1. Motivations

A) The vital role of thermocline fluctuations in ENSO cycle was well established
B) The relationship between thermocline and SST in the equatorial Pacific is not straightforward

2. Data

A) Z20 (a proxy for thermocline):
   - Z20 derived from three ocean reanalyses: ORA-S3 (Balmasneda et al. 2008; 1959-2009); ORA-S4 (Balmasneda et al. 2013; 1958-2013); and SODA (Carton and Giese 2006; 1958-2008)
B) SST:
   - OISST, version 2 (Reynolds et al. 2002): late 1981 - present
   - CSR SST, version 3 (Smith et al., 2008): 1854 - present
C) Surface wind stress:
   - ERA-Interim reanalysis (Dee et al. 2011): 1979 - present
   - NCEP/NCAR reanalysis (Kalnay et al. 1996): 1948 - present

3. Seasonality of Z20-SST relationship

4. Verification with SST nudged CGCM simulations

Experiments description
Running coupled models with model SSTs strongly nudged to observations:
2) CFSv2L: 6-members; 1982-2010

5. Linkage with ENSO spring barrier and Decadal variations

6. Key Points

1) Strong seasonality is found in the Z20 and SST relationship: weakest during spring;
2) The seasonality could be seen in CGCM simulations with model SSTs strongly nudged to observations;
3) Decadal shift of Z20-SST relationship agrees with ENSO SST persistency changes.

7. References
