This manuscript fits a statistical model to chloride deposition data in the Mount Lofty Ranges to enable a spatial surface of chloride deposition to be produced. A spatial surface of chloride would be very useful as an input to estimating groundwater recharge on a regional basis using the chloride mass balance. The manuscript aims to test the hypothesis that elevation, slope and aspect are important factors in chloride deposition.

The major problem with this paper is that it assumes that easting is an appropriate co-variate for predicting chloride deposition. The reasoning given for this assumption is that the wind comes from the west so therefore the chloride should too. To make this model fit the data, two data points (Murray Bridge and Tailem Bend) were excluded because they did not fit the trend with another data point (Mannum). The reason they did not fit the trend is because they are closer to the Southern ocean than St Vincent Gulf (see Figure i below).

If distance to the coast is used to predict the chloride deposition (for all 17 points) rather than the easting the model fit is much greater (see Figure ii below). The r^2 for distance from the coast is 0.711 compared to 0.620 for the easting. In previous studies of chloride deposition in Australia (e.g. Keywood et al) an exponential or double exponential decay function with distance from the coast has been used. If this model is used with the data set presented in this manuscript then the r^2 is 0.759. This simple model is a better fit to the data than the ASOADek model presented.

I cannot recommend this manuscript for publication as the methodology is flawed and the conclusions cannot be fully substantiated. Some detailed comments are below.

P5853, L14 CMB is most commonly used on the plains and rarely used in mountainous terrain. Runoff adds considerable complexity to the method. No justification is given as to why the CMB is appropriate in mountainous terrain.

P5854, L12 The siting of samplers in the open will underestimate chloride deposition because of impingement and entrainment of dryfall in the vegetation. How is this incorporated?

P5855, L13-8 How were the sites selected? There is no detail given on the elevation, aspect and slope of the sites even though the hypotheses to be tested are that elevation, aspect and slope are determinants in chloride deposition. The experimental design does not appear to be adequate to answer the questions posed. There are no mentions of transects up a constant slope or sites with equal elevation but different aspects.

P5855, L13-8 Why not include precipitation? Is it correlated with elevation, slope and aspect?

P5856, L10-4 Fig 2 does not support the assertion that both wet and dry deposition occur from the west. In Fig 2, only 2 of 8 plots show that the wind from the west is greater than the other directions. This is a key assumption in the methodology and it cannot be substantiated with the data shown.

P5857, L6-8 An r value close to +/- 1 does not indicate a physical causal relationship between the variables, it only implies there could be one. The language used in this sentence is far too definite.

P5859, L22 It is an assumption that the chloride comes from the west, not a fact.

P5859, L22-3 The “abnormally high” results come from the most southerly points. These are not outliers to be discarded because they do not fit the model. They highlight the deficiencies in the model. These points are closer to the Southern Ocean that St Vincent Gulf, could it be that this is the source of some of the salt? The assumption that all salt comes from the west may not be valid for these points.

P5860, L3 Kewood et al used a double exponential function for the relationship between chloride deposition and the coast to allow a much more rapid decrease in deposition close to the coast. Why was this model dismissed without trialling it?

P5860, L8 How can this be a “fact” if no alternatives were considered? Is this the best model or merely the one used for the study?

P5860, L22-7 How can dry deposition be extracted from bulk rainfall samples when it was not sampled for in the first place? I am not convinced that this is a valid analysis. The effect of precipitation upon deposition is removed and then the residuals are correlated with the distance from the west and this is proof that dry deposition is dependant upon distance from the west. There is no correlation between precipitation and deposition (tab 2), this has been shown many times because increased precipitation leads to a lower concentration of chloride in precipitation resulting in little change in deposition. By removing the effect of precipitation it is only noise that is removed and the original relationship remains – chloride deposition is correlated with distance to the west.

P5863, L11 – P5864, L9 Wet and dry deposition cannot be separated using this argument. On an inter-event basis there is often seen an inverse relationship between chloride concentration in rainfall and rainfall amount. This indicates that the atmosphere only holds a certain amount of chloride that can be rained out, big rainfall events are dilute, small ones are concentrated. This intra-event comparison has nothing to do with elevation.

P5864, L15-6 “we find that due to land-sea wind circulation, westerly and easterly winds frequently occur within a day” The author has provided proof that their assumption that chloride comes from the west does not always hold true.

P5864, L21-2 How can 9.00 am and 3.00 pm represent night-time and daytime when neither of them is during the night? This whole paragraph is pure speculation and actually diminishes confidence in the findings of the work. It should be deleted.

P5865, L14 Precipitation in summer is comparatively small over the study region. Perhaps an analysis of the deposition of chloride in summer and winter would shed some light on the wet vs dry fall argument?

