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Continuous representation of crustal deformation in south-central Alaska

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In contrary to crustal deformation in oceans, the continental crustal deformation of the Earth is not limited to confined zones of deformation. Moreover, deformation of the Earth is a continuous process in nature. Therefore, the analysis of deformation within continental plates requires high density of deformation sensor arrays. This is especially true when crustal deformation is to be analyzed in boundary regions of tectonic plates. Interpolation of estimated deformation measures is one solution when this requirement is not satisfied for any reason. Some of the existing interpolation techniques are purely mathematical whereas, in some others, other source of measurements like seismic moments is also taken into account. In this paper continuous deformation of the Earth's crust in South-central Alaska is firstly computed using the GPS results of two campaigns and the spline interpolation technique. The obtained result is then compared to the continuous representation of deformation which is obtained from the joint inversion of GPS results and seismic data. The continuous deformation of the test area in this study is partially governed by the subduction of the Pacific Plate beneath the North American Plate along the Aleutian trench. The Prince William Sounds earthquake of 1964 has been another dominating factor in crustal deformation in this area. The post-seismic deformation of this area as well as its governing mechanism has been thoroughly analyzed in various researches. The known features of crustal deformation in this area, obtained from previous studies, serve as a bench mark in this study.