The identification of chaos in hydrological time series involves the determination of certain invariants such as the correlation dimension, Lyapunov exponent, entropies, among others. Among the different invariants, the correlation entropy, which is an approximation of the Kolmogorov-Sinai (K-S) entropy is an important quantity that can be used to identify chaos in a nonlinear dynamical system. It gives an indication of the predictability of the nonlinear time series since the inverse of the K-S entropy evaluates the maximum time step for prediction. Its estimation in the presence of noise is difficult as noise blurs the signal in a time series.

In this paper, a new method of estimating the correlation entropy based on the work carried out by the author and colleagues is introduced and its application is demonstrated with four ‘chaotic’ time series, two artificial and two real hydrological. The artificial time series are used to test the method while the real-world time series are used for application. The artificial time series used are the Lorenz system and the Rössler system whereas the hydrological time series are the flow measurements made at two gauging stations across two major rivers in Asia, namely the Mekong which is a trans-boundary river that runs through six countries (China, Myanmar, Lao, Thailand, Cambodia and Vietnam) and the Chao Phraya that runs through Thailand. The results demonstrate that the correlation entropy estimated by the proposed method is robust to noise and closer to K-S entropy than those estimated by other methods.