2nd International Conference and Exhibition on

Satellite & Space Missions

July 21-23, 2016 Berlin, Germany

Geodetic earthquake forecasting and crustal deformation modeling from point position changes using GPS data

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We can consider that the Earth is a body represented by single points; energy stored or released due to geotectonic processes then engenders pre-seismic elastic strain and periodic co-seismic waves that shake the ground and change the positions of these points. Point position changes within the CORS-TR network were determined to study pre-seismic, co-seismic, and post-seismic motions of the 23 October 2011 Van, Turkey earthquake applying a variety of processing methods on GPS data. Observed co-seismic surface deformations at the CORS-TR stations were then modelled using a theoretical earthquake source model independent of the seismic observations. This presentation focuses on, from a geodetical point of view, the set of point position changes needed to forecast earthquakes and also discusses Earth's crustal deformations, as described by the outcomes of the analysis. To emphasize the three dimensional nature of Earth's crust deformations, this presentation will discuss the proposed investigation of a possible tectonic (plate) boundary in the Adriatic Sea that crosses from Gargona, Italy to Sibenik/Zadar, Croatia. To do so, we will apply analytical surface deformation theory to the annual movements of ground stations in a large geodynamic network along the edges of the Adriatic Sea.

Biography

Yüksel Altiner has earned his Bachelor of Science degree from the Yildiz Technical University of Istanbul and Master and Doctoral degrees from the University of Bonn. In 1997, he was named a University Docent in Geodesy by the Turkish Interuniversity Committee. He developed an Analytical Surface Deformation Theory, which was published in a book in 1999 and later translated from English into Chinese. Since 1989, he has worked in the Geodesy Division of the Federal Agency for Cartography and Geodesy in Frankfurt am Main, Germany.

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