Extended Range Forecast for Australian-Region Tropical Storm Activity in 2010/11

Issued: 5th May 2010

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Forecast Summary

TSR anticipates the 2010/11 Australian season will see activity ~10% below-average. Users should note that the precision of TSR's extended range outlooks for Australian-region tropical storm activity between 1975/6 and 2009/10 is low.

The TSR (Tropical Storm Risk) consortium presents a long-range forecast for Australian-region tropical storm and severe tropical cyclone numbers, and for Australian tropical storm strike numbers in 2010/11. The forecast spans the Australian season from the 1st November 2010 to the 30th April 2011 and is based on data available through the end of April 2010. Our main predictor is the forecast anomaly in October-November Niño 4 sea surface temperature (SST) which we anticipate will be above-average at $0.33\pm0.52\,^{\circ}$C. Since SSTs in this region are linked to vertical wind shear over the Australian region during Austral summer, above-average Niño 4 SST indicates above-average wind shear and below-average tropical storm activity. Thus we expect Australian basin cyclone activity and landfalling numbers to be below-norm in 2010/11. Bi-monthly updated forecasts will follow through to early December 2010.

Australian Region Total Numbers Forecast for 2010/11

		Severe Tropical Cyclones	Tropical Storms
TSR Forecast (±FE)	2010/11	4.9 (±2.3)	9.3 (±3.3)
35yr Climate Norm (±SD)	1975/6-2009/10	5.5 (±2.4)	10.5 (±3.5)
Forecast Skill at this Lead	1975/6-2009/10	9%	14%

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 1975/6-2009/10.
	Forecast Skill	=	Percentage Improvement in Mean Square Error Afforded by Cross-Validated Hindcasts 1975/6-2009/10 with 5-year block elimination over Hindcasts Made with the 1975/6-2009/10 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 25% probability that Australian-region tropical storm numbers in 2010/11 will be above average (defined as more than 11 tropical storms), a 33% likelihood they will be near normal (defined as between 9 and 11 tropical storms) and a 42% chance they will be below normal (defined as less than 9 tropical storms). The 1975/6-2009/10 climatology probabilities for each category are 37% (above-normal), 29% (near-normal) and 34% (below-normal).

Australian Landfalling Numbers in 2010/11

		Tropical Storms
TSR Forecast (±FE)	2010/11	4.0 (±2.0)
Average (±SD)	1975/6-2009/10	4.5 (±2.1)
Forecast Skill at this Lead	1975/6-2009/10	8%

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 23% probability that Australian tropical storm strike numbers in 2010/11 will be above average (defined as more than 5 landfalling tropical storms), a 38% likelihood they will be near normal (defined as 4 or 5 landfalling tropical storms) and a 39% chance they will be below normal (defined as less than 4 landfalling tropical storms). The 1975/6-2009/10 climatology probabilities for each category are 23% (above-normal), 43% (near-normal) and 34% (below-normal).

Predictors and Key Influences for 2010/11

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^oN-5^oS, 150^oW-160^oE. (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 2010/11 being slightly below-norm is the anticipated slight supressing effect on activity of early austral summer SSTs in the Niño 4 region. Below-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 (1975-2009 climatology) for October-November 2010 Niño 4 SST is 0.33 ± 0.52^oC. The forecast skill for this predictor at this lead is 46% (assessed using cross-validated hindcasts over the period 1975-2009).

Forecasts for 2010/11

For the 2010/11 Australian tropical cyclone season, TSR will be issuing: (1) Bi-monthly updated deterministic forecasts through to early December for Australian-region tropical storm and severe tropical cyclone numbers and for Australian tropical storm strike numbers; (2) Forecasts in early November and early December for the basin ACE index. The ACE index reflects a combination of intensity and duration for all storms each season and may be linked more closely to total losses and disruption than is the number of tropical storms or severe tropical cyclones; (3) Probabilistic forecasts for the numbers of basin and landfalling tropical storms; (4) Real-time forecast track, intensity, windfield and windspeed probabilities out to 5 days lead for all active tropical cyclones through the TSR Tropical Storm Tracker; (5) Automatic storm e-mail alerts with an option for users to select their preferred windspeed and

probability thresholds for an alert to be triggered.

Potential Benefits

Tropical storms are a costly natural disaster for the northern coastline of Australia and for southwest Pacific islands between latitudes 10^oS and 30^oS and longitudes 100^oE and 170^oE. The average storm damage bill per year 1990/1-2000/1 for this region was US $60 million (2005 $). By providing a lead time, storm forecasts help governments, administrators and businesses plan ahead, thereby reducing the risk and uncertainty from varying active and inactive storm seasons. TSR has a good seasonal forecast track record. Its forecasts for Australian-region tropical cyclone activity were successful in 8 of the 10 years between 2001/2 and 2009/10.

Further Information

Further information on the TSR forecast methodology and on TSR in general, may be obtained from the TSR website (http://tropicalstormrisk.com). Forecast updates for Australian-region tropical storm activity in 2010/11 will be issued by TSR on the 6th July 2010, 6th September 2010, 5th November 2010 and 6th December 2010.