

SEASCAPES

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An Increasing Demand for Storm Tide Studies

One of the legacies of Hurricane Katrina and its devastating Mississippi storm tide in 2005 has been an increased worldwide awareness of the dangers of these phenomena. Similarly, following Cyclone Althea that affected Townsville in 1971, much research was undertaken in Australia to better understand and predict the effects of such events up until the mid-1980s. Thereafter, partly due to a reduction in tropical cyclone numbers along the Queensland coast during the persistent El Niño periods, there was a reducing interest in such studies. However, since 2000, the potential impacts of Enhanced-Greenhouse warming and sea level rise have also raised the level of awareness of what is the most dangerous aspect of the tropical cyclone. Cyclone Larry in 2006 was another reminder that a major storm tide inundation is often only prevented by fortuitous coincidence with relatively low tide levels.

SEA's Dr Bruce Harper was a pioneer of storm tide studies in the 1980s and SEA has been particularly active in this area since the Queensland Climate Change Ocean Hazards Assessment project (20001-2004), which together with the James Cook University Marine Modelling Unit (now at the Australian Maritime College) provided the first comprehensive update of storm tide risks along the Queensland east coast since the early 1980s. This study (QCC 2001) provided a technical blueprint for future detailed studies, demonstrated the potential level of modelling accuracy that was possible and how to rationally

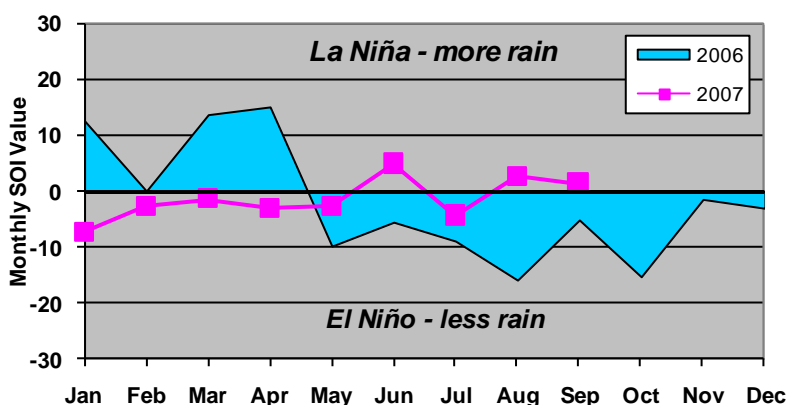
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Above: Clump Point jetty after TC Larry in 2006 produced peak stillwater levels more than 2 m above the high tide levels between Cardwell and Cairns.

Neutral Season—more TCs possible

After the "surprise" El Niño event of last year the monthly SOI (Southern Oscillation Index) has consistently stayed in the "neutral" zone. The SOI, which is simply ten times the ratio of the mean surface pressure between Darwin and Tahiti, 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. If the SOI maintains a generally neutral outlook there will likely be more cyclones than average next season. While the SOI remains relatively small, most other ENSO indicators show La Niña like characteristics, which is typically associated with more coast-crossing tropical cyclones in the Queensland region. [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

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estimate the likely effects of climate change.

Examples of follow-on studies that have been conducted by SEA since then include (jointly with GHD Pty Ltd in Brisbane):

