Multi-time Scale Co-integration Forecast of Annual Runoff in the Source Area of the Yellow River

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Abstract

In order to reveal the multi-time scale of rainfall, runoff and sediment in the source area of the Yellow River and improve the accuracy of annual runoff forecast, the Complete Ensemble Empirical Mode Decomposition with Adaptive Noise(CEEMDAN) method is introduced to decompose the measured rainfall, runoff and sediment data series of the Tangnahai hydrological station in the source area of the Yellow River of China. With the co-integration theory, two new error correction models(ECM) for the forecast of annual runoff in the source area of the Yellow River are constructed. The results show that rainfall, runoff and sediment in the source area of the Yellow River have multi-time scales and the component sequences have co-integration relationships. For two new ECM models, the CEEMDAN component ECM model has better forecast accuracy than the original sequence one. The relative error of all forecasted values is less than 15% except 2009, and the accuracy has reached level A.

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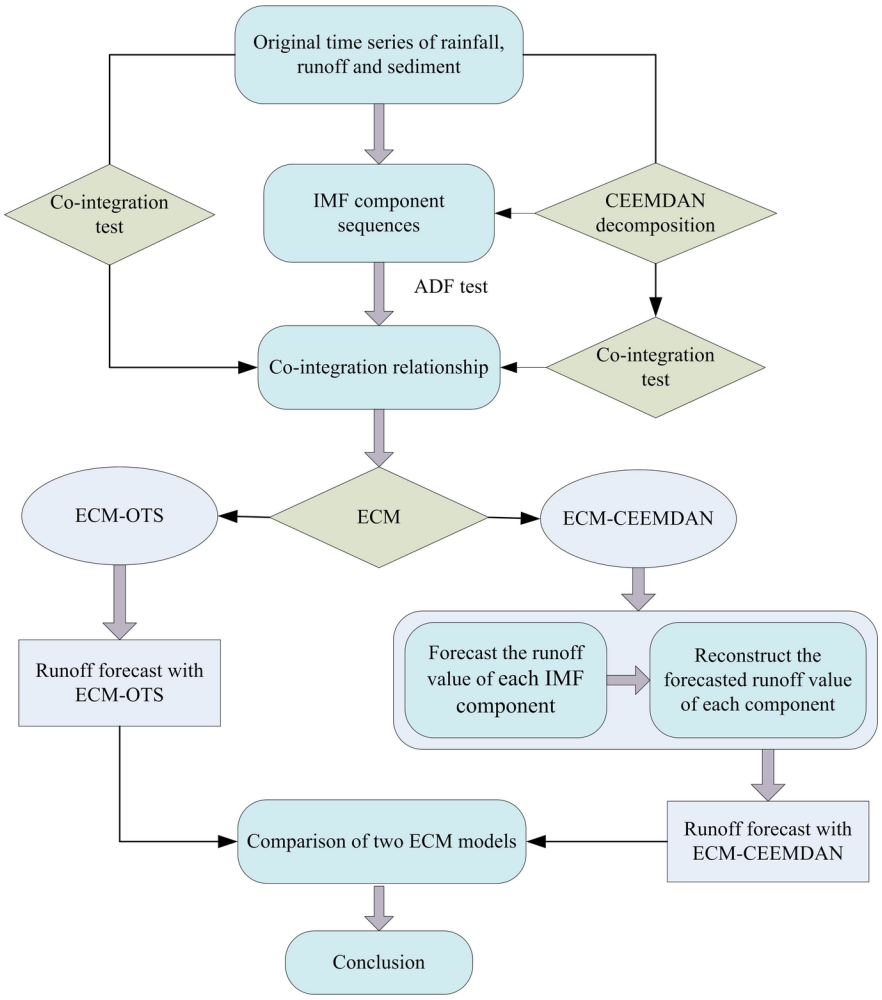

