Seismic spectroscopy under hyperlow frequencies

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The season's rhythms are the attributes of many geophysical processes. Examples are daily rhythms, the annual seasonal variations and longer periods. For many geophysical observations the presence of seasonal harmonics represents a handicap, as complicates the analysis of the basic process of geophysical activity. The special methods on allocation of seasonal rhythms are developed. But it is possible to change a view for a situation. Instead of passive observation over process it is necessary to become its active participant. Now the observer has some tool, which constantly acts on system with some generalized periodic force, and the observer measures the reaction of system to this applied force. The nature of this force is not important yet, main that it was permanent. The situation here is similar to the familiar Hook law. Let's apply force and will measure the response of a material. If applied force is small it is possible to use linear approximation. Factor of proportionality between force and reaction refers as compliance, and value of a compliance is determined only by internal properties of system.

In linear approach the system reaction is measured on external force harmonic only. Measuring amplitude of a harmonic, we receive the reaction of observable system that is some characteristic of internal properties of system. If amplitude of force assume constant, and the reaction of system varies with time, it means that the internal properties of observable system vary in time. These changes are our interest. This approach gives additional information on a system and allows to reanalyze the old data. Some examples are considered.

Geoacoustics in megapolis. Industrial noise is prevailing activity in megapolis and it masks other useful signals in acoustic diapason. However if the 24 hour harmonic

of industrial noise is used as probe signal the new geophysical information may be obtained. The acoustical precursor of hurricane in Moscow (1998) is example.

Geoacouslics in Kola superdeep borehole. Kola superdeep has unique structure that tactfully react as on seismic activity as on industrial activity of neighboring plants. If the 8 hour harmonic of industrial noise is used as probe signal the amplitudes of these harmonics may be used as precursor of seismic activity of North latitude region.

Daily rhythms on foreign exchange market. Financial time series are similar to geophysical time series as in fractal structure and for season rhythms. Using daily rhythm as probe signal for spreads of exchange rates it was obtained that low frequency variation of this harmonic is correlated to exchange rate trend and that the harmonic bursts are the precursor of sharp breaks of exchange rate trend.

11-year rhythm of solar activity. 11-year rhythm of solar activity is well known phenomenon. If the 11-year harmonic is used as probe signal for Wulf number series the new process with power law power spectrum is obtained with power index $\beta = 3.04 \pm 0.50$ ("black noise" process).