Distinguished Speakers'

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Phase locking, predictability barrier and coupling in tropical climate

Speaker: Prof. Moon, Woosok
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Earth's orbit and axial tilt imprint a strong seasonal cycle on climatological data. Climate variability is typically viewed in terms of fluctuations in the seasonal cycle induced by higher frequency processes. We can interpret this as a competition between the orbitally enforced monthly stability and the fluctuations/noise induced by weather. Here we introduce a new time-series method that determines these contributions from monthly-averaged data. We find that the spatio-temporal distribution of the monthly stability and the magnitude of the noise reveal key fingerprints of several important climate phenomena, including the evolution of the Arctic sea ice cover, the El Nino Southern Oscillation (ENSO), the Atlantic Nino and the Indian Dipole Mode. In analogy with the classical destabilising influence of the ice-albedo feedback on summertime sea ice, we find that during some time interval of the season a destabilising process operates in all of these climate phenomena. The interaction between the destabilisation and the accumulation of noise, which we term the *memory effect*, underlies phase locking to the seasonal cycle and the statistical nature of seasonal predictability. Furthermore, we expand this approach to two-dimensional dynamical systems to include interactions between two subsystems of the climate. In particular, based on a two-dimensional dynamical system, we can discuss the mutual relationship between ENSO and IOD.

School of Urban & Environmental Engineering

- **When : 2019.07.15. (Mon) 16:00**
- **Where: Bldg.110 (EB4), Room.N101**
- **Host : Prof. Cha, Dong-Hyun**
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