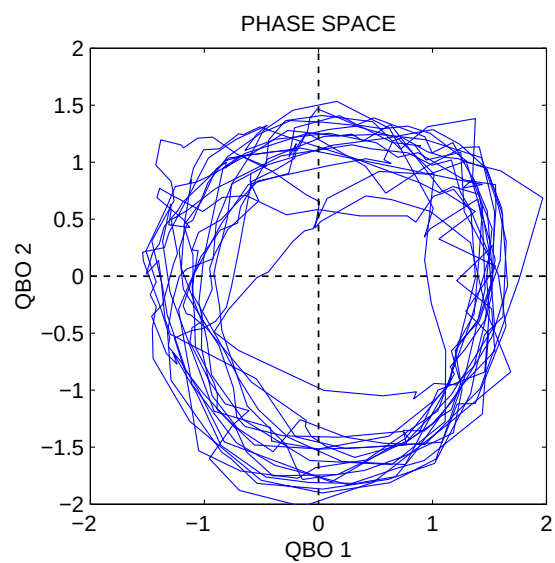
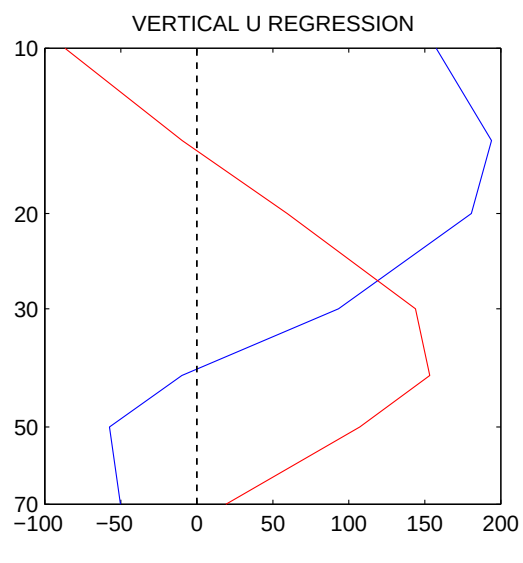
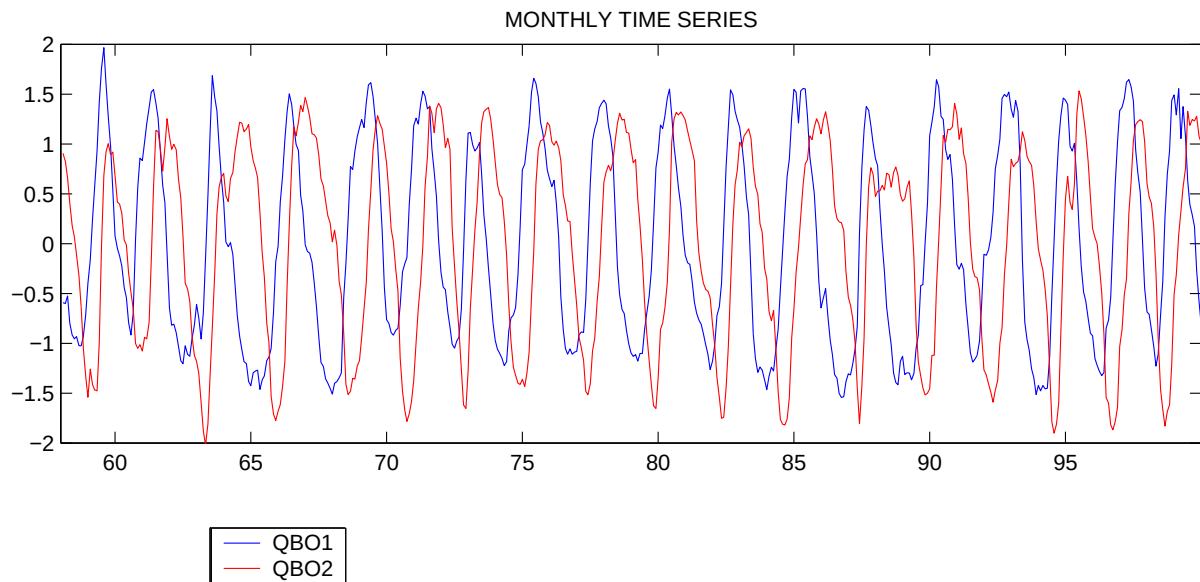


