TC genesis forecasts and observations during 2006/2007 and 2007/2008.

Anne Leroy (anne.leroy@meteo.fr)

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In 2006/2007 and 2007/2008, operational forecasts of TC activity have been issued on the web (http ://www.meteo.nc/espro/previcycl/cyclA.php). The method used to make such forecasts has been developped by Leroy and Wheeler 2008 (Monthly Weather Review, in press).

This document shows a verification of these real-time forecasts. Forecasts are compared to TC observations available at the end of each month at http ://www.typhoon2000.ph/garyp_mgtcs/ (courtesy of Gary Padget), which are basically the location and strenght of TCs as mentionned in RSMC's bulletins. Only the genesis probability forecasts will be compared to observations for simplicity reason, but similar results should be expected with occurence probability forecasts.

For each season, basic graphics comparing forecasted genesis probalities and genesis observations in each area during the TC season are shown. Brier Skill Scores are also calculated using as a reference a forecast that is the mean climatology. Note that given the relatively small size of sample used to calculate the scores (a single season), the scores calculated can vary greatly with one TC forming or not. Finally, a reliability diagram for 2006/2007 and 2007/2008 is shown. To make this reliability diagram, forecasts for all lead times and areas had to be included in order to have enough data.

1   TC season 2006/2007

See Fig. 1 and Tab. 1.

z1 and z2

Peaks of forecasted probabilities match well with TC genesis. Positive values of the Brier Skill Scores are reached : between 0.10 and 0.25.

z3

Two early TCs were observed : Xavier in October (not shown) and Yani in November. Early TCs seems to be more likely during El Niño. The statistical scheme, in its present form, can't take that into account. Forecasted probabilities are generally lower than the climatological TC genesis probability consistently with an El Niño. The Brier Skill Score is close to zero, showing that the forecasts had little skill during that season.

z4

As 2006/2007 was in an El Niño, forecasted probabilities are generally higher than climatology. TC genesis match well with peaks of forecasted probabilities in z4. But, some peaks (nevertheless relatively low) do not match with TC genesis. Finally the Brier Skill Scores are low but close to those attained by Leroy and Wheeler 2008.

	z1	z2	z3	z4
W1	0.15	0.24	0.03	0.04
W2	0.12	0.21	-0.02	0.04
W3	0.15	0.10	0.01	0.01

TAB. 1 – Brier Skill Scores in each area for each lead time. Note that given the relatively small size of sample used to the calculate scores (a single season), the scores calculated can vary greatly with one TC forming or not.
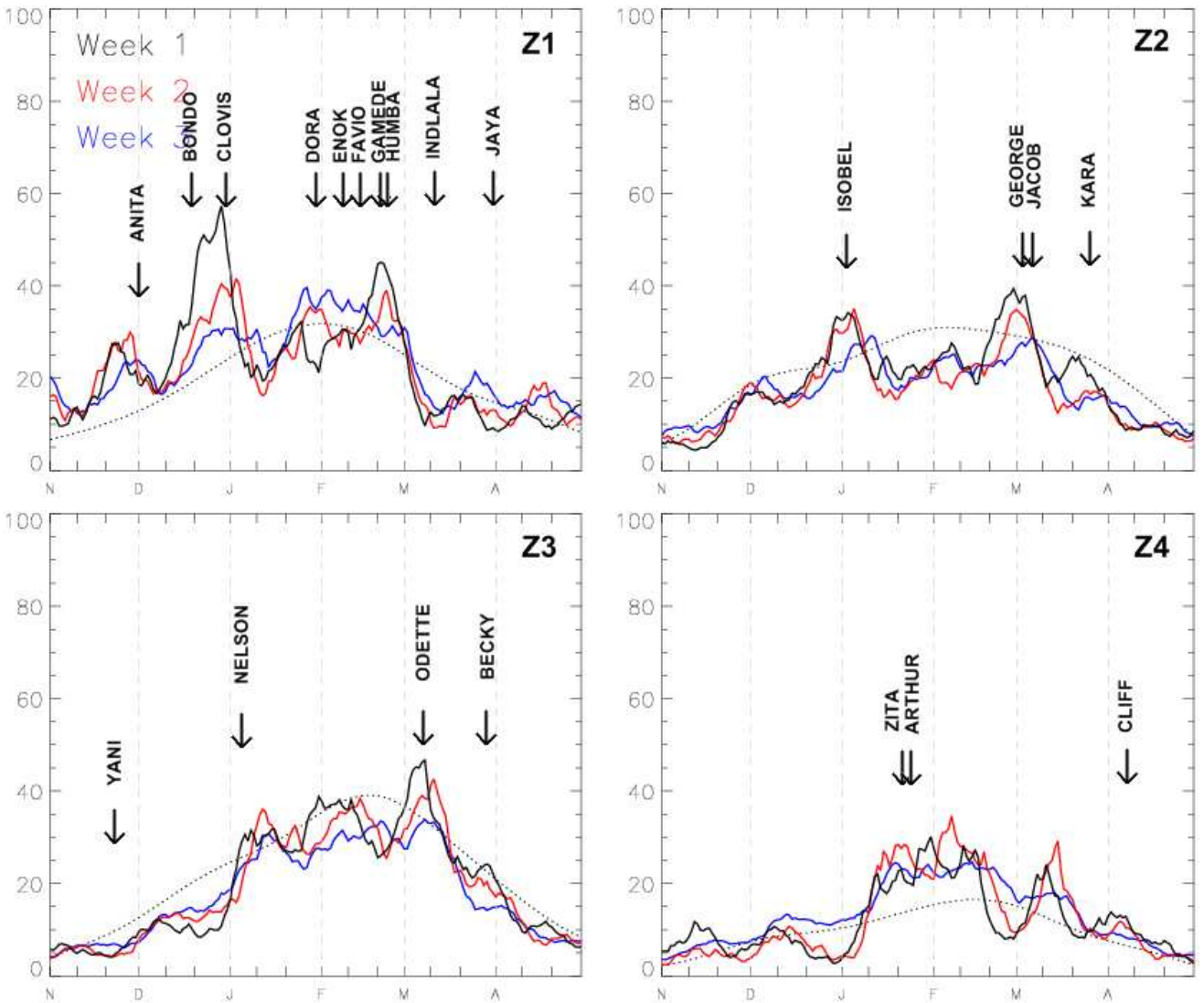
FIG. 1 – The genesis and occurrence probabilities over each area forecasted up to 3 weeks lead time : Week 1 (black) is the week from D to D+6, Week 2 (red) is the week from D+7 to D+13 and Week 3 (blue) is the week from D+14 to D+20, where D is the day when the forecast is issued. The climatological probability of genesis (in grey) is overlayed. The horizontal axis indicate the first day of the 7-day period for which the forecast is made from November 2006 to April 2007.

