



Analysis of the groundwater level changes preceding the weak intraplate earthquakes in the Bohemian Massif (Central Europe) in 2005

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We analyze continuous measurements of groundwater level in two 300-m deep wells at the experimental hydro-meteorological station situated on the NE margin of the Bohemian Massif, Central Europe, typical by the weak intraplate seismic activity. The aim of our study is to examine the relationships between changes of the groundwater level and earthquake occurrence. Based on the tidal and barometric response of the water level we estimated selected elastic parameters of the observed aquifers - the shear modulus G , the Skempton ratio B , the drained matrix compressibility β and the undrained compressibility β_u . Using these parameters we derived the sensitivity of the wells to the crustal volume strain. During the observation period from November 1998 to December 2005 we detected in one of the wells two pre-seismic steps related to August 10, 2005 ($M = 2.4$) and October 25, 2005 ($M = 3.3$) earthquakes. Amplitudes of the recorded precursory changes (+6 cm and +15 cm) are several times higher than the values predicted from the theoretical precursory crustal strain and the strain sensitivity of the well. Therefore we presume that the observed pre-seismic water-level steps cannot be easily explained by poroelastic response to the earthquake's strain field. We propose the hypothesis of the origin of precursory events based on the presumption of a sensitive site, in which is the well situated.