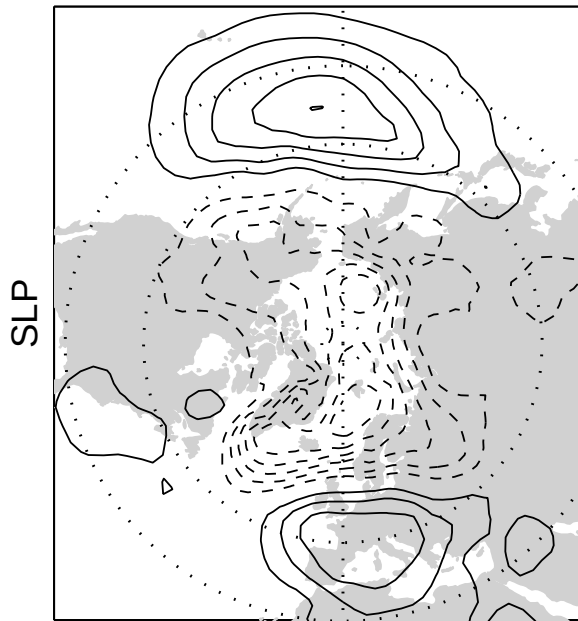
- *Surface signature of the QBO cycle*
- *Interannual variability: NAM, ENSO, trends*

Roberta Quadrelli and Mike Wallace

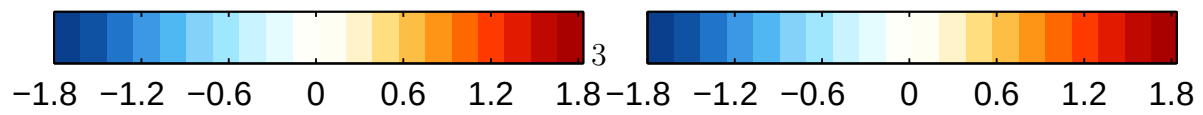
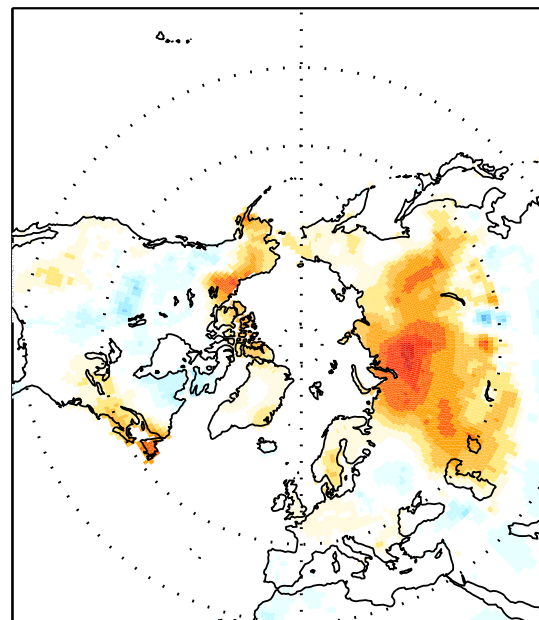
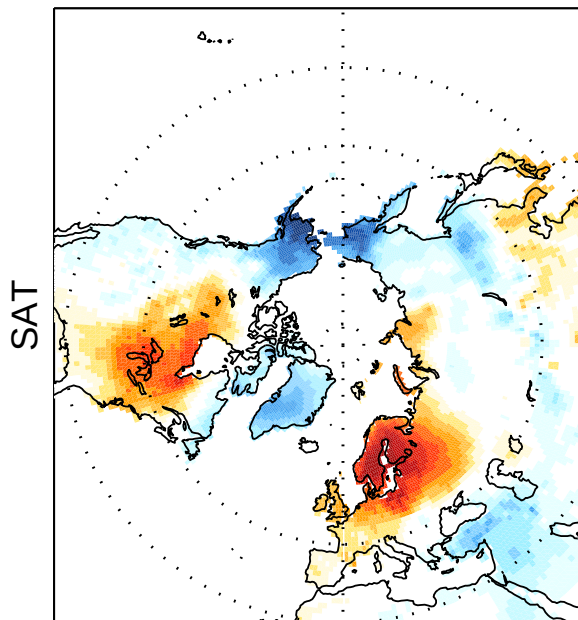
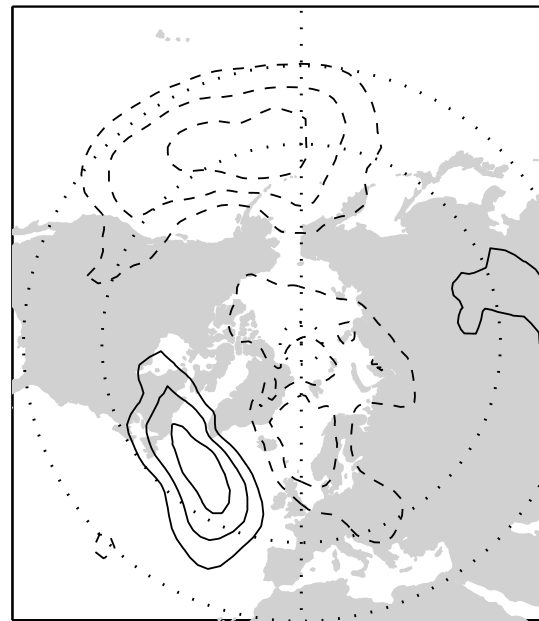
University of Washington, Seattle



