



Is strain analysis based on displacement field reliable for Geodynamics applications?

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Nowadays application of GNSS techniques (like GPS, GLONASS, and in near future Galileo) has become the main tool of crustal deformation analysis. Though there is no doubt in versatility of GNSS observations for such applications, however the way that GNSS observations are treated could be come the matter of incorrect conclusion for the prevailing deformation. This is due to the fact that displacement vector, which is commonly used for deformation analysis, is datum dependent and datum in geodetic observations is defined based on geodetic reference stations. Displacements of the reference stations, which are placed on the crust, could result false deformation deduction. In this paper while presenting the aforementioned inherent problem of deformation analysis based on displacement vector via simulated examples, an alternative method for deformation analysis based on repeated observations at different epochs will be presented and we will present formula for angles as well as distances observation in strain analysis. Since geodetic observations such as distances and angles are free from a definition of the coordinate systems are invariant quantities, they could lead to derive invariant strain components. Numerical simulations as well as real case studies, accompanied by theoretical details of the method are given in the paper.