

## Comparing the Evolution of Fractal Encodings of Daily Streamflow and Temperature as a Tool to Assess Climate Change

Mahesh Lal Maskey (1), Carlos E. Puente (1), and Bellie Sivakumar (2)

(1) Department of Land, Air and Water Resources, University of California Davis, Davis, CA, United States  
(mmaskey@ucdavis.edu), (2) School of Civil and Environmental Engineering, The University of New South Wales, Sydney, Australia(s.bellie@unsw.edu.au)

The fractal-multifractal method (FM), a geometric approach based on the transformation of multifractal measures via fractal functions and requiring few geometric parameters, has recently been shown to produce faithful encodings of geophysical records. It is shown that such a procedure (and its variants): (i) closely represents daily streamflow and temperature records at the Sacramento River (Freeport), with maximum cumulative errors that are always less than 2.5% over a period of fifty years, and (ii) yields FM geometric parameters that allow visualizing the dynamics of both processes. A classification of FM parameters, based on clustering techniques, and a comparison between the attributes of streamflow and temperature is then presented in order to assess potential climatic trends and changes.