



Earthquake precursory events in geophysical time-series: use of the Hilbert transform for the detection of simultaneous phase-synchronisation anomalies in paired time-series.

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In previous studies (e.g. Crockett et al., 2006; Crockett & Gillmore, 2009 & 2010; Crockett, 2012), we have investigated simultaneously recorded radon time-series for synchronised anomalies that occurred before, during and after UK earthquakes in 2002 and 2008. However, whilst successful in identifying such anomalies in closed time-series, the approaches we have used previously have not shown good potential for (near) real-time detection in actively monitored systems. In this presentation and developing from that earlier work, we report an updated approach using the Hilbert transform which is potentially capable of being used on a closer to real-time basis than the approaches we have adopted previously. The Hilbert transform is rapidly computable via the Fast Fourier Transform (FFT) and the analytic signal thus obtained provides a basis for separating high- and low- frequency information, via the instantaneous phase and envelope, which helps reveal synchronised anomalies. If realisable and robust for the underlying geologies in question, a technique based on this approach has the potential for incorporation into an earthquake early-warning system.

References.

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