Reliability of Modelled Wind Data

- Climate models can generally model climate variables well e.g., temperature, mslp BUT they have a problem modelling wind speeds and direction.
- GCMs - coarse resolutions

  e.g., HadCM3 2.5º x 3.75º

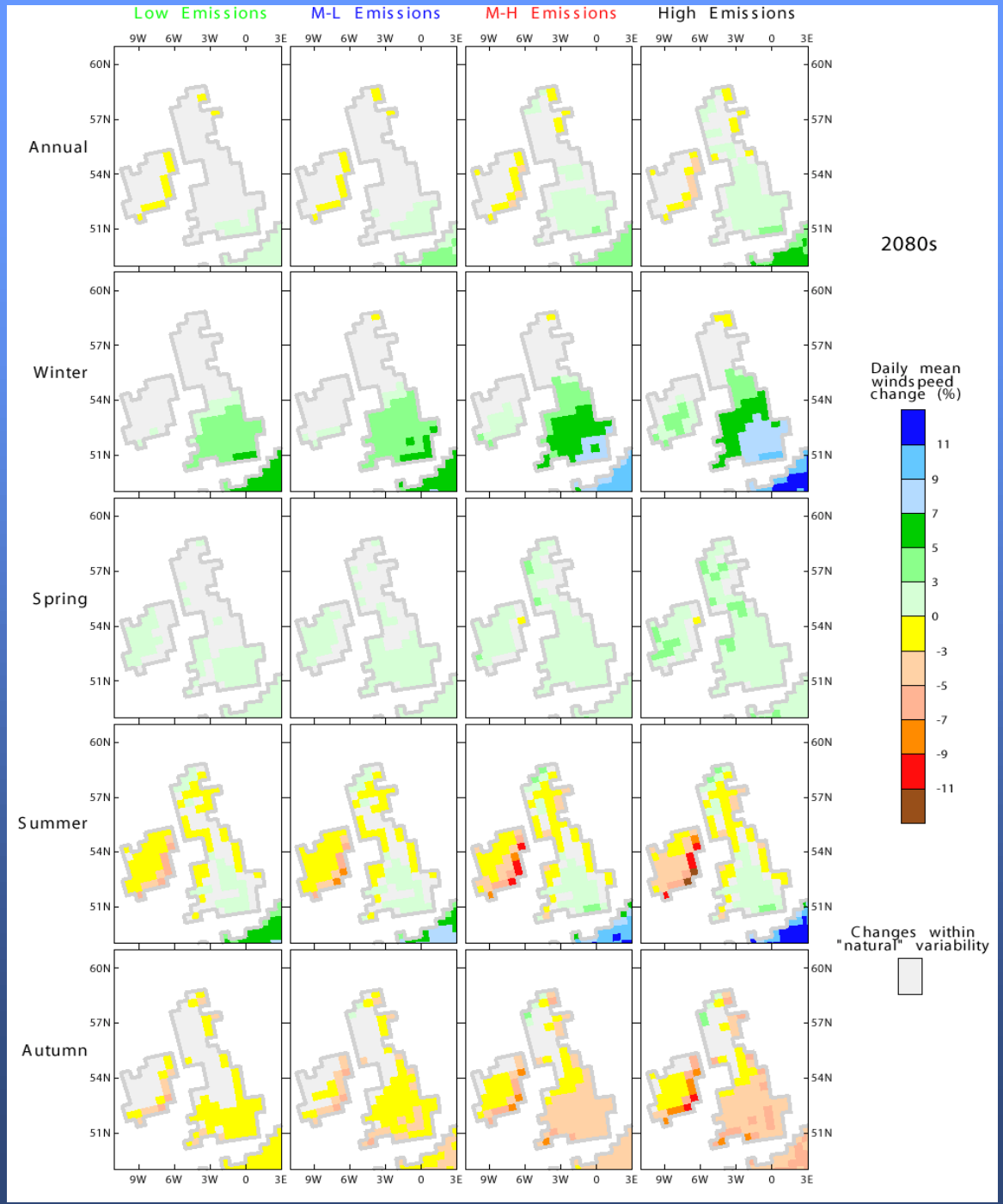
  e.g., HadAM3H 2.5º x 1.875º

  e.g., HadRM3H 0.44º
- Even the high resolution RCM is too coarse to model very small scale features of the circulation.
- Wind speed values are averaged over the grid box - at the highest resolution this is ~50km^2, and over time - average daily wind speed. Limited use in impacts modelling.