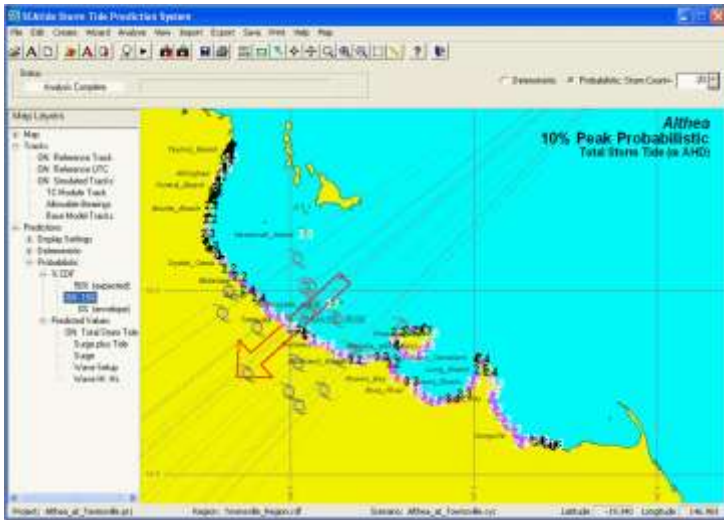
- Whitsunday Shire Storm Tide Study 2003
- Rarotonga Coastal Protection Study 2004-2005
- Townsville/Thuringowa Storm Tide Study 2004-2006
- Johnstone Shire Storm Tide Study 2007-

As well as (jointly with James Cook University):

- Northern Territory Storm Tide Prediction Project 2004-2005
- Darwin Storm Tide Study Update 2006
- Gove Storm Tide Study 2006

More recently, SEA and GHD were awarded the South East Queensland Storm Tide Review Project that considered the range and comprehensiveness of the storm tide studies already undertaken for 10 Local Government Authorities in the populous SE region. This work was coordinated by the SE Queensland Disaster Management Group (SEQDMAG) and recommendations were made by GHD/SEA for future studies to adopt more complete worksopes that would include such effects as Enhanced-Greenhouse but also to meet the technical standards outlined previously in QCC (2001). SEA was further commissioned to prepare a detailed scope of work for joint studies to be completed for Caboolture Shire, Redcliffe City, Redland Shire and Logan City.

QCC (2001) Queensland Climate Change and Community Vulnerability to Tropical Cyclones: Stage 1 - Ocean Hazards, Queensland Government, March, 2001, 375pp. (<http://www.longpaddock.qld.gov.au/ClimateChanges/pub/OceanHazardsMenu.html>)



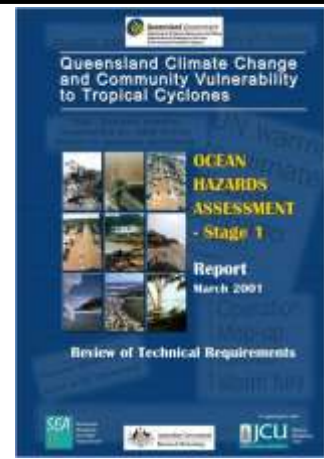
The advanced SEAtide storm tide prediction system developed for the Bureau of Meteorology in Darwin for use across the Northern Territory and also for Townsville City and Thuringowa Shire (shown).

Conferences and Workshops:

SEA's Dr Bruce Harper continued his active local and international participation in several scientific meetings and workshops over the past 6 months:

- Geoscience Australia, Canberra, 7 May 2007; "Storm Surge Modelling in the Australian Region".
- Seminar on Extreme Weather and Climate Change for Coasts and Ports; Convened by Engineers Australia NSW Maritime Panel and PIANC Australia, Sydney, 17 Sept, 2007; "Tropical Cyclone Intensity and Frequency – Past, Present and Future".
- WMO/IOC JCOMM 1st Scientific and Technical Symposium on Storm Surges, Seoul, Korea, 2-6 Oct, 2007; Keynote speaker on "Developments in Storm Tide Modelling and Risk Assessment in The Australian Region".

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Some of the SEA Clients:

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- Woodside Energy Ltd, WA
- Dept Natural Resources, VIC
- Dept Natural Res. and Mines, QLD
- EPA, QLD
- Dept Infrastructure Planning and Natural Resources, NSW
- Commonwealth Dept of Transport and Regional Services
- 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
- IAG
- Powerlink Queensland
- Geoscience Australia
- CSIRO Atmospheric Research
- Risk Management Solutions

Severe Thunderstorm Risks:

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

Flood Risks:

- RACQ Insurance, QLD

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