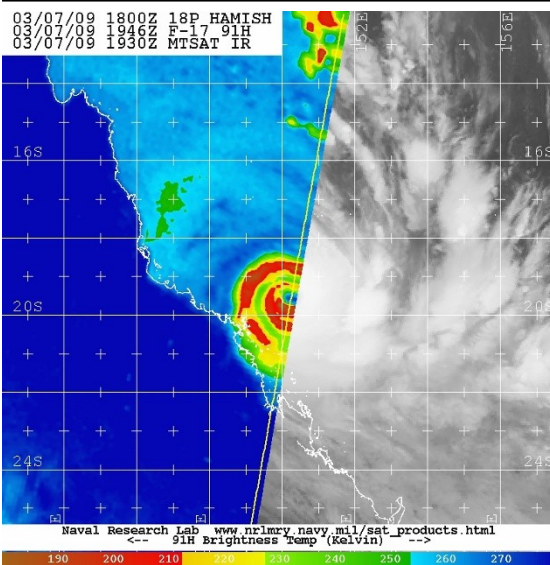


Photo: US Navy satellite product showing combined images from an infra-red cloud satellite (R) and a passive microwave satellite (L) overpass of severe TC *Hamish* on 7th March. The detail of the inner vortex of this very intense storm is highlighted by the microwave sensor, which can see the lower eyewall and intense rainband structures. The estimated peak intensity of 925 hPa exceeded that of TC *Larry* in 2006 by about 10 hPa.

RMS 2008 Expert Hurricane Elicitation

SEA's Dr Bruce Harper was invited to participate in the Risk Management Solutions Inc (RMS) 2008 Expert Hurricane Elicitation process, which was held in Miami, Florida, in November. The elicitation process addresses the uncertainty in future Atlantic hurricane landfall rates and intensities over the next five year period by seeking expert judgment on a range of risk model options developed by RMS. The resulting collective opinions are then translated into RMS client risk model adjustments for the following year.

The panel of experts is independently recommended by a selection panel comprising prominent hurricane researchers (Prof Kerry Emanuel, Dr Frank Marks and Dr Elizabeth Ritchie). In addition to Dr Harper, the 2008 panel consisted of Dr Suzana Camargo (Colombia Univ), Dr Bob Hart (Florida State), Dr Gabriel Vecchi (NOAA), Dr Roger Pielke Jr (Univ Colorado), Dr Judith Curry (Georgia Tech) and Dr Michael Mann (Penn State).

After 13 years—a SEA-change!

After 11 years at Bridgeman Downs, and a total of 13 years in business, SEA has recently relocated its office to inner Brisbane. This is a first step of a later move to Mount Coolum on the Sunshine Coast.

Real risk management decision - making tools for your business.

Some of the SEA Clients:

Coastal and Ocean Hazards:

- Woodside Energy Ltd, WA
- EPA, QLD
- Dept Env and Climate Change, NSW
- Alcan
- GHD Pty Ltd
- Bureau of Meteorology
- Kvaerner E&C Australia
- McConnell Dowell

Multi-Hazard Studies:

- Dept Emergency Services, QLD
- Bureau of Meteorology / GA

Tropical Cyclone Risks:

- Willis Re
- RACQ Insurance
- CGU Insurance
- Suncorp Metway Insurance
- Powerlink Queensland
- Geoscience Australia
- CSIRO Atmospheric Research
- Risk Management Solutions

Severe Thunderstorm Risks:

- Suncorp Metway Insurance
- Macquarie University, NHRC
- Powerlink Queensland

Research:

- Risk Prediction Initiative, Bermuda.
- James Cook University CTS
- Willis Research Network

Guidelines:

- World Meteorological Organisation
- Engineers Australia

For more information please contact:
Dr Bruce Harper

**Systems Engineering
Australia Pty Ltd**
ABN 065 073 544 439
106/71 Beeston St
Newstead, Qld 4006, Australia

Tel/Fax:
(07) 3254-0782

Email:
seng@uq.net.au

