

## **Changes of circulatory and nervous diseases mortality patterns during periods of exceptional solar events**

Katerina Podolska (1,2)

(1) Charles University, Faculty of Science, KDGD, Prague, Czech Republic (kapo@ufa.cas.cz), (2) Institute of Atmospheric Physics, Academy of Sciences of the Czech Republic, Prague, Czech Republic

The paper contains a statistical analysis of exceptional solar events and daily numbers of deaths from diseases from ICD-10 group VI. Diseases of the nervous system, group IX. Diseases of the circulatory system, and overall daily numbers of deaths in the Czech Republic. It is demonstrated that neurological diseases exhibit greater instability during the period of rising and falling solar activity.

Specifically, we study the daily number of deaths separately for both sexes at the age groups under 39 and 40+ during the Solar Cycles No. 23 and No. 24. We focus mainly on exceptional solar events such as a “Bastille Day event” on July 14, 2000 (class X5), “Halloween solar storm” on October 28, 2003 (class X17), and events on January 7, 1997, April 2, 2000 (class X20), or September 7, 2005 (class X15). Special attention is given to “St. Patrick’s Day storm” on March 17, 2015, the strongest geomagnetic storm of the Solar Cycle No. 24 that occurred following a coronal mass ejection (CME).

We investigate changes in daily numbers of deaths during 1 month before and 1 month after these exceptional solar events. We take specific storm dynamics of geophysical parameters into consideration, and we also apply the results of risky characteristics of expositions by ionospheric and geomagnetic parameters. It is verified that, for diseases of the nervous system, women are generally more sensitive than men. On the contrary, this differences between men and women are not found for diseases of the circulatory system.

Our findings suggest that the impact of hazardous space weather conditions on human health depends on the specific course and strength of individual solar storm.