

SEASCAPES

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Queensland Climate Change and Coastal Vulnerability to Tropical Cyclones: Ocean Hazards Assessment

The Bureau of Meteorology, in conjunction with a number of Queensland Government agencies and with financial support from the Queensland Greenhouse Taskforce, has commissioned a study to assess the magnitude of the ocean threat from tropical cyclones in Queensland. The project is intended to update and extend the present understanding of the threat of storm tide inundation in Queensland on a state-wide scale including the effects of storm wave conditions in selected areas, and estimates of potential Greenhouse impacts. The study was awarded on the basis of competitive tender and is being undertaken by Systems Engineering Australia Pty Ltd (SEA) in association with the

Marine Modelling Unit of James Cook University and involves a number of other eminent ocean modellers within Australia. Project Manager for the consulting study is Dr Bruce Harper of SEA reporting to Bureau of Meteorology Project Director Mr Jim Davidson in Brisbane. A Project Steering Committee comprising representatives from Natural Resources, EPA and Emergency Services provides further advice to the Bureau.

The overall Community Vulnerability project will consist of the following elements:

- Review current knowledge and make technical recommendations for the overall project. Appraise

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Bureau of Meteorology



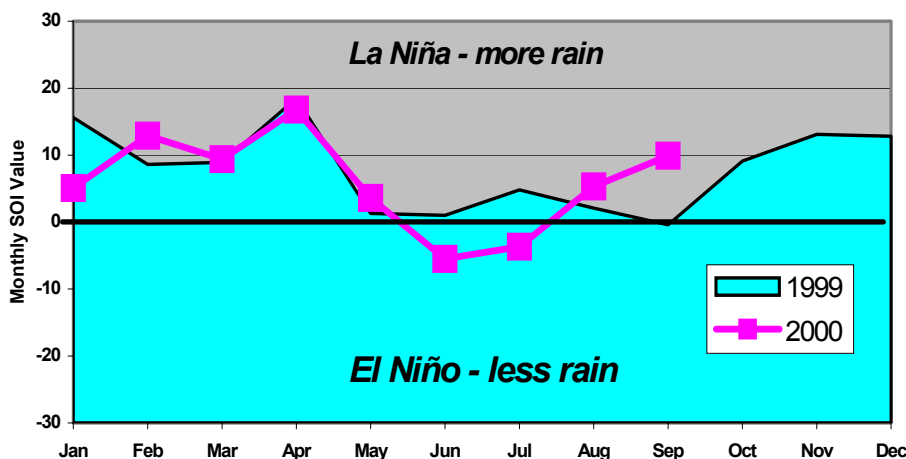
Queensland Government



Marine Modelling Unit

Near-Neutral SOI Forecast for 2001

The National Climate Centre's outlook for total November-January rainfall shows increased potential (60-65%) for above-average totals in both the tropical north of Australia and southwest W.A. The Indian Ocean remains warmer than average while Pacific Ocean temperatures have remained near average. Computer models suggest near-neutral conditions in the Pacific Ocean for the next 6 months. However, neutral conditions historically show an increase in tropical cyclone activity for Queensland over both El Niño and La Niña years. [Data and comments based on Bureau of Meteorology sources]