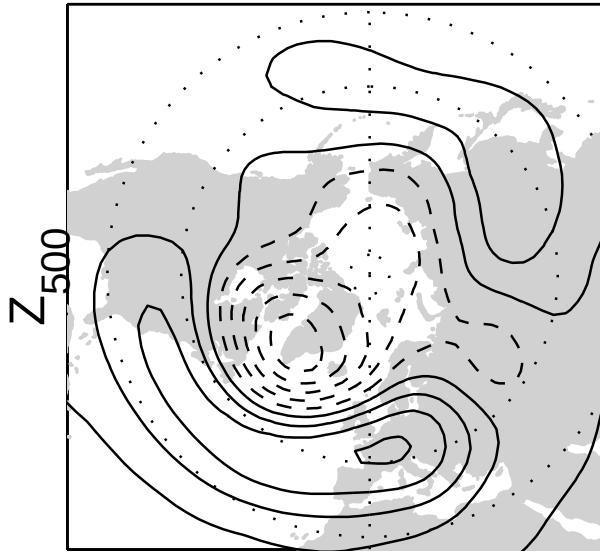
QBO1



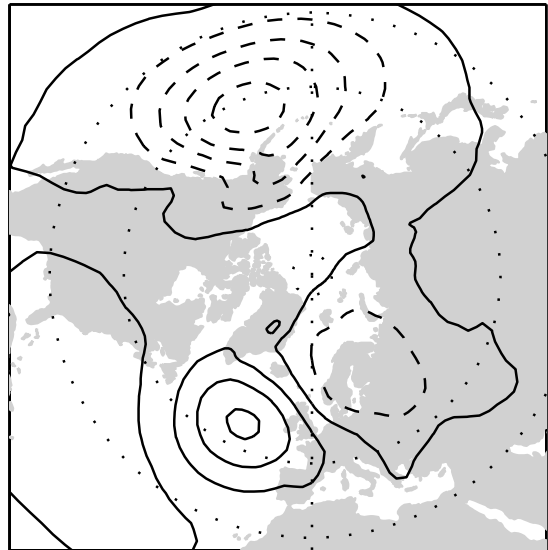
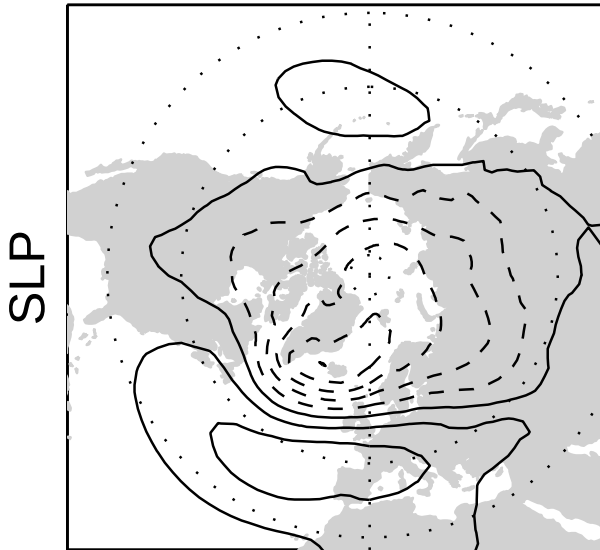
QBO2

