Using Moving North Pacific Index to Improve Rainy Season Rainfall Forecast over the Yangtze River Basin by Analog Error Correction

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A new analog error correction (AEC) scheme based on the moving North Pacific index (MNPI) is designed in this study. This scheme shows obvious improvement in the prediction skill of the operational coupled general circulation model (CGCM) of the National Climate Center of China for the rainy season rainfall (RSR) anomaly pattern correlation coefficient (ACC) over the mid-to-lower reaches of the Yangtze River (MLRYR). A comparative analysis indicates that the effectiveness of the new scheme using the MNPI is better than the system error correction scheme using the North Pacific index (NPI). A Euclidean distanceweighted mean rather than a traditional arithmetic mean, is applied to the integration of the analog year's prediction error fields. By using the MNPI AEC scheme, independent sample hindcasts of RSR during the period 2003–2009 are then evaluated. The results show that the new scheme exhibited a higher forecast skill during 2003–2009, with an average ACC of 0.47; while the ACC for the NPI case was only 0.19. Furthermore, the forecast skill of the RSR over the MLRYR is examined. In the MNPI case, empirical orthogonal function (EOF) was used in the degree compression of the prediction error fields from the CGCM, whereas the AEC scheme was applied only to its first several EOF components for which the accumulative explained variance accounted for 80% of the total variance. This further improved the ACC of the independent sample hindcasts to 0.55 during the 7-yr period.