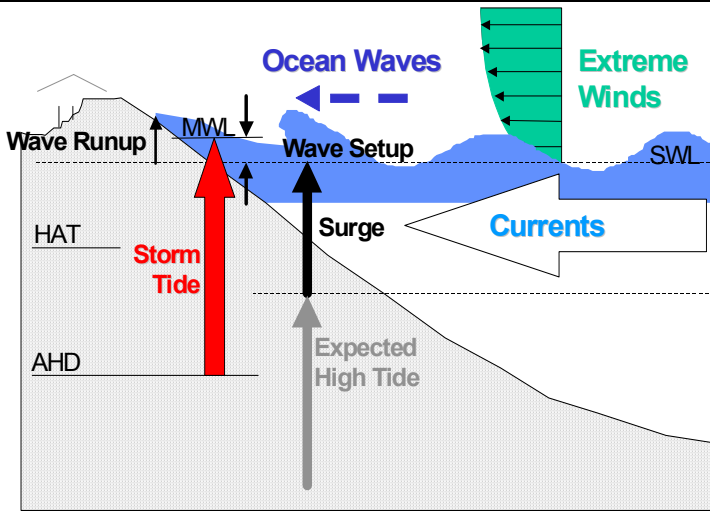


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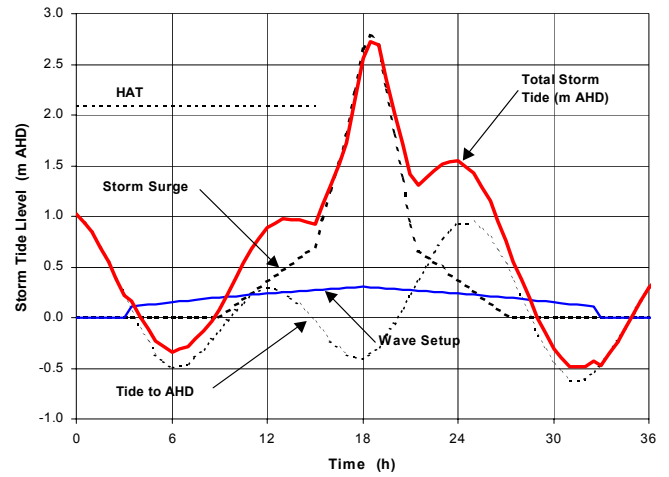
SEASCAPES features the developing risk assessment capabilities of Systems Engineering Australia Pty Ltd (SEA). Our services include coastal, ocean and offshore engineering, statistical analysis of tropical cyclone data, quantitative estimation of insurance losses, cyclone wind, wave and storm surge modelling, flood risk assessment and severe thunderstorm downbursts, hail and tornadoes.

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Coastal water level components of a storm tide.



Effects of the relative timing of tide, surge and wave setup.

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and adapt the James Cook University storm surge model software for the purposes of the project.

- Install the storm surge modelling software on the Bureau's computer system in Brisbane.
- Assist the Bureau in undertaking storm surge modelling for Queensland.
- Undertake modelling of storm wave parameters for selected areas on the Queensland coast.
- Develop software to compute and display storm surge maximum envelope of waters (MEOWs) for individual cyclone model runs and for families of cyclone model runs on a regional basis.
- Develop estimates of coastal inundation risk due to storm tide and extreme waves associated with tropical cyclones.
- Develop estimates of extreme wave statistics for key coastal locations.
- Develop Greenhouse scenario estimates of coastal inundation risk and extreme waves.

The Stage 1 study contract was awarded in May and is scheduled for completion this year. This phase of the work is limited to:

- (a) A comprehensive review of all technical requirements of the project in order to plan further development needs, and
- (b) State-wide numerical simulations of tropical cyclone storm surge.

Cocos (Keeling) Islands Storm Surge Study



Systems Engineering Australia is currently undertaking a numerical modelling study which is designed to provide statistical estimates of the tropical cyclone storm tide threat at the Cocos (Keeling) Islands - an Australian Government Territory in the Indian Ocean (12°10'S, 96°50'E). The client is Gutteridge Haskins and Davey Pty Ltd (Perth) on behalf of the Commonwealth Department of Transport and Regional Services.

The Cocos group is a relatively small isolated mid-oceanic atoll comprising 26 islands surrounding a shallow lagoon. The island is located in a region of significant tropical cyclone activity during October through to March. The lagoon is 10 km E-W and 12 km N-S and shallow (<10 m) with the principal openings to the north and north-west but with smaller openings to the south and east. The inhabited islands (pop. 600 in total) are low lying (typically + 6m MSL) and heavily vegetated with coconut palm.

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Tropical Cyclone Risks:

- RACQ-GIO Insurance
- Commercial Union Insurance
- Suncorp Metway Insurance
- Aon Group Australia Limited
- Powerlink Queensland

Severe Thunderstorm Risks:

- Suncorp Metway Insurance
- Macquarie University, Natural Hazards Research Centre
- Powerlink Queensland

Flood Risks:

- RACQ Insurance, Qld.

Coastal and Ocean Hazards:

- Woodside Offshore Petroleum, WA.
- Dept Natural Resources, Vic.
- Environmental Protection Agency, Qld.

Multi-Hazard Studies:

- Dept Emergency Services, Qld.
- Bureau of Meteorology / AGSO

Research:

- The Risk Prediction Initiative, Bermuda.

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