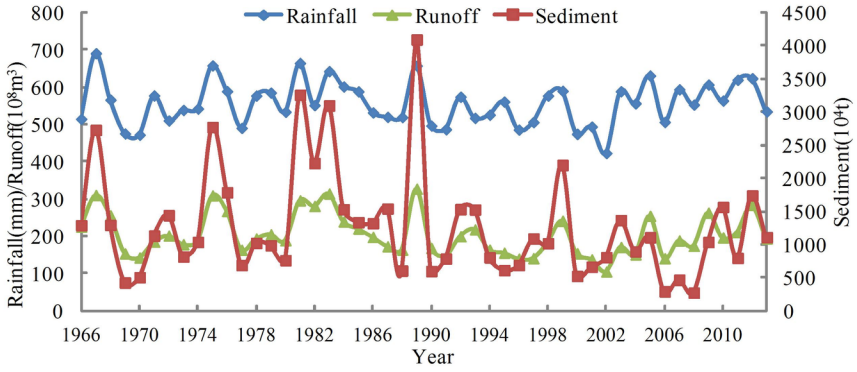

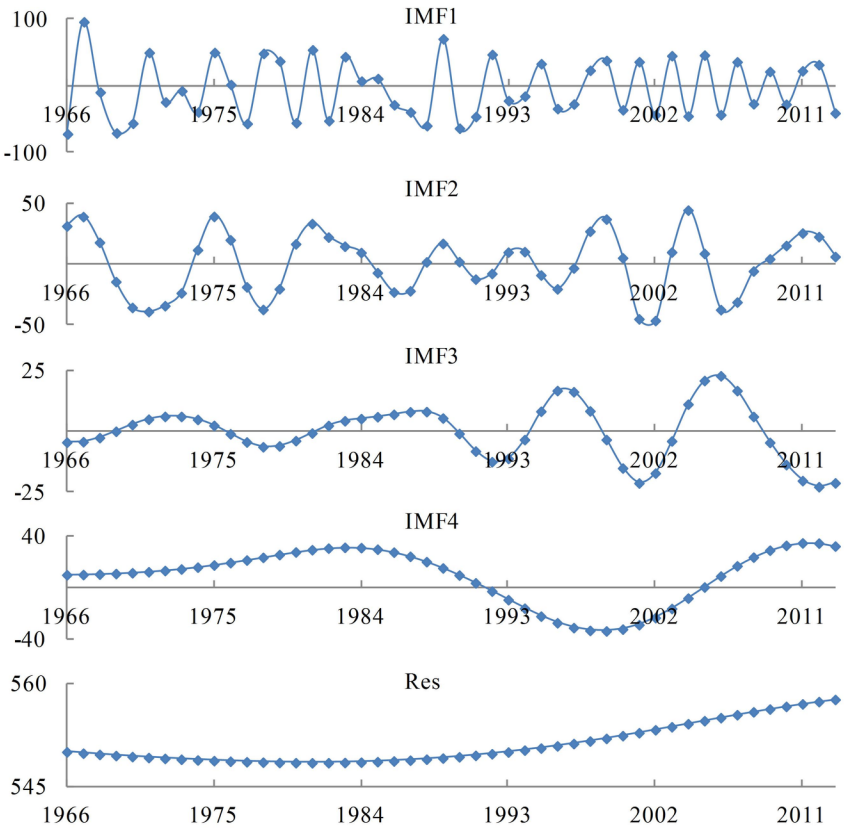

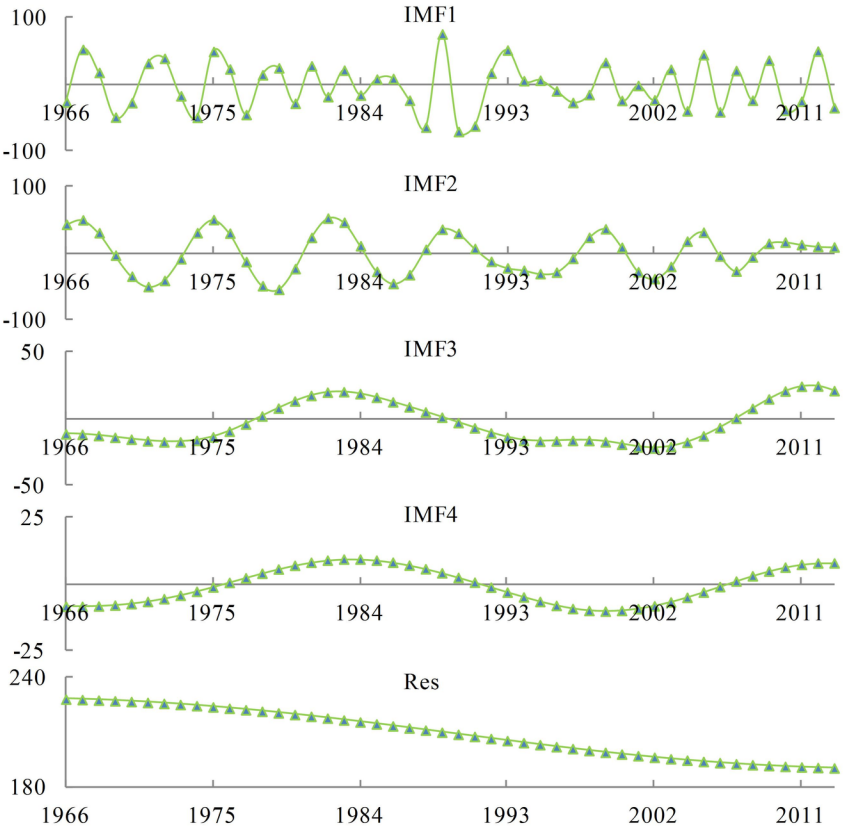

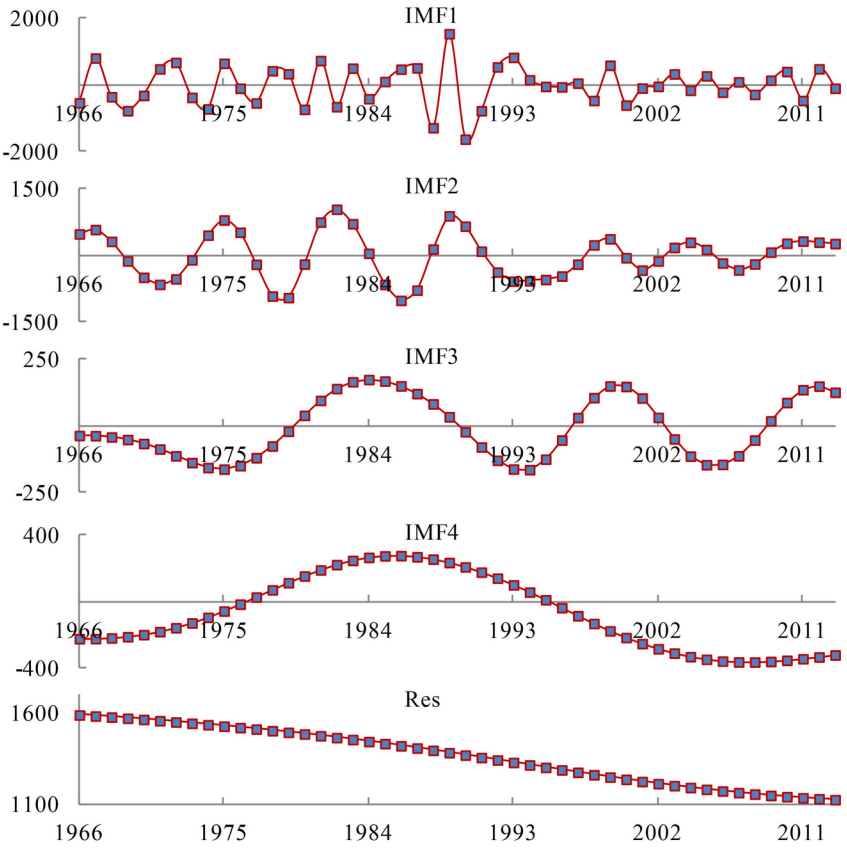