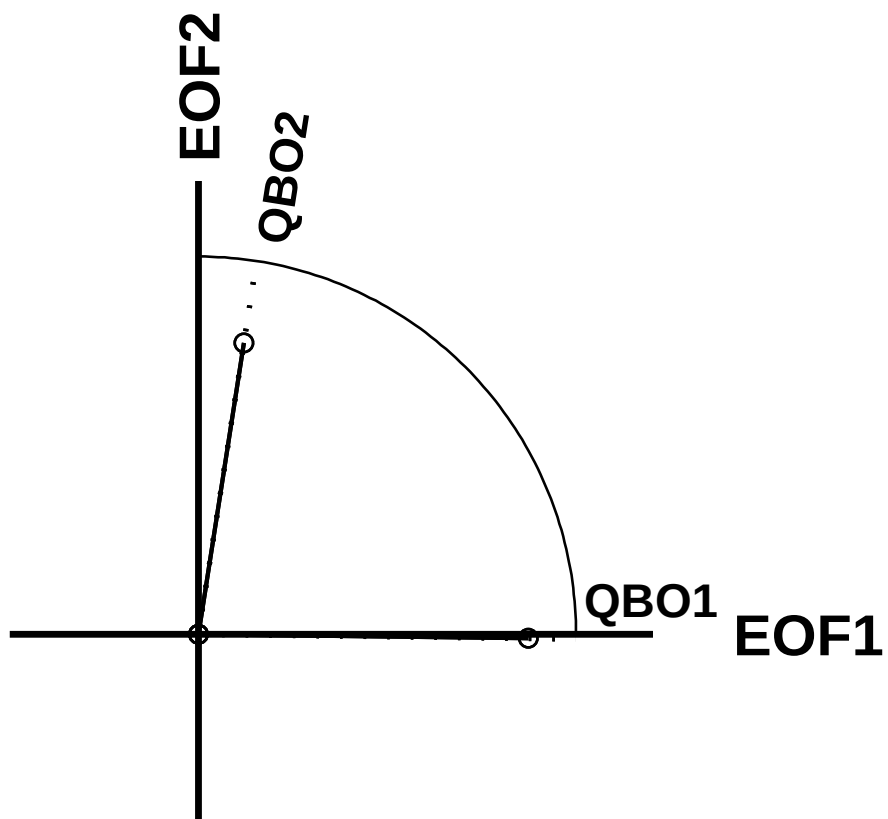


PC1



PC2

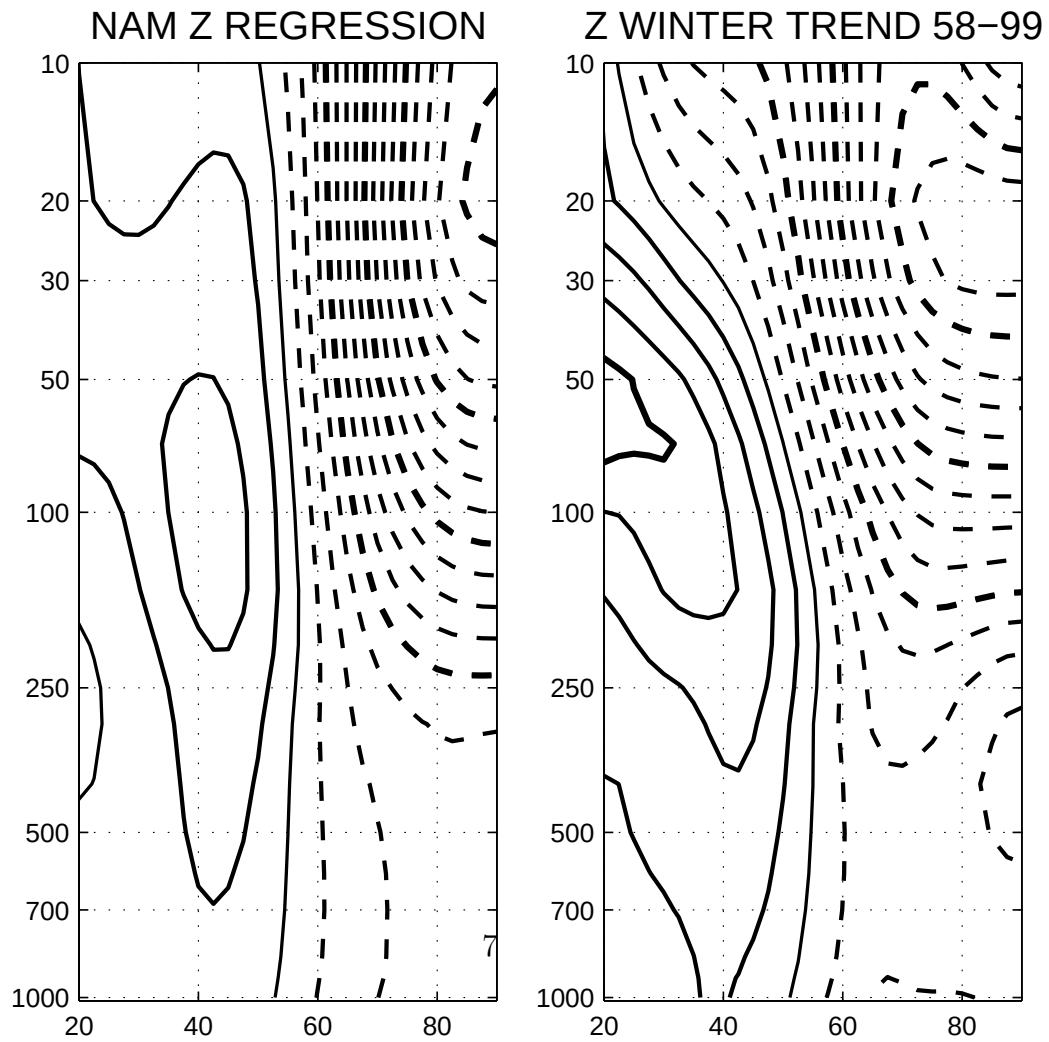




Summary

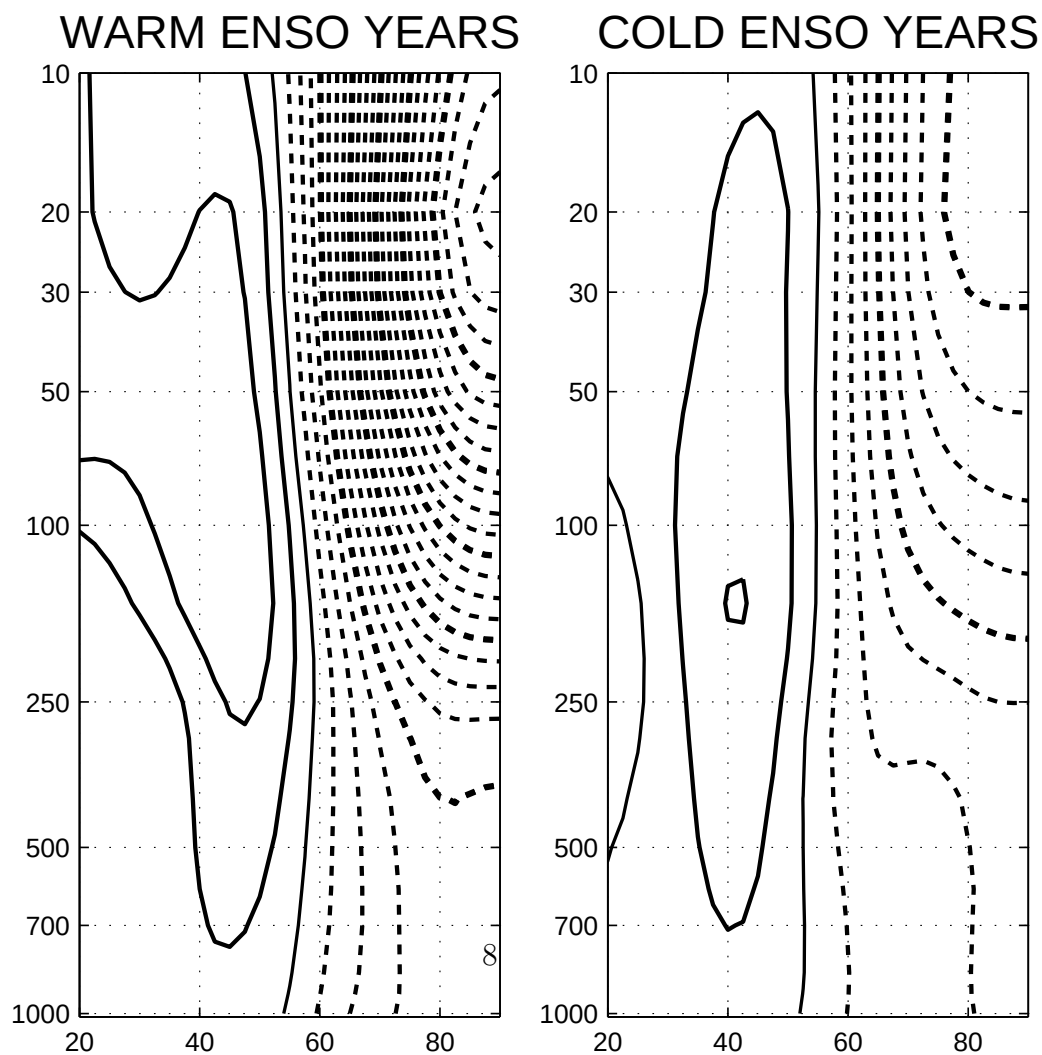
