



## **Effect of the Seasonal Cycle on ENSO in a Simple Linear Model**

**K. Stein**, F.F. Jin , N. Schneider , A. Timmermann

University of Hawaii

The El Niño - Southern Oscillation (ENSO) displays two prominent seasonal characteristics: 1) the seasonal synchronization of event peaks during boreal winter, and 2) the "spring barrier" in persistence – the drop off of seasonal autocorrelations and the associated decay of model predictive skill. Historically, these two phenomena have been studied separately, and the physical mechanisms responsible for setting ENSO's seasonal behavior are not yet fully understood. This study proposes an extension of the Recharge Oscillator framework that includes the effect of the seasonally varying background state of the equatorial Pacific. This simple framework allows for the examination of both of ENSO's leading seasonal characteristics in terms of ENSO's growth rate and frequency. We find that the timing of ENSO event peaks is set by the seasonally varying growth rate parameter, whereas the existence of the spring barrier is found to be due to the combination of both the growth and frequency parameters. Additionally, the first order physical effects of the varying background state on ENSO are incorporated into the simple framework, allowing for the calculation of ENSO's growth and frequency parameters from natural system data and global coupled model output.