

## **SPECIAL SECTION**

### **ULF VARIATIONS OF THE GRAVITATIONAL FIELD AND INSTRUMENTATION SYSTEM FOR THEIR REGISTRATION**

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Wideband gradiometer instrumentation system based on the usage of "Cavendish balance" type torsion system allowing real-time registration of ultra low frequency ( $<10^{-2}$  Hz) disturbances of the terrestrial gravitational field has been considered. Torsion system of the instrument has asymmetrical construction with weights having special shape. Basic theory for torsion systems elements construction is presented. The principle of torsion system rotation angle measurement using position-sensitive detector has been described.

There are considered seasonal features of signals, approach to their interpretation, correlation with geodynamical processes. Examples of the detailed instrument readings before several strongest events of 1995-2011 years are presented. High-frequency variations before several events is the key to the estimation of time of future event. Spectral properties of mega-anomaly registered in December 2009 are presented. Interpretation of such signals is discussed.

### **GLOBAL GRAVITATIONAL EFFECTS BEFORE AND AFTER STRONG M8.9 EARTHQUAKE IN JAPAN ON 11 MARCH 2011**

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Before and after the powerful Japanese magnitude 8.9 earthquake of 11 March 2011 some gravitational effects were registered in large areas across the Eastern Hemisphere as far as over 9,000 km away from the earthquake's epicenter. The gravitational anomalies were measured experimentally using ATROPATENA stations, new physical registering devices deployed in Indonesia (Yogyakarta), Pakistan (Islamabad), Azerbaijan (Baku) and Turkey (Istanbul). The stations continuously measure time-varying changes of the natural gravitational field in three mutually perpendicular directions. It has been established that indications of the Cavendish balance can be influenced by the dynamics of lithospheric stress fields altering the density and mass of

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# BOOK OF ABSTRACTS

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**Halberg Chronobiological Center** (*USA, Minneapolis*)  
**International Academy of Science H&E** (*Innsbruck, Austria*)  
**Russian Academy of Sciences** (*Moscow, Russia*)  
**Pakistan Academy of Sciences** (*Islamabad, Pakistan*)  
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