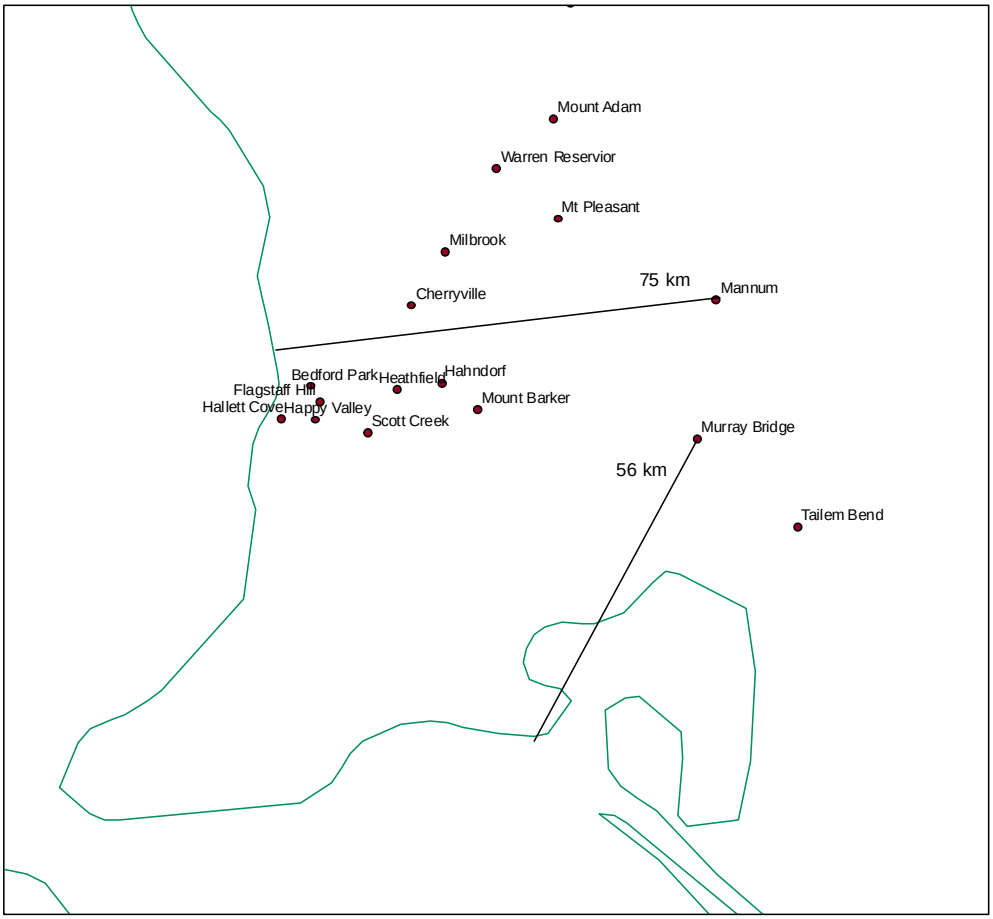

Figure i. Location of sites in relation to coast

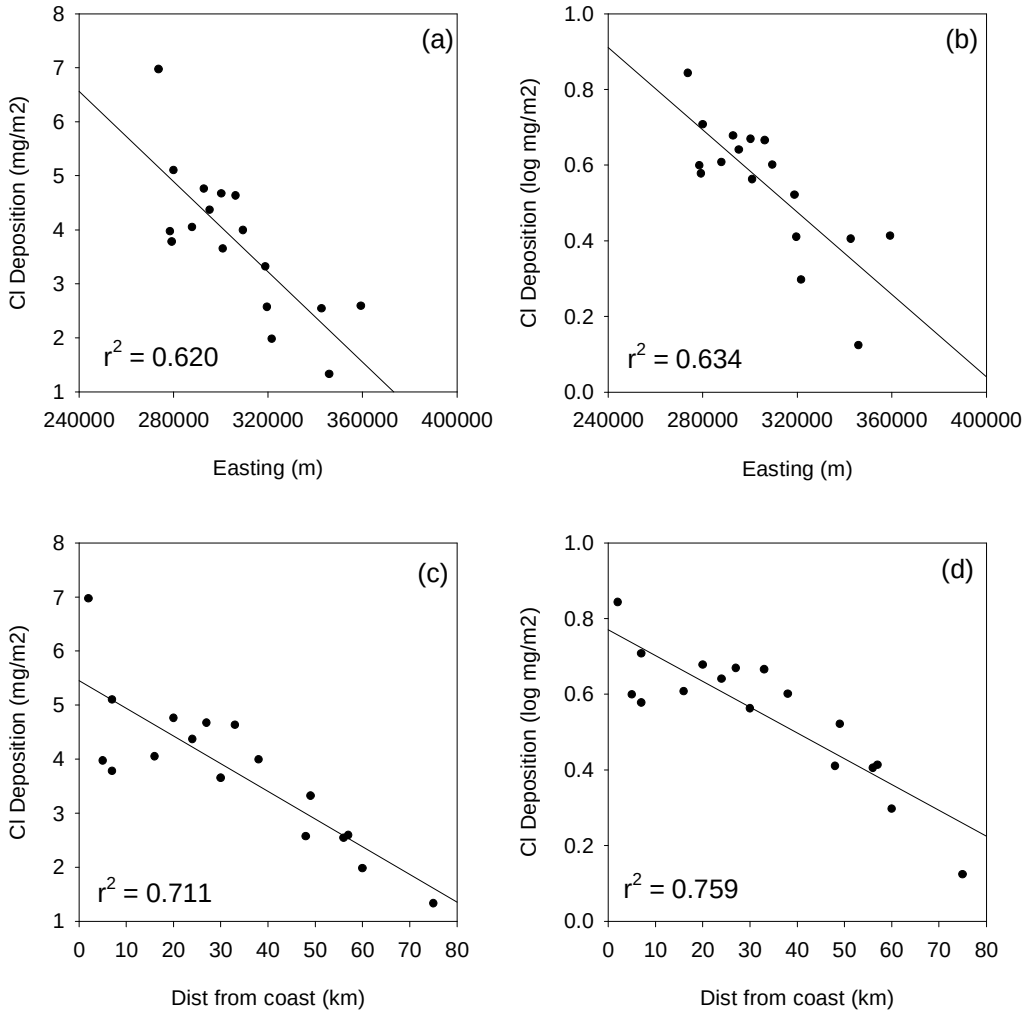

Figure ii. Chloride deposition with distance from the coast.