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Application of Wavelet Analysis on Variability, Teleconnectivity, and Predictability November-January Taiwan rainfall

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Abstract
First the wavelet analysis was used to analyze the variability of winter (November-January) rainfall (1974-2006) of Taiwan and seasonal sea surface temperature (SST) in selected domains of the Pacific Ocean. From the scale average wavelet power (SAWP) computed for the seasonal rainfall and seasonal SST, it seems that these data exhibit interannual oscillations at 2-4-year period. Correlations between rainfall and SST SAWP were further estimated. Next the SST in selected sectors of the western Pacific Ocean (around 5°N-30°N, 120°E-150°E) was used as predictors to predict the winter rainfall of Taiwan at one season lead time using an Artificial Neural Network calibrated by Genetic Algorithm (ANN-GA). The ANN-GA was first calibrated using the 1974-1998 data and independently validated using 1999-2005 data. In terms of summary statistics such as the correlation coefficient, root-mean-square errors (RMSE), and Hansen-Kuipers (HK) scores, the seasonal prediction for northern and western Taiwan are generally good for both calibration and validation stages, but not so in some stations located in southeast Taiwan and Central Mountain.