



## **Research of tidal periodicities in the seismic hazards of the Vrancea zone (Romania)**

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Based on previous positive results, we investigate the eventuality of the role of earth tides on the triggering of earthquakes occurring in the Vrancea zone (Romania). The bend region of the South-Eastern Carpathians named the Vrancea zone ( $45^{\circ}$ - $46^{\circ}$ N,  $25.5^{\circ}$ - $27.5^{\circ}$ E), is characterized by a prevailing intermediate depth seismicity (depth higher than 60 km). Important historical events of this type of seismic activity are the earthquakes of: November 10, 1940 (h=150 Km,  $M_w=7.7$ ), March 4, 1977 (h=94Km,  $M_w=7.4$ ), August 30, 1986 (h=131 Km,  $M_w=7.1$ ), and May 30, 1990 (h=91Km,  $M_w=6.9$ ). We used the RomPlus catalogue of the National Institute of the Earth Physics, Bucharest, between 1976-2005, which contains for events with Richter magnitude higher than 3, nearly 3000 events. A stacking method of analysis named HiCum, is applied to investigate for different periodicities existing in the earth-tides spectrum, if reliable tendencies exist. Among the actions of different geophysical fields (consisting principally in climatic & gravitational variations) at the intermediate-depth levels of the seismic events, the role of the gravity field variations is predominant. Its systematic variations are controlled by the lunar-solar attraction forces on every terrestrial point through the precisely defined periods of the earth-tides. Local and regional heterogeneities lead to a different response from a zone to another in accordance with the geological and tectonic characteristics of each zone. This response is also influenced by the regional characteristics of the mantle-crust interface, probably associated with a viscous coupling mechanism. Our results are interpreted on these assumptions. This method if confirmed, promises to be an effective tool for pattern analysis of major risk zones giving information about seismic activity evolution for the different geodynamical regions.

**Key words:** earth-tides, HiCum method, seismic hazard, Vrancea zone.