- QBO as a combination of 2 modes:
 - ★ Every winter classified
 - ★ Projection on surface modes
 - ★ Linear signature on SLP- SAT:
 - ~10% of winter mean SLP variance
 - "Intraseasonal" features

NAM and TRENDS



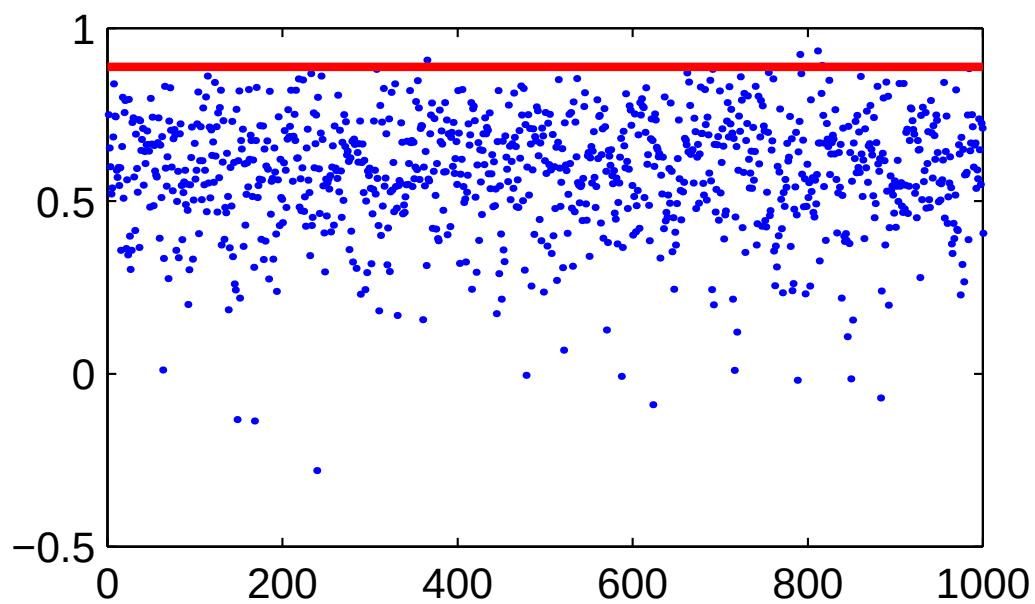
Contours every 10 m (left); Contours every 4 m per 10 yrs (right).

