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Influence of the 1999 Izmit and Duzce, Turkey, 1999 Earthquakes on the regional seismicity clustering

Virginie Durand (1), Michel Bouchon (1), Hayrullah Karabulut (2), David Marsan (3), Jean Schmittbuhl (4,5), Marie-Paule Bouin (6), and Mustafa Aktar (2)

(1) CNRS, LGIT, Grenoble, France,, (2) Bogaziçi Üniversitesi, Istanbul, Turkey, (3) Université de Savoie, Chambery, France, (4) CNRS, Institut de Physique du Globe de Strasbourg, Strasbourg, France, (5) EOST, Université de Strasbourg, France, (6) Observatoire Volcanologique et Sismologique de la Guadaloupe, France

The deformation of northwest Turkey reflects the strong interaction which takes place there between the westward extrusion of the anatolian plate and the north-south extension of the agean domain. While the mechanics of the North Anatolian Fault is characterized by the occurrence of large earthquakes, followed by periods of relative quiescence, the agean extension in the region is seismically characterized by the presence of a few clusters of near-continuous activity. Using the catalogue of seismicity of the Kandilli Observatory, we plot the cumulative number of events for clusters (Yalova, West Marmara, Cerkes) and fault segments adjacent to the rupture to examine the evolution of the seismicity after the 1999 Izmit and Düzce earthquakes. We notice that the clusters were activated by these two earthquakes : for ten years, no event of magnitude greater than 5 occured. Whereas each cluster produced one event of magnitude greater than five during the year following the Izmit and Düzce earthquakes. These clusters are characterized by extensive focal mechanisms. Furthermore, the activation of the clusters is delayed (from several days to several months) and occurs at great distances from the rupture, whereas the fault is immediatly activated, at shorter distances. These observations show the existence of a strong interaction between the NAF and the extension clusters. This interaction may explain some of the characteristics of the 1939-1999 sequence.