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Realistic Noise Assessment and Strain Analysis of Iranian Permanent GPS Stations

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To assess noise characteristics of Iranian Permanent GPS Stations (IPGS), northwestern part of this network namely Azerbaijan Continuous GPS Station (ACGS), was selected. For a realistic noise assessment it is required to model all deterministic signals of the GPS time series by means of least squares harmonic estimation (LS-HE) and derive all periodic behavior of the series. After taking all deterministic signals into account, the least squares variance component estimation (LS-VCE) is used to obtain a realistic noise model (white noise plus flicker noise) of the ACGS. For this purpose, one needs simultaneous GPS time series for which a multivariate noise assessment is applied. Having determined realistic noise model, a realistic strain analysis of the network is obtained for which one relies on the finite element methods. Finite element is now considered to be a new functional model and the new stochastic model is given based on the multivariate noise assessment using LS-VCE. The deformation rates of the components along with their full covariance matries are input to the strain analysis. Further, the results are also provided using a pure white noise model. The normalized strains for these two models show that the strain parameters derived from a realistic noise model are less significant than those derived from the white model. This could be either due to the short time span of the time series used or due to the intrinsic behavior of the strain parameters in the ACGS. Longer time series are required to further elaborate this issue.