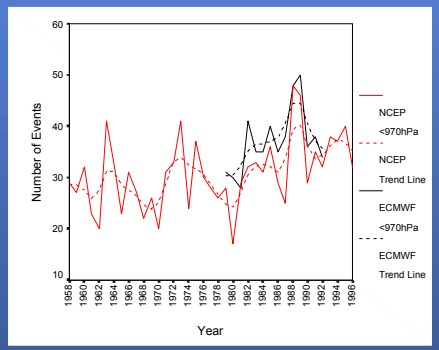
UKCIP02 Results

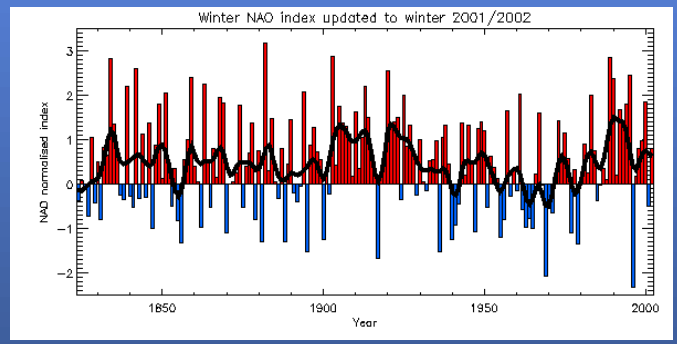
Change in Mean Daily Wind Speed - advise the use of empirical relationships to obtain statistics at shorter timescales

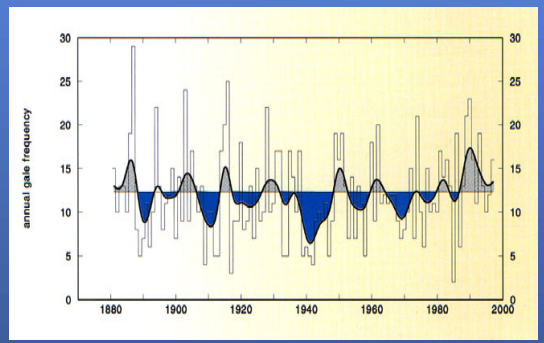
e.g., max. mean hourly wspd = 30% greater than daily mean wspd.

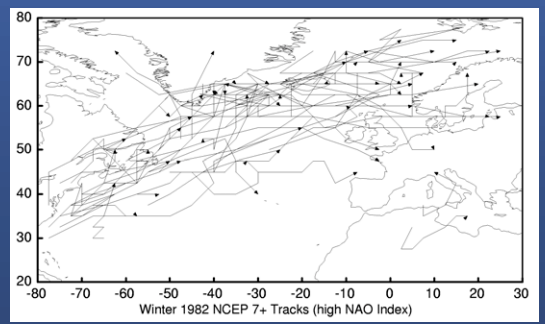


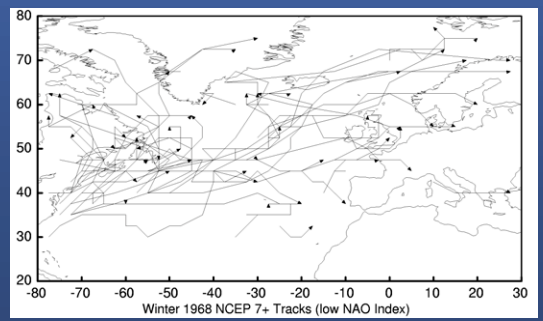
- If we can't rely on modelled wind speeds, what's the alternative?
- The NAO, cyclone activity and wind speeds are closely related.
- Hadley Centre models are amongst the most accurate in modelling the North Atlantic storm track.
- So what do they tell us about future cyclone activity?



