

**ATS/CIRA Colloquium**

**Clara Deser**

**Visiting from the NCAR Climate and Global Dynamics Division**

**Isolating the Effects of Anthropogenic Aerosols and Greenhouse Gases in the CESM1 Large Ensemble**

**Hosted by Jim Hurrell**

**3 p.m. Thursday, Nov. 14  
ATS room 101**

The CESM1 initial-condition Large Ensemble (LENS) has been widely used to disentangle forced climate change from internal variability at regional scales. Here, we introduce a complementary set of single-forcing ensembles with CESM1 to study the individual roles of GHG and anthropogenic aerosols (AA) in the evolution of multi-decadal trends since 1920, with a focus on large-scale patterns of tropical precipitation and SST. The forced trends in LENS evolve from an inter-hemispheric pattern dominated by AA forcing early in the 20th century to an equatorially-symmetric pattern dominated by GHG forcing later on, with the cross-over point in the mid-1970s. Forced trends in LENS are weakest during 1950-2000 due to a combination of reduced AA forcing and compensating effects from GHG. Approximately 10 members are needed to isolate the patterns of the forced response from internal variability in the single-forcing ensembles. Our preliminary attempts to attribute evolving trends in the observational record highlight the challenges posed by the prominent role of internal variability and data constraints.

Link to colloquia page: <https://www.atmos.colostate.edu/colloquia/>