Summary of the 2000/01 Australian Region Tropical Storm Season and Verification of Authors' Seasonal Forecasts

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Summary

A year with slightly below average activity both for basin numbers and for Queensland strike numbers. All seasonal forecasts proved accurate to within 1-standard error.

The Tropical Storm Risk (TSR) consortium presents a validation of three forecasts: (a) pre-season Australian region forecast for tropical storm and severe tropical cyclone numbers; (b) long-range and pre-season forecasts for Queensland tropical storm strike numbers; and (c) long-range forecasts for SW Pacific tropical storm and severe tropical cyclone numbers. We show that the mean forecast values were all within 1-standard error of the observed totals, and for the critical categories of Australian-region severe tropical cyclone numbers and Queensland tropical storm strikes, the forecasts were almost correct.

Features of the 2000/01 Australian Region Season

- The 2000/01 Australian Region tropical storm season was slightly below average with 10 tropical storms and 6 severe tropical storms. These figures compare to the 1975/76-1999/00 climatology values of 11.7 and 6.5.
- The number of tropical storm strikes on the populated eastern Queensland coast was also slightly below average at one (Abigail). The 1975/76-1999/00 climatology figure is 1.1.
- Queensland as a whole was affected by two tropical storms: Wylva and Abigail. Wylva made landfall just to the west of the Northern Territory/Queensland border on the 16th February causing Aus $ 13 million damage to community infrastructure, roads and bridges. Abigail first made landfall about 30 km northwest of Cairns on the 24th February and - after traversing Cape York - made landfall again close to the Northern Territory/Queensland border on the 27th February. The impact of Abigail on the Cairns area was slight with damage put at Aus $ 83,000. Abigail's impact on Mornington Island on the 27th was greater with damage put at Aus $ 245,000.
- December and January passed without the birth of a single tropical storm in the SW Pacific. This occurrence last happened 56 years ago in 1944/45.
- 80% of the Australian-region tropical storms in 2000/01 formed during two short periods: 10th to 26th February, and between the 3rd and 16th April. Both these periods coincided with the eastward passage of strong MJO (Madden Julian Oscillation) convective pulses. In contrast, there was little MJO activity during December and January.

Catalogue of Events in 2000/01

Individual Storm Summary for Australian Region 100°E to 170°E					
No	Name	Dates	Peak Wind (kts)	Storm Category	Category at Queensland Landfall
1	Sam	05-09 Dec	125	STC	
2	Terri	29-31 Jan	55	TS	
3	Winsome	10-11 Feb	45	TS	
4	Wylva	15-16 Feb	35	TS	
5	Vincent	12-15 Feb	35	TS	
6	Abigail	24-27 Feb	65	STC	TS
7	Paula	26 Feb - 4 Mar	90	STC	
8	Walter	3-8 Apr	90	STC	
9	Sose	6-11 Apr	65	STC	
10	Alistair	16-21 Apr	65	STC	

Individual Storm Summary for SW Pacific Basin 142°E to 120°W				
No	Name	Dates	Peak Wind (kts)	Storm Category
1	Oma	20-22 Feb	50	TS
2	Abigail	24-27 Feb	65	STC
3	Paula	26 Feb - 4 Mar	90	STC
4	Rita	1-4 Mar	40	TS
5	Sose	6-11 Apr	65	STC

Key for Tables

Severe Tropical Cyclone (STC)	=	1 Minute Sustained Wind > 63Kts = Hurricane Category 1 to 5
Tropical Storm (TS)	=	1 Minute Sustained Wind > 33Kts
Forecast Error	=	Standard Deviation of Independent Hindcast Errors for 1986/87-2000/01
Australian Region	=	Southern Hemisphere 100°E to 170°E (Storm must form as a Tropical Storm within to count).
SW Pacific Region	=	Southern Hemisphere 142°E to 120°W (Storm must form as a Tropical Storm within to count).
Queensland Strike	=	Strike on Northeast Australian Coast from 15°S (Cooktown) to 30°S (Northern New South Wales).

Verification of Forecasts for 2000/01

1. Australian Region Total Numbers

The numbers of severe tropical cyclones and tropical storms were overpredicted by 1 and 2 respectively. The forecasts for both categories were accurate to within 1 standard error.

Australian Region (100°E to 170°E) Total Numbers		
	Tropical Storms	Severe Tropical Cyclones
Average Number (± SD) (1975/76-1999/00)	11.7 (±4.0)	6.5 (±2.5)
Actual Number 2000/01	10	6
TSR Forecast (± SD) 17 December 2000	12.4 (±2.5)	6.8 (±1.3)

2. SW Pacific Region Total Numbers

The numbers of severe tropical cyclones and tropical storms were overpredicted by 2 and 3 respectively. Both forecasts were accurate to within 1 standard error and both proved more accurate than climatological forecasts.

SW Pacific (142°E to 120°W) Total Numbers		
	Tropical Storms	Severe Tropical Cyclones
Average Number (± SD) (1975/76-1999/00)	10.2 (±3.8)	5.4 (±2.4)
Actual Number 2000/01	5	3
TSR Forecast (± SD) 3 April 2000	7.6 (±2.8)	5.1 (±2.3)

3. Queensland Strike Numbers

The number of tropical storm strikes on the populated northeast Australian coast (1) was correctly predicted at both extended and pre-season leads.

Queensland (15°S to 30°S) Strike Numbers	
	Tropical Storms
Average Number (± SD) (1975/76-1999/00)	1.1 (±1.1)
Actual Number 2000/01	1
TSR Forecast (± SD) 17 December 2000	1.4
TSR Forecast (±SD) 3 April 2000	1.3 (±1.1)

Monthly Updated Forecasts

For the 2001/02 Australian-region tropical storm season, *TSR* offers monthly updated forecasts for tropical storm and severe tropical cyclone activity as the season approaches. The figures on the *TSR* 'Skill' web page show the *TSR* forecast skill and uncertainty as a function of lead month for both these storm categories. Please contact Dr Mark Saunders (mas@mssl.ucl.ac.uk) if you are interested in this service.

TSR will issue a public pre-season forecast for Australian-region and Queensland landfalling tropical storm activity in early December 2001.

Potential Benefits

Tropical cyclones prove a costly and deadly natural disaster for northeast Australia and for the southwest Pacific islands between 10°S and 30°S. With the advent of satellites, numerical models provide warnings of impending landfall up to a week ahead. However, efforts are now being directed towards the seasonal probabilistic forecasting of events many months in advance. Such long-range forecasts would benefit society, business and government by reducing - through the available lead-time - the risk and uncertainty inherent to varying active and inactive storm seasons.

Tropical Storm Risk.com (TSR)

TropicalStormRisk.com (TSR) is a venture which has developed from the UK government-supported TSUNAMI initiative project on seasonal tropical cyclone prediction. The *TSR* consortium comprises leading UK insurance industry experts and scientists at the forefront of seasonal forecasting. The *TSR* insurance expertise is drawn from *Benfield Greig*, a leading independent global reinsurance and risk advisory group, the *Royal and Sun Alliance* insurance company, and from the UK composite and life company *CGNU Group*. The TSR scientific grouping brings together climate physicists, meteorologists and statisticians at *UCL* (University College London) and the *Met. Office*. *TSR* forecasts are available from http://tropicalstormrisk.com.

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