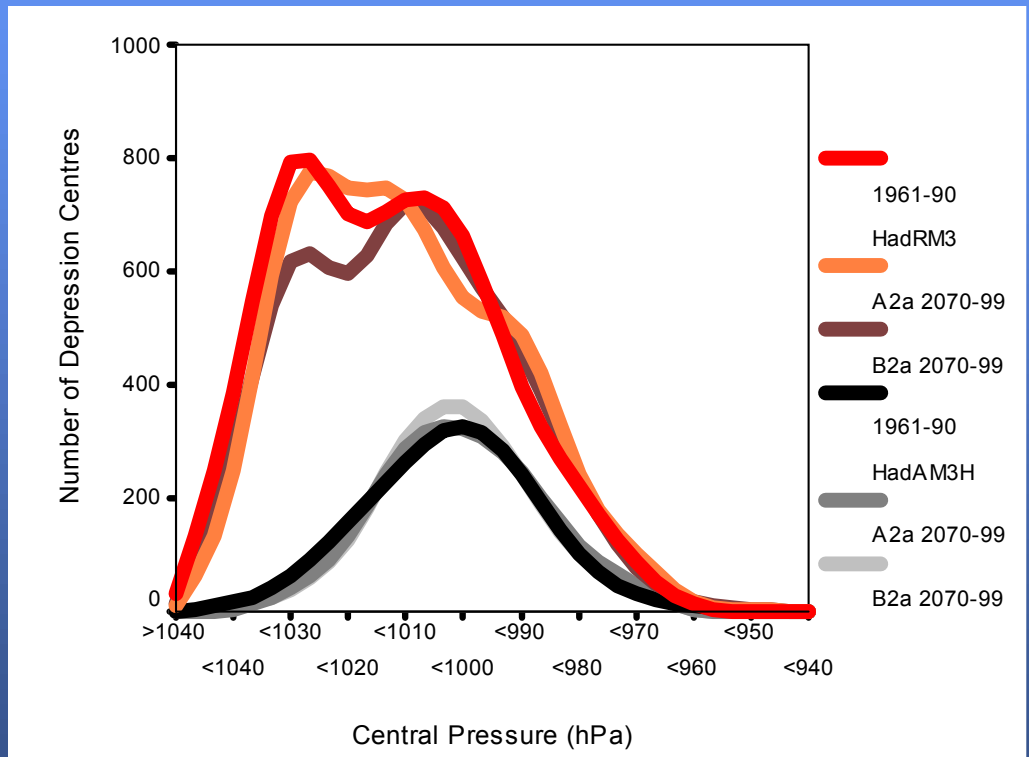








Intensity Distribution over the UK

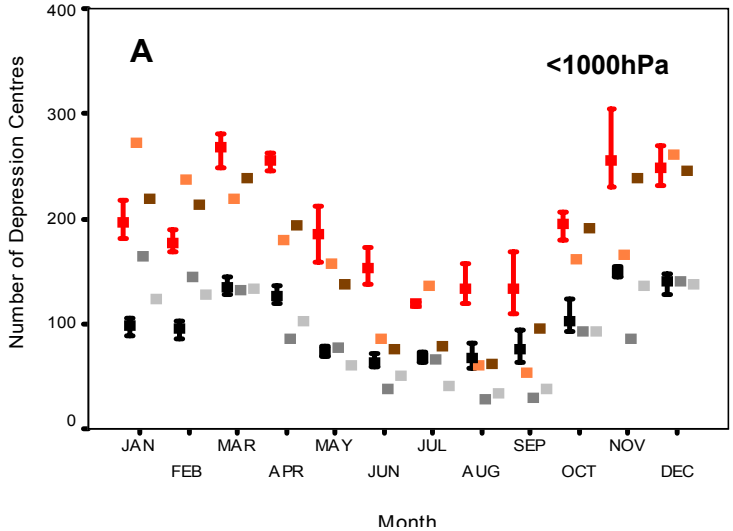


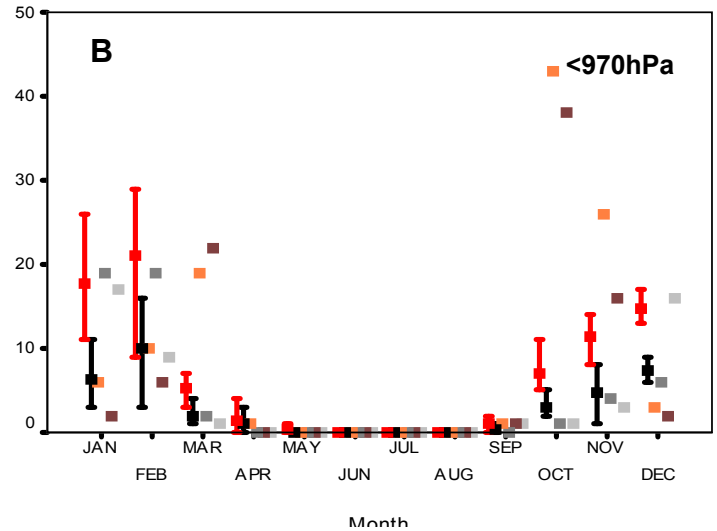
Red = RM3

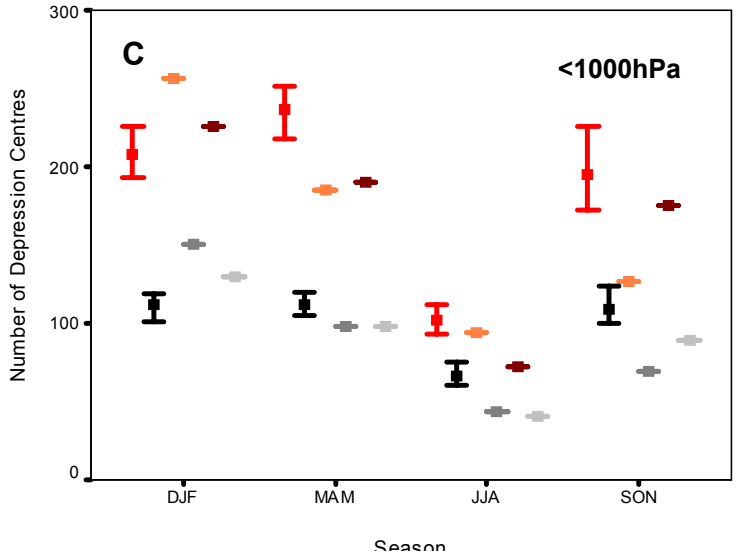
Black = AM3H

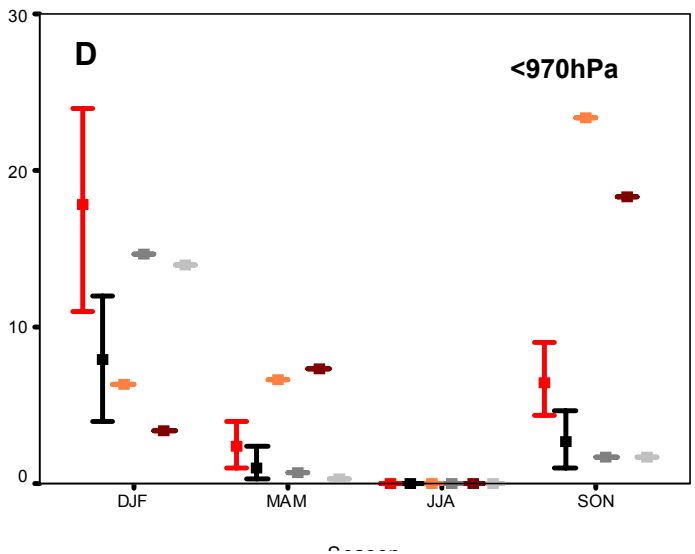
Orange/Dark grey = A2aF

Brown/Light grey = B2aF



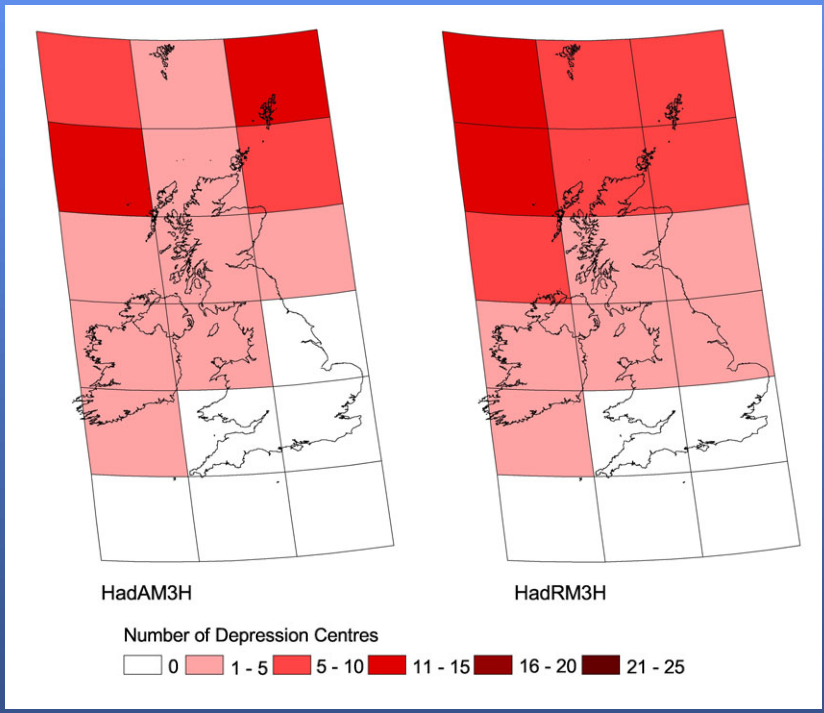


