ORAL 06

기후 스마트 농업 평가를 위한 생태계의 자기 조직화 능력 정량화

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Toward Quantifying Self-organization Capacity of Ecosystem for Climate-smart Agriculture Assessment

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Climate-smart agriculture (CSA) initiative provides practical objectives that facilitate the development of holistic indicators for quantitative evaluation and monitoring. However, quantitative measurement of resilience which associated to second objective of CSA is still challenging. From complex system perspective point of view, self-organization capacity of a system has been proposed as an indicator for system resilience in terms of power spectrum entropy. Wavelet analysis of time series data can be used to obtain wavelet power spectrum entropy (WHsn) which provide local-time scale information and the variation over time. WHsn ranged from 0 to 1, in which close to 0 implies the time series is composed of periodic cycles and varies orderly. In this context, 1-WHsn may be used as a measure for evaluating the self-organization capacity of the ecosystem (i.e. key mechanism for resilience). The pontetial of 1-WHsn as an indicator of self-organization capacity is tested by using time series of gross primary productivity (GPP) over agricultural ecosystem of Haenam Farmland in Korea (HFK). Individual years reprensent the variation in agricultural management and environmental condition were selected and analyzed for different sampling interval (i.e. 30 minutes, daily, and 8-days). Our result demostrate that 1-WHsn able to capture the change in ecosystem self-organization overtime. The interpretation of current finding and the effect of using different data sampling interval to the variability 1-WHsn will be presented and discussed.

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