



# November Forecast Update for Australian-Region Tropical Storm Activity in 2004/5

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## Forecast Summary

**TSR slightly raises its forecast but continues to anticipate the 2004/5 Australian season will see below average activity.**

The TSR (Tropical Storm Risk) early November forecast update for Australian-region tropical cyclone activity continues to anticipate a below average season for 2004/5. The forecast spans the Australian season from the 1st November 2004 to the 30th April 2005 and is based on data available through the end of October 2004. The TSR predictor for Australian-region total numbers is the forecast anomaly in October-November Niño 4 sea surface temperatures (SST) which is anticipated to be warmer than normal at  $0.85 \pm 0.08^\circ\text{C}$ . The TSR predictor for Australian landfalling numbers is the forecast anomaly in December-March SST for the extended ENSO region  $5^\circ\text{N}$ - $5^\circ\text{S}$ ,  $120^\circ\text{W}$ - $177.5^\circ\text{W}$  which is anticipated to be warmer than normal at  $0.66 \pm 0.29^\circ\text{C}$ . Monthly updated forecasts will continue to early December 2004. Appendices give the TSR predictions from previous months.

## Australian Region Total Numbers Forecast for 2004/5

|                                      |                | Tropical Storms    | Severe Tropical Cyclones | ACE Index       |
|--------------------------------------|----------------|--------------------|--------------------------|-----------------|
| TSR Forecast ( $\pm\text{FE}$ )      | 2004 /5        | 7.9 ( $\pm 3.0$ )  | 4.2 ( $\pm 1.6$ )        | 55 ( $\pm 38$ ) |
| 29yr Climate Norm ( $\pm\text{SD}$ ) | 1975/6-2003/4  | 10.7 ( $\pm 3.7$ ) | 5.8 ( $\pm 2.4$ )        | 84 ( $\pm 41$ ) |
| Forecast Skill at this Lead          | 1989/90-2003/4 | 64%                | 29%                      | 5%              |

Key: ACE Index = Accumulated Cyclone Energy Index = Sum of the Squares of 6-hourly Maximum Sustained Wind Speeds (in units of knots) for all Systems while they are at least Tropical Storm Strength. ACE Unit =  $\times 10^4$  knots<sup>2</sup>.

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 Replicated Real Time Forecasts 1989/90-2003/4.  
Forecast Skill = Percentage Improvement in Mean Square Error over Running 10-year Prior Climate Norm from Replicated Real Time Forecasts 1989/90-2003/4.  
Australian Region = Southern hemisphere  $100^\circ\text{E}$  to  $170^\circ\text{E}$  (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 ( $100^\circ\text{E}$  to  $170^\circ\text{E}$ ), while slightly non-standard, is selected to provide the best overview for tropical cyclone activity around the whole of Australia.

There is only a 9% probability that Australian tropical storm numbers in 2004/5 will be above-average (defined as more than 12 tropical storms), a 28% likelihood they will be near-average (defined as between 9 and 12 tropical storms) and a 63% chance they will be below-average (defined as less than 9 tropical storms). The 1975/6-2003/4 climatology probabilities for each category are 31% (above-normal), 34.5% (near-normal) and 34.5% (below-normal).

## Australian Landfalling Numbers in 2004/5

|                             |                | Tropical Storms  | ACE Index        |
|-----------------------------|----------------|------------------|------------------|
| TSR Forecast ( $\pm$ FE)    | 2004 /5        | 4.1 ( $\pm$ 1.8) | 2.6 ( $\pm$ 2.7) |
| Average ( $\pm$ SD)         | 1975/6-2003/4  | 4.7 ( $\pm$ 2.2) | 3.0 ( $\pm$ 2.2) |
| Forecast Skill at this Lead | 1989/90-2003/4 | 24%              | 22%              |

Key: ACE Index = Accumulated Cyclone Energy Index = Sum of the Squares of hourly Maximum Sustained Wind Speeds (in units of knots) for all Systems while they are at least Tropical Storm Strength and over the Australian Mainland (reduced by a factor of 6). ACE Unit =  $\times 10^4$  knots<sup>2</sup>.  
 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 13% probability that Australian tropical storm strike numbers in 2004/5 will be above average (defined as more than 5 landfalling tropical storms), a 58% likelihood they will be near normal (defined as 4 or 5 landfalling tropical storms) and a 29% chance they will be below normal (defined as less than 4 landfalling tropical storms). The 1975/6-2003/4 climatology probabilities for each category are 28% (above-normal), 41% (near-normal) and 31% (below-normal).

