June Forecast Update for Australian-Region Tropical Storm Activity in 2006/7

Issued: 7th June 2006

by Dr Adam Lea and Professor Mark Saunders
Benfield Hazard Research Centre, UCL (University College London), UK

Forecast Summary

TSR continues to anticipate the 2006/7 Australian season will see activity close to average.

The TSR (Tropical Storm Risk) early June forecast update for Australian-region tropical cyclone activity in 2006/7 continues to anticipate activity close to average. The forecast spans the Australian season from the 1st November 2006 to the 30th April 2007 and is based on data available through the end of June 2006. Our main predictor is the forecast anomaly in October-November Niño 4 sea surface temperatures (SST) which we anticipate will be close to average at 0.16±0.49^{o}C. Since SSTs in this region are linked to vertical wind shear over the Australian region during Austral summer, an average Niño 4 SST indicates average wind shear and average tropical storm activity. Thus we expect Australian basin cyclone activity and landfalling numbers to be close to average in 2006/7.

Australian Region Total Numbers Forecast for 2006/7

		Severe Tropical Cyclones	Tropical Storms
TSR Forecast (±FE)	2006/7	5.7 (±2.3)	9.9 (±3.3)
31yr Climate Norm (±SD)	1975/6-2005/6	5.7 (±2.4)	10.6 (±3.6)
Forecast Skill at this Lead	1975/6-2005/6	12%	15%

Key:

Severe Tropical Cyclone	=	1 Minute Sustained Wind > 63Kts = Hurricane Category 1 to 5.
Tropical Storm	=	1 Minute Sustained Wind > 33Kts.
SD	=	Standard Deviation.
FE (Forecast Error)	=	Standard Deviation of Errors in Simulated Real Time Forecasts 1975/6-2005/6.
Forecast Skill	=	Percentage Improvement in Mean Square Error Afforded by Cross-Validated Hindcasts 1975/6-2005/6 with 5-year block elimination over Hindcasts Made with the 1975/6-2005/6 Climate Norm.
Australian Region	=	Southern Hemisphere 100°E to 170°E (Storm Must Form as a Tropical Cyclone Within to Count).

- Very severe tropical cyclones (hurricane category 3-5) are not forecast due to data reliability problems in the historical record.
- Our Australian-region (100°E to 170°E), while slightly non-standard, is selected to provide the best overview for tropical cyclone activity around the whole of Australia.

There is a 17% probability that Australian-region tropical storm numbers in 2006/7 will be above average (defined as more than 12 tropical storms), a 54% likelihood they will be near normal (defined as between 9 and 12 tropical storms) and a 29% chance they will be below normal (defined as less than 9 tropical storms). The 1975/6-2005/6 climatology probabilities for each category are 29% (above-normal), 36% (near-normal) and 35% (below-normal).

Australian Landfalling Numbers in 2006/7

		Tropical Storms
TSR Forecast (±FE)	2006 /7	4.3 (±2.0)
Average (±SD)	1975/6-2005/6	4.6 (±2.1)
Forecast Skill at this Lead	1975/6-2005/6	10%

Key: Landfalling Region = Northern Australian coast from Perth around to Brisbane.

- Severe tropical cyclone strikes are not forecast due to their low occurrence rate and to their lack of correlation with tropical storm strike numbers.

There is a 21% probability that Australian tropical storm strike numbers in 2006/7 will be above average (defined as more than 5 landfalling tropical storms), a 54% likelihood they will be near normal (defined as 4 or 5 landfalling tropical storms) and a 25% chance they will be below normal (defined as less than 4 landfalling tropical storms). The 1975/6-2005/6 climatology probabilities for each category are 32% (above-normal), 42% (near-normal) and 26% (below-normal).

Predictors and Key Influences for 2006/7

Our model exploits the predictability of tropical SSTs. Anomalous patterns of SST are the primary source of tropical atmosphere forcing at seasonal and interannual timescales. The predictors in our model for Australian-region tropical storm numbers are:

1. The forecast October-November SST for the El Niño Southern Oscillation (ENSO) Niño 4 region 5°N-5°S, 150°W-160°E. (Main predictor for leads up to November).
2. The observed October-November SST for the Niño 4 region. (Main predictor for December forecast).

Australian-region severe tropical cyclones and landfalling tropical storm numbers are forecast by thinning from the total tropical storm numbers.

The Niño 4 forecast comes from an in-house multi-ensemble extension of the Knaff and Landsea (1997) ENSO-CLIPER model (Lloyd-Hughes et al, 2004).

The key factor behind our forecast for Australian-region tropical storm activity in 2006/7 being close to average is the anticipated neutral effect of early austral summer SSTs in the Niño 4 region. Average SSTs in this region lead to average atmospheric vertical wind shear over the Australian region during Austral summer; a condition favouring average tropical storm activity. Our current forecast SST anomaly (1975-2005 climatology) for October-November 2006 Niño 4 SST is 0.16±0.49^{o}C (similar to last months value of 0.13±0.50^{o}C). The forecast skill for this predictor at this lead is 49% (assessed using cross-validated hindcasts over the period 1975-2005).

Further Information

Further information on the TSR forecast methodology and on TSR in general, may be obtained from the TSR website (http://tropicalstormrisk.com). The TSR next monthly forecast update for Australian-region tropical storm activity in 2006/7 will be issued on the 5th July 2006.

Appendix - Predictions from Previous Months

1. Australian Region Total Numbers

a) Deterministic forecasts

Australian Region Total Numbers 2006/7			
		Tropical Storms	Severe Tropical Cyclones
Average Number (±SD) (1975/6-2005/6)		10.6 (±3.6)	5.7 (±2.4)
TSR Forecasts (±FE)	7 June 2006	9.9 (±3.3)	5.7 (±2.3)
	12 May 2006	10.0 (±3.4)	5.6 (±2.2)

b) Probabilistic forecasts

Australian Region Tropical Storm Numbers 2006/7				
		Tercile Probabilities		
		below normal	normal	above normal
Climatology 1975/6-2005/6		35	36	29
TSR Forecasts	7 June 2006	29	54	17
	12 May 2006	28	53	19

2. Australian Landfalling Numbers

a) Deterministic forecasts

Australian Landfalling Numbers 2006/7		
		Tropical Storms
Average Number (±SD) (1975/6-2005/6)		4.6 (±2.1)
TSR Forecasts (±FE)	7 June 2006	4.3 (±2.0)
	12 May 2006	4.4 (±2.0)

b) Probabilistic forecasts

Australian Landfalling Numbers 2006/7				
		Tercile Probabilities		
		below normal	normal	above normal
Climatology 1975/6-2005/6		26	42	32
TSR Forecasts	7 June 2006	25	54	21
	12 May 2006	21	54	25