"Dynamics and Predictability of 2-Year La Niña"

The predictability of La Niña, the cold phase of El Niño/Southern Oscillation (ENSO), has not received much research attention because La Niña is generally thought as the mirror image of El Niño and therefore obeying the same dynamics. Predicting the onset of La Niña is trivial, as they always follow an El Niño. However, predicting the termination (i.e. the duration) is extremely challenging, since often La Niña events last for an additional second year. Determining the predictability of these 2-year La Niña events is important for predicting the duration of associated impacts throughout the world, such as drought over North and South America or floods in Australia. In this talk I will present results from numerical experiments performed with the Community Earth System Model (CESM1), a climate model capable of stimulating realistic 2-year La Niña. The stimulations show that as La Niña events become stronger, the strength of the delayed thermocline feedback-the mechanism responsible for the onset and termination of ENSO events-does not increase proportionally. This non-linearity results in weaker damping rates for strong La Niña events enhancing their persistence. One implication from this result is that depending on the initial conditions, the duration of La Niña could be skillfully predicted before the onset of La Niña, that is, more than 18 months in advance.