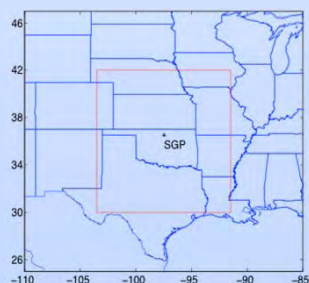


Motivation

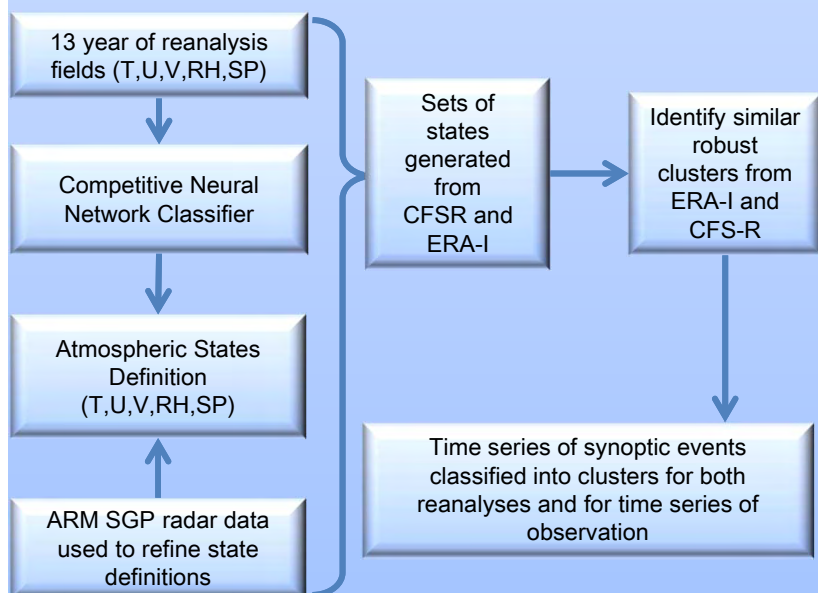
- Different models including different parameterization schemes are used in ERA-I and CFS-R reanalyses
- We want to understand if
 - a) the models produce similar dynamical stats
 - b) similar dynamical stats produce similar cloud properties
- Compositing model and observational data by atmospheric states allow us to compare cloud and radiative by state and identify possible source of error.

Region of interest



- Reanalysis is sampled on a 9x9 horizontal grid within the red box
- Vertically pointing millimeter radar at the ARM Southern Great Plains site used to measure cloud profile.

Conceptual flow chart



Examples of State analyses

The following states frequently occur in sequence, demonstrating the algorithm's ability to discern different stages of a passing front.

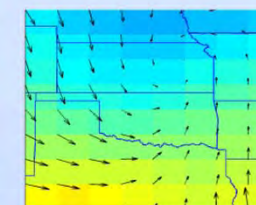
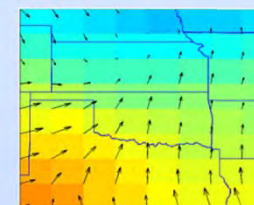
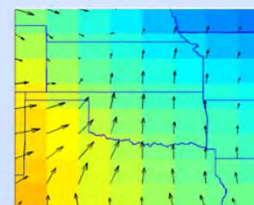
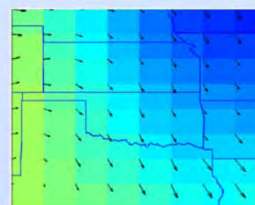
High pressure, clear and cold

Warm sector / cold front generating

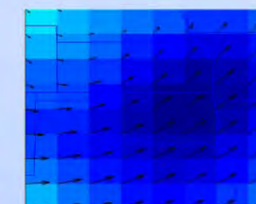
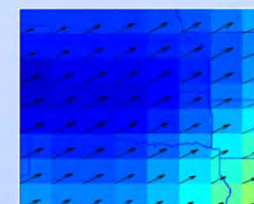
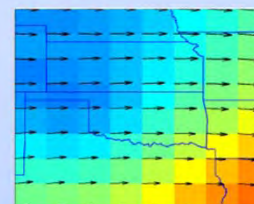
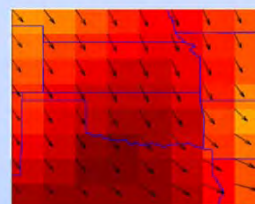
Arriving cold front

Front has passed, cooling the region

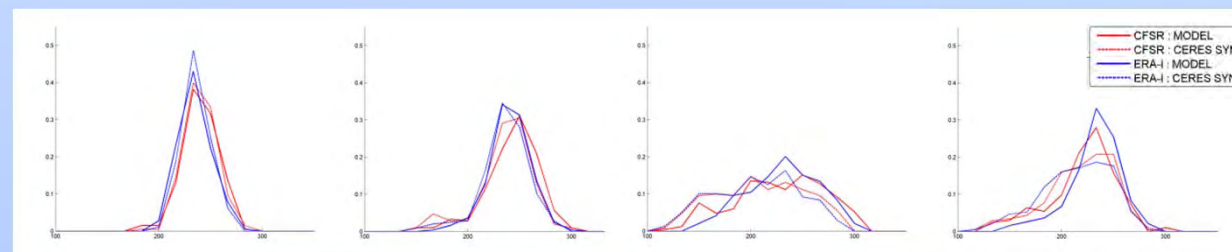
1000 hPa temperature and winds



Surface pressure anomaly and 500 hPa winds



All sky OLR



Conclusion

- States with similar meteorology and cloud profiles are produced independently in each reanalyses. Time series show that these states can represent successive phases of synoptic events.
- By comparing the associated OLR profiles of matching states we are able to evaluate the ability of reanalyses to reproduce radiative fluxes. OLR agreement is generally good but model distributions tend to be narrower (have less variability) than those from data
- Ongoing work includes comparing physical variables. Evaluating cloud parameterization is hampered by lack of cloud property values in reanalyses outputs.