Geophysical Research Abstracts,
Vol. 11, EGU2009-6058, 2009
EGU General Assembly 2009

Space Weather: A New Hazard of Technological Era

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The impact of space weather on technological infrastructure is growing as new technologies are introduced. What was a delightful picture of aurora in northern sky in earlier times, now becomes costly errors in aeromagnetic surveys, inefficiency of pipeline corrosion protection and multi-million dollar power blackout and satellites malfunctioning or total loss. Thus requirements for studies of space weather in order to mitigate its effects have steadily increased.

The paper presents three aspects of result-based space weather studies. The first is the development of the methodology for assessing the effects of space weather on vulnerable infrastructure. This will be shown based on the example of statistical maps for different areas of Canada of the occurrences of different levels of geomagnetic activity which affects the power systems and on pipeline infrastructure in Canada.

The second aspect is “case studies” of extreme events and their effects. The third and the most difficult task is forecasting of space weather events. How to address these two tasks will be demonstrated using examples of the Canadian space weather forecast centre predictions for some of the latest large space weather events and post-events studies.