Abstract
The application of NWP to providing wind resource assessments is in its infancy. NWP displays potential as a resource assessment tool but requires refinement to be a viable option. For a resource assessment the ultimate goal is an output with minimal error compared to observations. Results show that some runs exhibit a relatively low RMSE compared to the mean, but the correlation between model and observations is low, implying the low RMSE may be fortuitous. It is advised to address model performance with respect to the correlation, improving the replication of atmospheric variability which will likely have a positive effect upon confidence in model output.

Introduction
Replacing observational resource assessment (RA) campaigns with NWP output could save millions of pounds. The application of NWP to wind RA is novel but widely accessible thanks to the flexibility of available models such as WRF. This research aims to investigate the potential of NWP as a wind RA tool. In a previous study 33 runs were undertaken using WRF-NMM (Hughes and Watson, 2012), presented here are the results of research intended to improve upon this model performance.

Method
Adopting a meteorological philosophy sought an improvement in the correlation over the previous research rather than RMSE. As a result changes were made which altered the dynamical performance of the model (table 1.). Differences in the spatial domains are shown in fig 1. WRF-ARW and WRF-NMM were both run to produce wind speed for the same 33 cases in 1996 and compared against 50m wind speed observations from the Scroby Sands meteorological mast.

Results
For the 33 cases run WRF-ARW runs display a stronger average correlation with observations (0.6125 v 0.3237) but with a marginally larger RMSE (1.6095 v 1.5483 ms\(^{-1}\)). Figure 2 is an illustration of one model run which exhibits a reasonable RMSE (~1.4 ms\(^{-1}\)) in the context of other results but a poor correlation (0.37) to observations.

Discussion
Considering the mechanics of the model was key to gaining the performance advantage from the model changes. If the techniques had been restricted to improving RMSE, on-going research indicates a potential improvement of maybe -0.05 in RMSE and 0.05 in correlation. Changes to address dynamic model performance resulted in an increased correlation, implying an improvement in model simulation of atmospheric processes. While RMSE wasn’t reduced in this case, more confidence can be assigned to the accuracy of the model output. Figure 2 shows one example where model output is close to the same value as observed, however at times, the trends are almost inverse. Correcting such dynamic inaccuracies and maintaining or improving RMSE will result in a more desirable and reliable output.

Conclusions
Significant progress remains to be made improving model performance but the future is bright for the application of meteorological research in the field of renewable energy. This research highlights the importance of concentrating on improving the model as a meteorological tools and not simply refining the output with error reduction techniques.

Reference