

## **C20C Project on Weather Noise**

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The project will use output from existing C20C ensemble simulations to compare the properties of the actual atmospheric weather noise implied by the various models. The weather noise would be computed by subtracting ensemble and monthly mean simulated fields from observational analyses, such as NCEP, ERA-40, MERRA, .... Ideally, we would like to look at fields such as surface fluxes of heat, momentum, and fresh water; SLP; precipitation; 500 hPa height etc. Below are two potential uses for this product:

- 1) Model verification. Determine whether the weather noise inferred from a model satisfies the causality principle that the weather noise is unpredictable. The parameterizable (predictable) part of the weather noise should be included in the ensemble means of the simulations; hence, the residual should be unpredictable if the model is realistic (e.g. Rodwell and Folland 2002). Predictability can be determined from simple lag regression analyses (e.g. does the North Atlantic tripole index predict future weather noise surface fluxes?). If the weather noise does not satisfy the causality principle, the model is not realistic.
- 2) Studies of low frequency coupled climate variability: Use the weather noise surface fluxes to force simplified coupled models (such as versions of the Interactive Ensemble CGCM) to analyze properties and mechanisms of the low frequency SST variability forced by weather noise.

One issue with this project is it requires 2D fields from ensemble mean results from C20C runs made by several models.