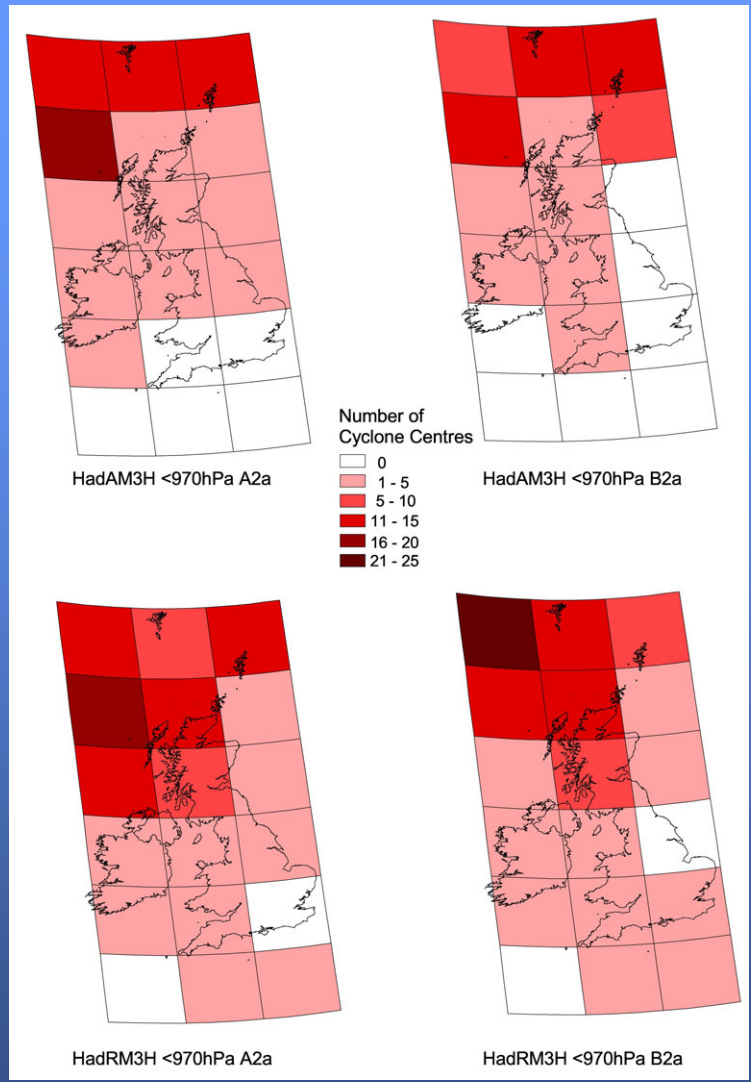




Monthly/Seasonal Distribution over UK

Present and Future Spatial Distribution





How can we use this information to develop wind scenarios?

- **Fact:** We have seen no significant change in cyclone intensity, frequency or spatial distribution in the future.
- **Option:** use present day climatologies to generate wind scenarios.
- The Tyndall Centre project is using an exposure variable based on the FCs DAMS score (50m resolution) to interpolate observed wind speeds for cyclone events between stations.
- **Benefits:** sub-daily time steps (NCEP and ECMWF Reanalysis Data at 4xdaily time step). Station data = mean hourly wind speed, gust speed and direction.