

Variation of Fractal Properties of Seismicity in Muzaffarabad Earthquake, 2005 Region

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The temporal variation of multifractal properties in spatial distribution of seismicity in the region affected by the main shock of the Muzaffarabad earthquake of October 2005 earthquake ($M_w = 7.6$) and Northwest Kashmir and its aftershock sequence are investigated using earthquake catalog data from 1973 to March, 2009 in order to understand the process and mechanism preceding a large, shallow earthquake. A monotonous increase of multifractal dimension D_q with a wide range of q appeared clearly for about two years prior to this large, shallow earthquake, D_q then decreased to a minimum at the time of the main shock. During the aftershock sequence, D_q oscillated between 3.0 and 0.5. The decrease and then increase of D_q with respect to the spatial distribution of seismic events indicate clustering and declustering in multifractal structure, respectively. The temporal variation of D_q reflects the accumulation and release of strain energy within the tectonic stress field.