### Key Predictors for 2004/5

The key factor behind our forecast for below average Australian-region tropical storm activity in 2004/5 is the anticipated suppressing effect of above average early austral summer SSTs in the Niño 4 region. Above average SSTs in this region lead to above average atmospheric vertical wind shear over the Australian region during Austral summer; a condition favouring below average tropical storm activity. Our current forecast SST anomaly (1974/5-2003/4 climatology) for October-November 2004 Niño 4 SST is  $0.85 \pm 0.08^\circ\text{C}$  (down from  $1.09 \pm 0.16^\circ\text{C}$  last month). The forecast skill for this predictor is 98% (assessed using replicated real-time forecasts over the last 15 years). Our landfalling predictor (December 2004 - March 2005 forecast SST value for the extended ENSO region  $5^\circ\text{N}$ - $5^\circ\text{S}$ ,  $120^\circ\text{W}$ - $177.5^\circ\text{W}$ ) is anticipated to be  $0.66 \pm 0.29^\circ\text{C}$  (down from  $0.70 \pm 0.34^\circ\text{C}$  last month). The forecast skill for this predictor at this lead is 90%.

### 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 final TSR monthly forecast update for Australian-region tropical storm activity in 2004/5 will be issued on the 6th December 2004.



## Appendix - Predictions from Previous Months

### 1. Australian Region Total Numbers

| <b>Australian Region Total Numbers 2004/5</b> |             |                        |                                 |                  |
|---|-------------|------------------------|---------------------------------|------------------|
|   |             | <b>Tropical Storms</b> | <b>Severe Tropical Cyclones</b> | <b>ACE Index</b> |
| Average Number ( $\pm$ SD) (1975/6-2003/4)    |             | 10.7 ( $\pm$ 3.7)      | 5.8 ( $\pm$ 2.4)                | 84 ( $\pm$ 41)   |
| TSR Forecasts ( $\pm$ FE)                     | 5 Nov 2004  | 7.9 ( $\pm$ 3.0)       | 4.2 ( $\pm$ 1.6)                | 55 ( $\pm$ 38)   |
|   | 5 Oct 2004  | 7.0 ( $\pm$ 2.9)       | 3.9 ( $\pm$ 1.5)                | -                |
|   | 6 Sep 2004  | 8.0 ( $\pm$ 3.0)       | 4.3 ( $\pm$ 1.5)                | -                |
|   | 4 Aug 2004  | 8.6 ( $\pm$ 3.1)       | 4.5 ( $\pm$ 1.5)                | -                |
|   | 5 Jul 2004  | 9.7 ( $\pm$ 2.7)       | 4.8 ( $\pm$ 1.5)                | -                |
|   | 4 Jun 2004  | 10.6 ( $\pm$ 3.0)      | 5.2 ( $\pm$ 1.6)                | -                |
|   | 11 May 2004 | 11.0 ( $\pm$ 3.4)      | 5.3 ( $\pm$ 1.6)                | -                |
|   | 6 Apr 2004  | 11.4 ( $\pm$ 2.4)      | 5.5 ( $\pm$ 1.5)                | -                |

### 2. Australian Landfalling Numbers

| <b>Australian Landfalling Numbers 2004/5</b> |             |                        |                  |
|--|-------------|------------------------|------------------|
|  |             | <b>Tropical Storms</b> | <b>ACE Index</b> |
| Average Number ( $\pm$ SD) (1975/6-2003/4)   |             | 4.7 ( $\pm$ 2.2)       | 3.0 ( $\pm$ 2.2) |
| TSR Forecasts ( $\pm$ FE)                    | 5 Nov 2004  | 4.1 ( $\pm$ 1.8)       | 2.6 ( $\pm$ 2.7) |
|  | 5 Oct 2004  | 4.0 ( $\pm$ 1.8)       | -                |
|  | 6 Sep 2004  | 4.0 ( $\pm$ 1.9)       | -                |
|  | 4 Aug 2004  | 4.2 ( $\pm$ 1.9)       | -                |
|  | 5 Jul 2004  | 4.4 ( $\pm$ 1.9)       | -                |
|  | 4 Jun 2004  | 4.4 ( $\pm$ 1.8)       | -                |
|  | 11 May 2004 | 4.5 ( $\pm$ 1.8)       | -                |
|  | 6 Apr 2004  | 5.0 ( $\pm$ 1.9)       | -                |