NAM Z REGRESSION



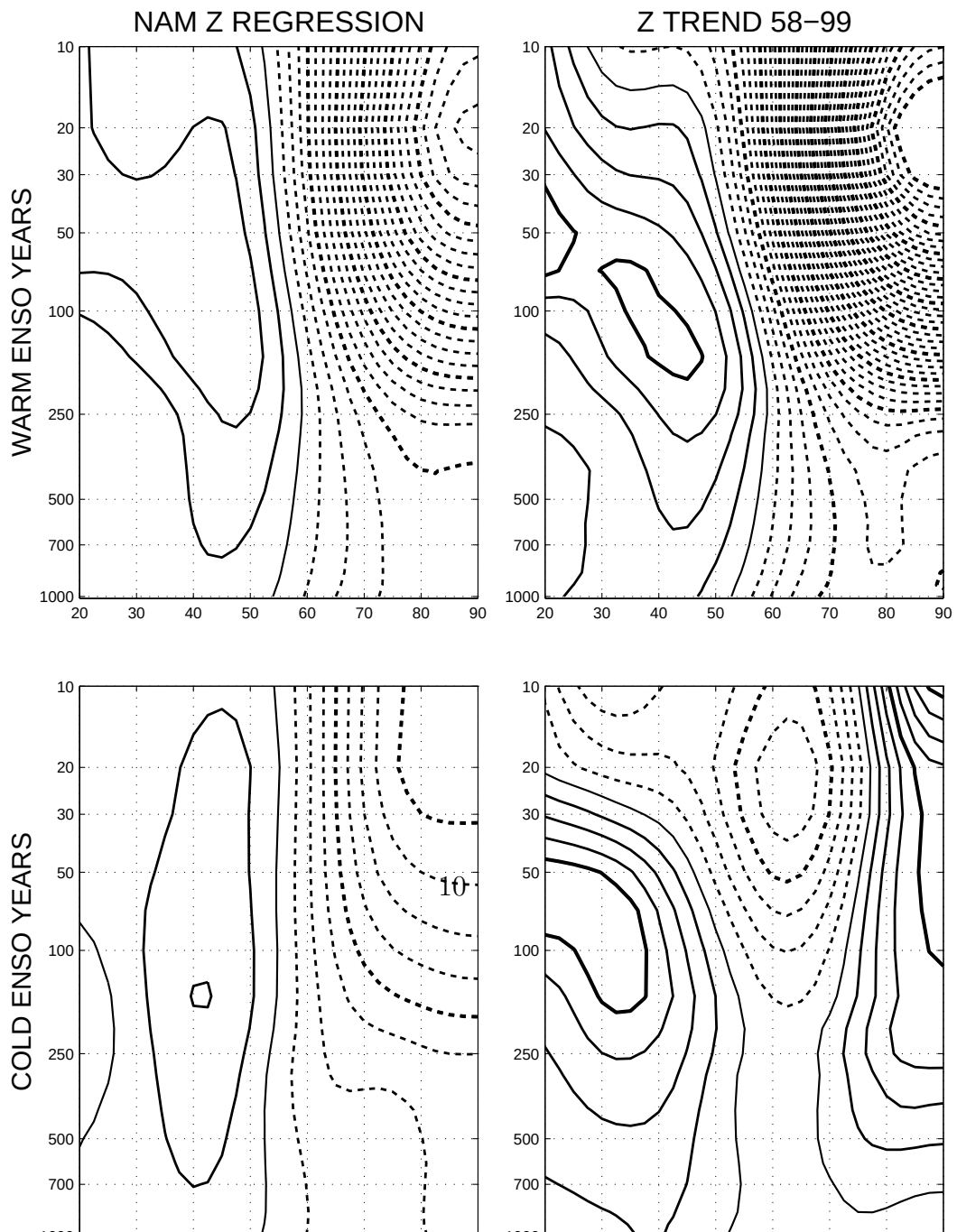
Contours every 10 m

SLP PC1-30hPa PC1 WARM WINTER CORRELATION

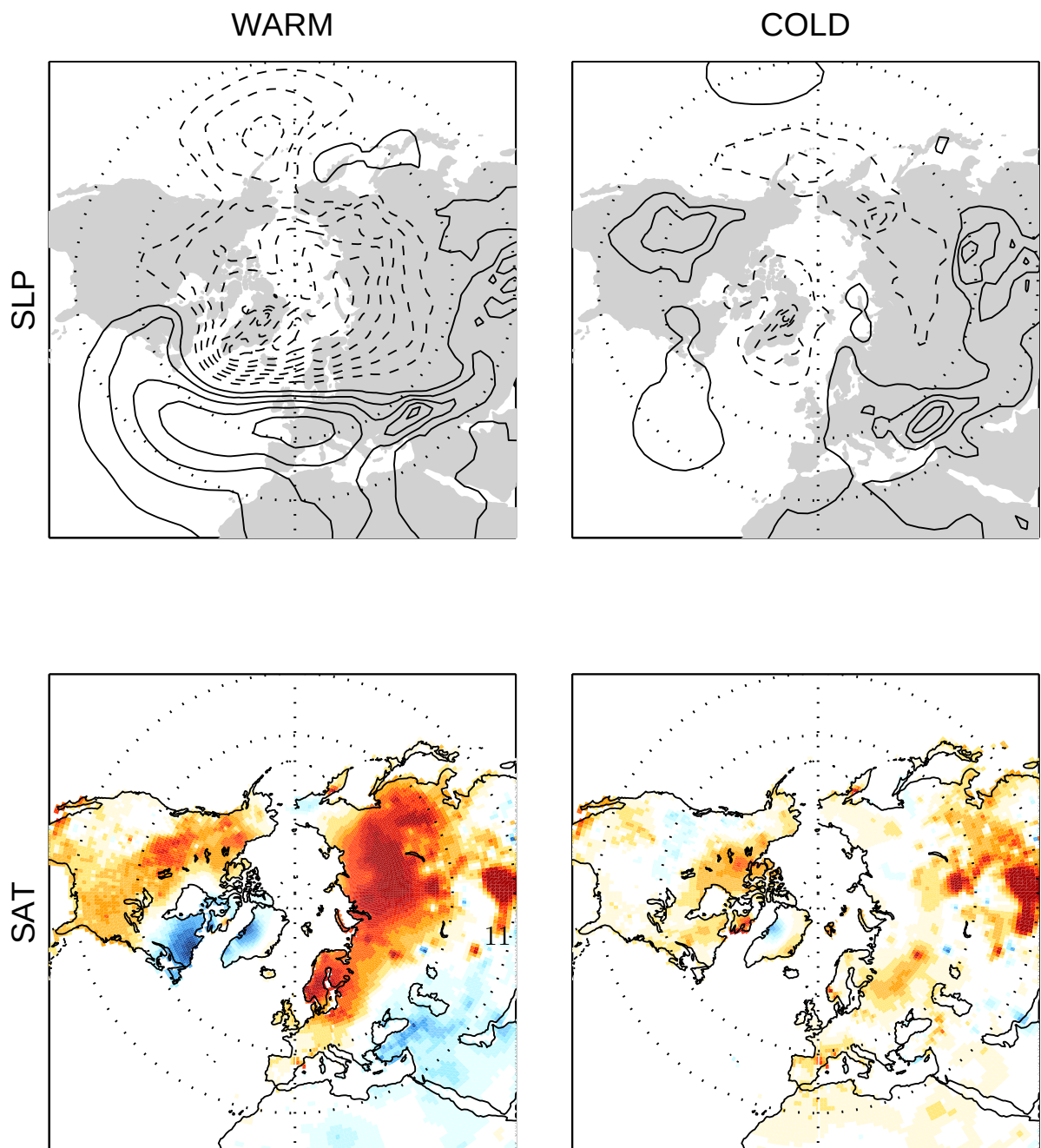


$r=0.89$, 99.6%

NAM, ENSO and TRENDS



SLP and SAT WINTER TRENDS 58-99: WARM vs. COLD ENSO YEARS



SLP contours every 0.5hPa per 10 yrs; SAT contours every 0.2 degrees per 10yrs.

Summary

ENSO phases modulate:

- ★ Vertical coherence of NAM
- ★ Strength of observed linear trends
- ★ Projection of trends onto NAM structure

Non- linear dynamics?

Impact on climate prediction