Interpreting TAMSAT-ALERT output

The aim of this practical is for you to practise interpreting probabilistic output from forecasting models. You will also have the opportunity to work directly with output from the TAMSAT-ALERT system. Before starting the practical, watch this YouTube video on interpreting box and whisker plots, if you are unfamiliar with them:

https://www.youtube.com/watch?v=Hm6Mra5XJSs

You have been provided with a spreadsheet, containing three sets of data. The first two columns contain an observed time series of WRSI for a averaged over a region and season in Southern Africa (Year and Observed WRSI). The season is the October – March growing season.

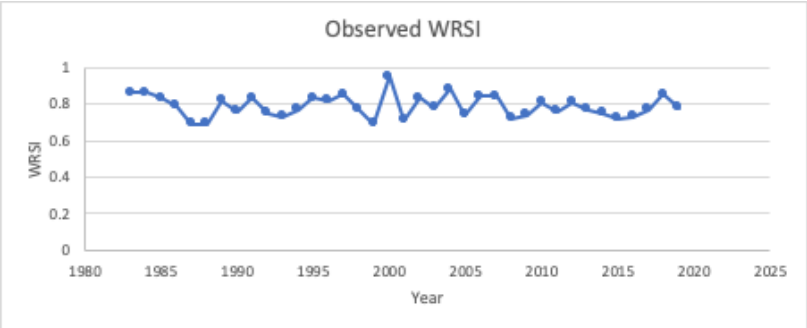
The second set of columns (Ensemble member, December forecast, February forecast) are WRSI for the same region and season as for the observations, but as they would have been forecast by TAMSAT-ALERT in mid-December and mid-February.

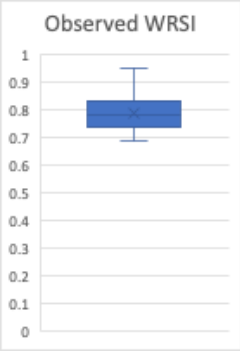
1. Plot a time series and box and whiskers plot of the observed data. To plot the time series, select the 'Year' and 'Observed WRSI' columns and then

   insert -> chart -> scatter.

   To make a box and whiskers plot, select the 'Observed WRSI' column and then

   insert -> select chart -> box and whisker





2. Use your plots to answer the following:

   a. Is this region at risk of seasonal agricultural drought (WRSI < 0.5)?

   No, the lowest value of WRSI in the past 35 years is about 0.75

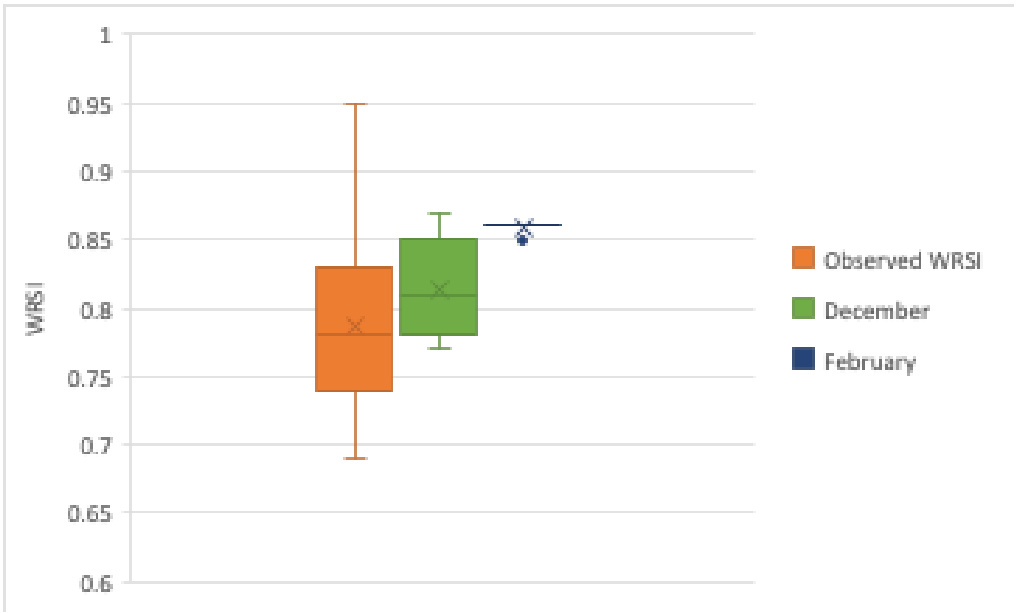
   b. Is there evidence of a climate change related trend in the model output?

   No, there is no clear trend

   c. Is there any need for irrigation in this region?

   There is insufficient information in these plots to determine whether there would be significant benefit from irrigation. Although the seasonal WRSI is good in almost all years, there may still be water shortages at key stages of the growing season. To determine whether this is the case, we would need to examine data at a higher time resolution – for example daily or weekly.

3. Now make box and whisker plots of the observed WRSI, and December and February forecast WRSI. [The simplest way to do this is to select all the data, then create a box and whiskers plot, as before, and then delete the un-needed series by selecting them within the chart]



4. Use your plots to answer the following:

   a. In December, are we forecasting WRSI to be higher or lower than average?

   The December predicted mean WRSI is higher than average, and therefore we are predicting WRSI to be higher than usual.

b. How confident can we be in this prediction?

We can be reasonably confident that the WRSI will be average or higher, but the spread of the ensemble is moderately large, so we can not yet be confident in the exact magnitude of the seasonal WRSI.

c. In February, are we forecasting WRSI to be higher or lower than average?

The February predicted mean WRSI is higher than average, and therefore we are predicting WRSI to be higher than usual.

d. How confident can we be in this prediction?

The ensemble spread is very small, so we can be confident in this prediction.

5. Reflecting on the previous session on the TAMSAT-ALERT predictions, why are we more certain of the seasonal WRSI in February than in December.

The TAMSAT-ALERT system is predicting whole season WRSI, and incorporates observations until the forecast date, and then an ensemble of possible futures for the remainder of the season. Here we are predicting WRSI over the October-March season. In December, we have observations for October and November, and December-March is based on multiple possible future weather scenarios. In February, we have observations for October, November, December and January, and we only need to use the multiple possible weather scenarios for February and March. With the season nearly at an end, we can therefore be confident in our whole season prediction.