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Abstract:
Space Weather for the Next Generation

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The space environment of Earth changes over time scales ranging from seconds to millennium. The short time scale disturbances are referred to as Space Weather. Nowadays, human life depends heavily on space technology. Solar activity in the form of sunspot regions is one of the important causes of space weather. The solar activity reaches its maximum value approximately every eleven years.

Powerful eruptions originate from sunspot regions pose a dangerous situation because the plasma, particle, and electromagnetic radiation disturb the space environment. Space weather affects our day to- day activities because the human society is more and more dependent on space technology from agriculture to oil prospecting, from telecommunication to XM radio, from airplane travel to living on the International Space Station, and so on. This talk provides a summary of space weather activities worldwide and what research is being done to mitigate space weather activities now and in the future.

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Curriculum Vitae

Dr. Natchimuthukonar Gopalswamy Position: Astrophysicist Solar Physics Laboratory, Heliophysics Division NASA Goddard Space Flight Center Greenbelt, Maryland 20771, USA

Over the past two decades, Dr. Natchimuthuk Gopalswamy has been engaged in solving problems in solar and solar terrestrial physics using data from various large radio telescopes and space missions, particularly coronal mass ejections. He has considerable expertise in the analysis of multi-wavelength data (X-ray, EUV, optical and radio). In the recent years, he has been extensively involved in the analysis of Yohkoh, SOHO, STEREO, Wind and ACE data in conjunction with radio and optical images obtained by ground based instruments to study space weather issues.

Dr. Gopalswamy received his BSc (1975) and MSc (1977) degrees from the PSG College of Arts and Science (Coimbatore). He received his PhD (1982) from the Indian Institute of Science, Bangalore and post-doctoral training from the University of Maryland, College Park (1985). He was briefly (19841985) the Resident Scientist of the Kodaikanal Observatory of the Indian Institute of Astrophysics. He was an Associate Research Scientist at the University of Maryland, College Park and a Research Professor at the Catholic University of America before moving to NASA as an Astrophysicist.

Notable achievements:

· Established the Center for Solar Physics and Space Weather at the Catholic University of America to train students and Post-doctoral fellows in the physics of Sun-Earth connections.
· Created a Coordinated Data Analysis (CDAW) Data Center and an online catalog of more than 10,000 CMEs, available on-line.
· Conducted a series of CDAW workshops since 1999, which resulted in the publication of scores scientific papers in refereed journals.
. Has established national committees in 76 countries to promote space science as the international coordinator of the International Heliophysical Year (IHY) 2007.

Some of the notable discoveries:

· First detection of radio CME (1992)
· Umbral oscillations in microwaves (1993)
· Transient microwave brightenings (1995)
· Three-part CME using non-coronagraphic observations (1996)
· Effective interplanetary acceleration (2000)
· Colliding CMEs (2001)
· Empirical Shock Arrival Model (2002)
· Relation between Solar Polarity Reversal and CMEs (2003)
· CMEs Interaction and Solar Energetic Particle Intensity (2004)
· Hierarchical Relation between CME Kinetic Energy and Type II Radio Bursts (2005)
. High speed radio-quiet CMEs (2007)
. CME deflection by coronal holes (2009)

Professional Membership

-Member of the International Astronomical Union (IAU) since 1985 -Life member, Astronomical Society of India
-Bureau member, Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)
-Member the American Astronomical Society
-Member, Solar Physics Division of the American Astronomical Society
-Member the American Geophysical Union
-Member of the steering committee and meeting coordinator of the Solar Heliospheric and Interplanetary Environment (SHINE) group (2003 2005)
-Member Editorial Board, Sun and Geosphere (2006 -)
-Associate Editor of JGR Space Physics (2000-2006)
-Associate Editor of Geophysical Research Letters (2007 -)
-International Coordinator of the International Heliophysical Year (IHY)
-Member of the Organizing committee of the IAU Commission 10 (1997-2009)
-Member of the committee of the IAU Commission 49 for 2006-2009
-Member of the Organizing committee of IAY Division II (2009 -)
-President, IAU Commission 49 (2009 -)

Awards, Honors

-G. Ramaswamy Naidu Memorial Prize, University of Madras, 1975-1977
-Prof. P.E. Subramani Ayyar Commemoration Medal, Univ. of Madras, 1977.
-Dr. K.S. Krishnan Gold Medal, University of Madras, 1977.
-Dr. K.S. Krishnan Memorial Prize, University of Madras, 1977.
-Jagirdar of Arni Medal, University of Madras, 1977.
-Fellowship of the Science and Technology Agency of Japan, 1996
-Senior Research Associate, US National Academy of Sciences' National Research Council, 1998-2000
-NASA GSFC NATIONAL RESOURCE Group Achievement Award, 2000
-NASA GSFC Solar System Exploration Division's Peer Award, 2006
-NASA Goddard Space Flight Center Special Act Award in recognition of superior service, 2006
-NASA GSFC New Business Capture Award, 2006
-Robert H. Goddard Honor Award for Science 2008