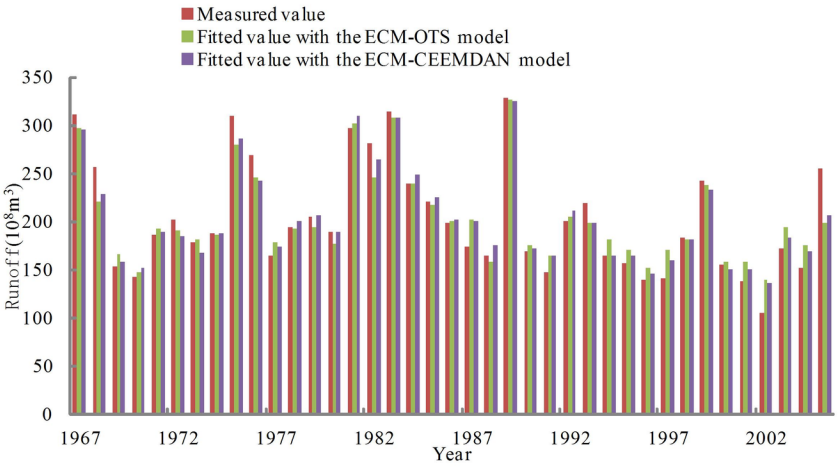

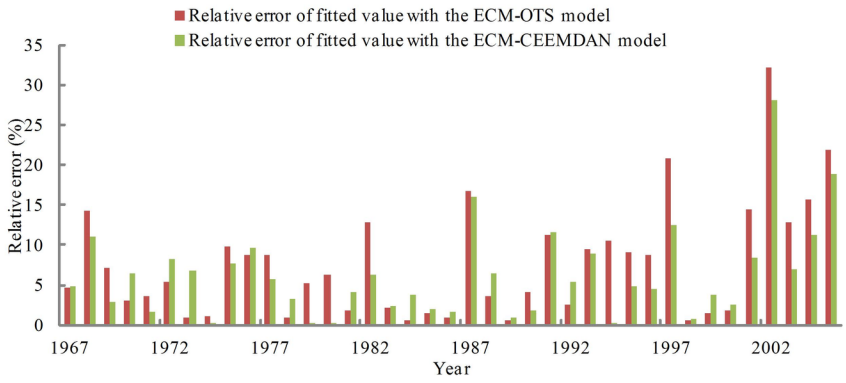

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