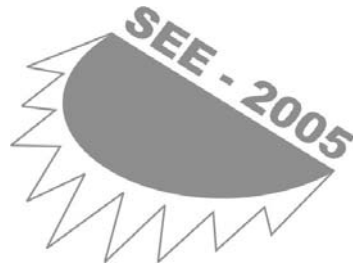
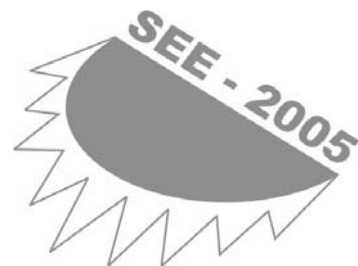


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## Foreword

From September 26 to 30, 2005, 75 scientists and students from 11 countries attended the second conference on Solar Extreme Events (SEE-2005) at Nor Amberd, Armenia.

Investigation of Solar Extreme Events is important for several reasons:

- It provides unique information about violent processes in the solar corona, including mechanisms of particle acceleration and Coronal Mass Ejection (CME);
- The study of propagation of huge amounts of solar plasma in the interplanetary space can shed light on its interactions with Interplanetary Magnetic Field (IMF) and ambient population of the Galactic Cosmic Rays (GCR);
- Interplanetary shocks and CMEs, along with solar particle and electromagnetic emissions, trigger various dynamic processes in the Earth's magnetosphere, causing global geo-effective events, including geomagnetic storms, heating of the upper atmosphere, changes in the electrodynamic properties of ionosphere, and creation of geomagnetically-induced surface currents. All this constitutes Space Weather (SW) conditions that change dramatically with SEE development.
- Space Weather can have a negative impact on the performance and reliability of space-borne and ground-based technology systems and endanger human health and life. It is of paramount importance to establish accurate methods for monitoring and forecasting SW disturbances and to identify the mechanisms of various SW effects.

The solar extreme events of October-November 2003, known as the Halloween events, have provided us with valuable information we can use to achieve better understanding of space weather. The SEE-2004 symposium in Moscow in July 2004 focused on comprehensive discussions of solar/heliospheric and magnetospheric aspects of these events. The data obtained onboard numerous satellites and from ground-based observatories were presented, discussed and interpreted both from experimental and theoretical points of view. Meetings during the COSPAR Assembly (Paris, July 2004) and the European Cosmic Ray Symposium (Florence, September 2004) revealed the substantial interest of the scientific community in the Halloween events as well as its continuous efforts to understand them in detail. New attempts to develop analytical techniques to incorporate data from space-borne and surface instruments have created new perspectives for understanding and forecasting the consequences of SEEs.

In 2004 several extreme events from the end of July to mid-November provided new examples of severe Geospace Storms and Forbush decreases. However, the 23rd solar cycle reserved its most severe events for the descending phase. The Ground Level Enhancement (GLE) from the event of January 20, 2005, the largest one in nearly half a century, caused gigantic count rate increases on the neutron monitors of South Pole. The event displayed very complicated behavior, revealing diversity of particle acceleration mechanisms and the importance of numerous factors influencing particle transport, composition and event geo-effectiveness. The analysis of these events is underway; it will provide an extremely interesting basis for the understanding of SEEs and their effects.

The aims of SEE-05 were twofold:

- (1) To provide a wide forum for discussion of recent Solar Extreme Events and their impact on technological systems and human environment, and

(2) To discuss directions of future research, while promoting cooperation between groups with different research interests from different countries.

The scientific program was divided into three major areas:

- Energetic processes on the Sun during extreme events
- Magnetospheric response to solar extreme events
- Violent conditions of space weather and possibilities for its forecasting.

The conference sessions consisted of invited talks and contributed papers presented at poster sessions. High-quality invited talks were given by Vahe Petrossian, Igor Veselovsky, Riho Nyrnmik, Vladimir Kuznetsov, Galina Bazilevskaya, Leonid Lazutin, Yuri Stozhkov, Yuri Yermolaev, Erwin Flueckiger, John Bieber, Anatoly Belov, Michail Panasyuk, Frank Jansen and Yasushi Muraki. The review talks highlighted how the Sun affects heliosphere and the Earth's environment, putting particular emphasis on energetic particle storms, solar eruptions producing these storms and their impact on Earth.

The conference reports demonstrated that integrated information about the consequences of Extreme GLEs and Geomagnetic Storms, including spectral forms, amplitudes and anisotropies of ion fluxes in the vicinity of Earth, strength and direction of the interplanetary Magnetic Field and the state of the magnetosphere, is indispensable for testing solar ion acceleration and propagation models as well as for early diagnostics of the expected impact of violent solar eruptions on technology.

New types of particle monitors, measuring secondary cosmic ray fluxes with inherent correlations are necessary for establishing world-wide networks for Space Weather forecasting. The International Heliophysical Year should provide an excellent opportunity for establishing these networks as well as involve participation of developing countries and, of course, European Space Weather initiatives.

The conference site was located near experimental facilities of Aragats Space Environmental Center (ASEC). The operation of ASEC monitors was demonstrated to the conference participants. In addition, the data base of solar extreme events detected by ASEC monitors was available in the computer class. The prototype detectors developed by Cosmic Ray Division of Alikhanyan Physics Institute (the conference host) were demonstrated during the poster sessions. It is planned to use these detectors for the new Space Weather network. Participants from Croatia, Bulgaria and Costa Rica expressed a wish to become a part of the new network by installing detectors in their countries. Negotiations concerning the formal aspect of this cooperation are underway.

The conference was supported by COSPAR, International Science and Technology Center (ISTC), National Foundation of Science and Advanced Technologies and WEB limited.

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Ashot Chilingarian, Mikhail Panasyuk

August, 2005



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