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Non-uniform scaling behaviour in seismic temporal fluctuations of central Italy and signatures of possible precursory patterns

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The scaling behaviour of the time dynamics of seismicity observed in central Italy from 1981 to 2007 is analyzed. On the base of the detrended fluctuation analysis (DFA), which is a powerful tool to detect and investigate time-scaling behavior in nonstationary signals, deviations from uniform power-law scaling were identified and quantified by means of an instability index. The results point out to increases of the instability index in correspondence with the occurrence of large earthquakes or intense seismic clusters. The presence of possible precursory signatures are revealed.