Review of manuscript "Verification of pre-Monsoon temperature forecasts over India during 2016 with focus on heat wave prediction. By Harvir Singh, Kopal Arora, Raghvendra Ashrit and EN Rajagopal.

General Comments

This research on the predictability of heatwaves over India is of huge potential interest and humanitarian benefit given the loss of life suffered in these events. The authors demonstrate predictability in both deterministic and ensemble forecasts, with ensembles showing some marginal increase in skill. The manuscript is reasonably well organised but there are a lot of inconsistencies and technical errors that need addressed before this manuscript can be considered for final publication (see below).

Specific Comments

1. How much of the skill in predicting the heatwaves comes from persisting a heatwave already present in the initial conditions? How does the model perform when the heatwave evolves within the forecast range (e.g. Beyond days 2-3).
2. Synoptic evolution in heatwave case studies - It would have been good to also see the prevailing synoptic conditions and larger-scale flow conditions associated with these heatwaves (e.g. MSLP or low level winds) in both observations/analysis and deterministic and EPS (ensemble mean) forecasts. Perhaps also the time series of temperatures (deterministic and EPS members (at day 2, 5, 7), and Observations) over a specific region (e.g. Rajasthan) during one of the heatwave events would also give the reader a more physical feel for the predictability that is difficult to get just from the verification metrics alone. This is achieved to some extent by snapshots in Figs 4-7.
3. Could the authors provide more detail on how the various categorical scores are calculated for the EPS. Are the scores based on the ensemble mean vs. observations or do they use all 44 individual ensemble members to construct a score?
4. Page 6, lines 11-12 - "Deterministic forecast hardly shows any variation in either of the considered days and illustrates quasi-stationary characteristics of the deterministic forecast from Day-1 through Day-10 forecast". I don't really understand this or know which figure/result it is referencing. Can the authors clarify.
5. Figure 1 suggests that the deterministic forecasts (and to a lesser extent the EPS) underpredicts the frequency of heatwaves compared to observations over Indian land points. This appears to be inconsistent with later discussions around figures 2 and 3 which suggest that the deterministic and EPS over predict the number of heatwave days (>40) compared to the Observations? Can the authors explain this inconsistency?
6. In Fig 6. the NCUM and to lesser extent the NEPS forecasts show a growing warm bias over NW India with FC range. Do the authors have any physical explanation for this bias (e.g. soil moisture initialisation, model systematic errors in circulation?)
7. Predictability of heatwaves - In the summary the authors state "Unless the atmosphere is in a highly predictable state, we should not expect an ensemble to forecast extreme events with a high probability". It would be good to see some discussion of whether these heatwave events are highly predictable (e.g. links to large scale flow anomalies), given they seemed to be predictable several days ahead? Was the ensemble spread of Tmax smaller or larger than normal in these heatwaves?
8. Are there plans to use these EPS predictions of heatwaves to give warnings to the public?

Technical corrections

This manuscript suffers from a lot of technical errors and inconsistencies that make it difficult to read. Some of these relate to English useage but many are just errors that are easily corrected. I have listed the main errors below

1. A number of variations on the word "heatwave" appear in the manuscript (Heat wave, Heat Wave, heat wave and heatwave). Suggest authors provide a consistent spelling (e.g. heatwave).
2. Authors also refer to "deterministic models" and "ensemble models". This should be replaced with "deterministic forecasts" and "ensemble forecasts" throughout the text as both actually use the same model (UM).
3. Page 1, Line 9 removed "the" in this sentence - here we investigate extreme events (heatwaves)
4. Page 1, Line 22 - replace "...prediction the extreme events" with "...prediction of extreme events"
5. Page 1, Line 22 - I don't understand the sentence "Extreme Weather events **comprehend** non-linear interactions..."
6. Page 1, Line 30 - simplify this sentence "Based on multiple perturbed initial conditions, ensemble approach samples the errors in the initial..." to "It is based on
7. Page 2, line 1 - remove the first reference to Sarkar et. al., 2009, as it is repetitive.
8. Page 2 line 2 - Replace "Met office" with "Met Office"

9. Page 2 line 14 - replace “0.85 0°C” with “0.85 °C”
10. Page 2 line 15 - don’t understand how Molteni et. al. (1996) could be used as refrence for a warming trend covering 1880-2012!
11. Page 2 line 17 - assume that the annual mean temperature of 0.42 C per 100 years refers to the globally averaged temperatures. This should be made clear.
12. Page 2 line 21 - this paragraph begins with a sentence “Another study…” but the reference at the end of the sentence is Arora et. al. (2009) which was the same study discussed in the previous paragraph.
13. Page 2 Line 24 - not sure what "recently reiterated" means?
14. Page 2 line 28 - "sales" should read "scales"
15. Page 2 line 29 - the sentence "...using ensemble forecast forecasts both, deterministic and ensemble forecasting." is very convoluted, can I suggest "...using both ensemble and deterministic forecasts"
16. Page 3 line 9 - delete "and" in the following "...adopt **and** the most compatible score type"
17. Page 3 line 11 - this sentence is very repetitive.
18. Page 3 line 23 - remove "... which was 1°x1° resolution a few years earlier over Indian land area." As it is irrelevant for this study.
19. Page 3 Line 32 - replace "operational NCMRWF" with "operational **at** NCMRWF
20. Page 4 line 8 - replace "...MET Office" with "...Met Office MOGREPS system (Bowler et. al. 2008)" where reference is *Bowler, N. E., Arribas, A., Mylne, K. R., Robertson, K. B. and Beare, S. E. (2008), The MOGREPS short-range ensemble prediction system. Q.J.R. Meteorol. Soc., 134: 703–722. doi:10.1002/qj.234*
21. Page 4 Line 14 - replace "Uncertainty in forecasting model..." with "Uncertainty in **the** forecasting model..."
22. Page 4 line 16 - Remove this line as it is repetitive (see line 4-5 on this page which says the same thing)
23. Page 5 line 8 - Heidke skill score mentioned but not defined or used. Remove this reference?
24. Page 5 line 26 - replace "...efficiency" with "...capability"?
25. Page 6 line 9 - replace "... the figures (Fig. 5) and (Fig. 4)." with "Fig. 5 and Fig. 4."
26. Page 6 line 11 - use "**The** deterministic forecast..."
27. Page 6 lines 11-12 Replace "...any variation in either of the considered days and illustrates quasi-stationary characteristics of the deterministic forecast from Day-1 through Day-10 forecast" with "... any variation in either of the days and illustrates quasi-stationary characteristics from Day-1 through Day-10"
28. Page 6 line 13 - Remove "...and vary in not so distinctive fashion".
29. Page 6 line 15 - "Fig. (2.)" should read "Fig.2"
30. Page 6 line 15 - Remove "..(Tmax).."
31. Page 8 line 7 - Fig 10. should read Fig 9.
32. Page 8 line 18 - Fig. 9 should read Fig. 10.
33. Page 8 line 21 - missing end parentheses ")"
34. Page 8 line 23 - missing figure number.

Figures and tables

1. Figure 2 and 3 - the colour bar is labelled °C When the quantity is a count.
2. Table 2 title - "Causalities" should read "Casualties".