2 TC season 2007/2008

See Fig. 2 and Tab. 2.

z1 and z2

Peaks of forecasted probabilities match well with TC genesis. Especially in z1, TC genesis tend to cluster around the peaks of the forecasts, except for Bongwe. This is confirmed by the Brier Skill Scores : positive and even higher than 0.2 in z1.

z3

During the beginning of the season (November to January), peaks of forecasted probabilities match well with Funa and Guba. But overall, the forecasts perform significantly worse than the mean climatology (negative Brier Skill Score). This is partly explained by Gene and Daman, which formed near the eastern border of the region at the date line. At least, the statistical scheme had well seen that the TC genesis risk was further east compared to previous days/weeks (see forecasts for z4). Then (February to April), the ITCZ was located far to the south of its average position, in an area where there is probably too much vertical shear for cyclone genesis. Nevertheless, several tropical low, not reaching the TC intensity, formed independantly of the MJO state.

z4

Only one TC formed in z4 during a peak of forecasted probability. This is consistent with the known effect of La Niña in this region reducing the cyclogenesis risk. The 3 other peaks are relatively low : forecasted values are between 10 and 25 %. The overall Brier Skill Scores are close to zero.

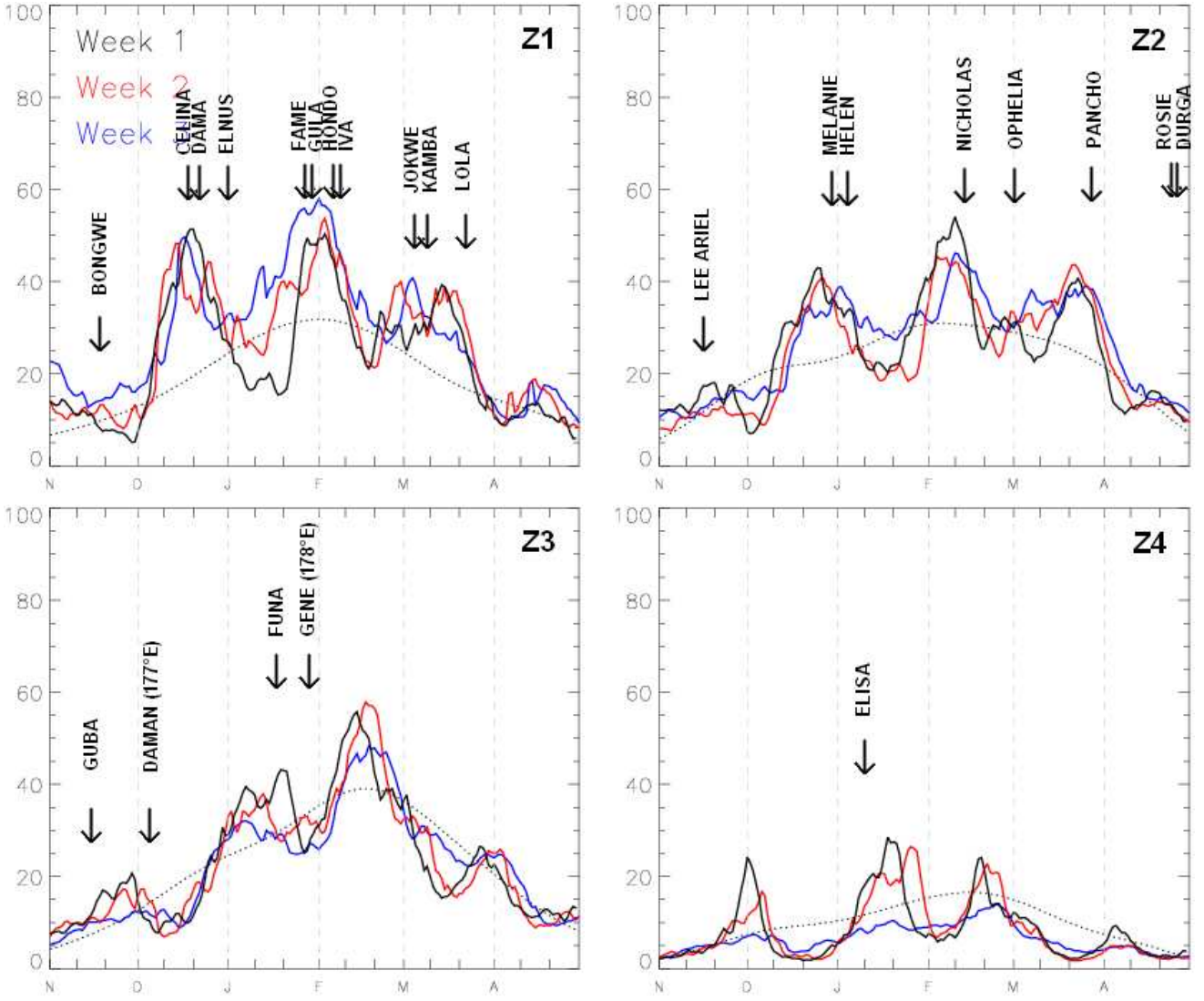|	z1	z2	z3	z4
W1	0.21	0.11	-0.15	0.00
W2	0.26	0.09	-0.13	-0.03
W3	0.24	0.04	-0.18	0.07

TAB. 2 – Similar to 1 but for TC season 2007/2008.

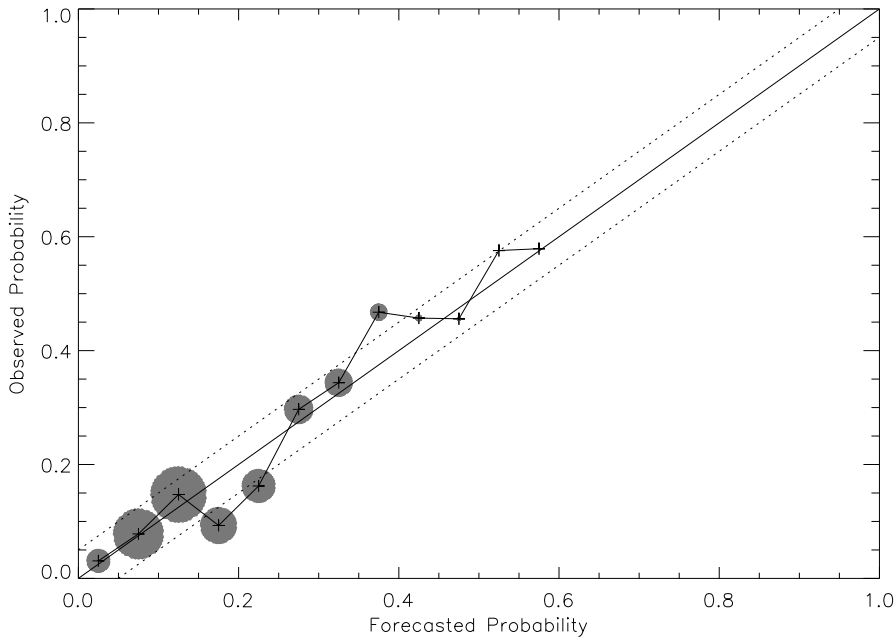Fɪɢ. 2 – Similar to 1 but for TC season 2007/2008.

FIG. 3 – Reliability diagram comparing observations to forecasts made in 2006/2007 and 2007/2008. All areas and lead time are included. For each of the 20 intervals of forecasted probability, the averaged observed probability is calculated and indicated with a plus symbol (+). Each plus symbol is surrounded by a grey circle whose radius is proportionnal to the number of observations within the interval. The diagonal lines indicate the perfect forecast (full line) and a 10 % interval centered on the perfect forecast (dashed lines).

3   Reliability diagram

In order to compare observations and forecasts, a reliability diagram is plotted (Fig. 3). Forecasts for all lead times, seasons and areas are included in order to have a large enough number of forecats and observations. The reliability curve is relatively similar to those obtained with (cross-validated) forecasts made over the training period.