



Noise analysis of the time series of permanent GPS stations in Iran for precise crustal deformation monitoring

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Iran has been always exposed to very destructive earthquakes such as Bam earthquake. Similar cases in Iran's earthquake history led to creation of a local geodynamic network in order to do geodynamic studies, examine the crust movements and monitoring deformation of the earth crust. The data gathered in the stations of this network is transmitted daily to geodynamic calculation center of national cartography center of Iran; then the data is processed and time series of station ' position are made there. These time series include two main parts called the signal and the noise. using the linear least squares parametric adjustment (LLSPA) and least square spectral analysis (LSSA) the signal part is identified. Using maximum likelihood estimation (MLE) the velocities of stations' positional change, type and amplitude of the noises existing in time series together with their standard deviation is estimated. The result of this research shows that the noises existing in time series change the stations' velocities(rate) and change their standard deviation up to eight times. These noises are of flicker noise and white noise type which their quantity in vertical components is more than the horizontal components. Apply the velocities obtained in deformation movement equations, it's possible to estimate real quantity of strain parameters and monitor the earth crust deformation through these strain parameters graphically. So, in order to estimate real values in monitoring deformation through time series, it's necessary to perform noise analysis on them. Otherwise, the results may be far away the truth.