

The 14th Workshop on Technical and Scientific Aspects of
MST Radar MST14/iMST1

Programme

National Institute for Space Research
Auditorium Fernando de Mendonça
Av. dos Astronautas, 1758 Jd da Granja

São Jose dos Campos, SP - Brazil May 25-31,2014

Preface

Over the last 30 years, we have held a very successful series of workshops on "Technical and Scientific Aspects of MST Radar", in diverse locations like India, Peru, the USA, UK, France, Canada and Germany. Scientists, engineers, technical experts, theoreticians, students, all together in one forum for MST radar studies, this is what has been special about the series of MST workshops.

The fourteenth workshop is being held in 2014, and at this time we are going to expand the scope, in order to include ionospheric research. This was motivated by the fact that many people in the MST radar community are also engaged in ionospheric radar research and we recognize the benefits of having joint workshops with our colleagues who focus primarily on ionospheric issues. We are optimistic that this will lead to improvements in research techniques, analysis and fundamental understanding of both atmospheric and ionospheric processes. Consequently, the workshop will be called MST14/iMST1, with the expectation that this will be the first of many collaborative workshops.

The focus of the iMST workshop, in São José dos Campos (SP), will be meso/strato/tropospheric radar and ionospheric coherent scatter radar, but contributions from related areas, such as incoherent scatter probing, collaborative studies using radars and other instruments like lidars and in-situ studies, and relevant modeling efforts are all welcome.

MST14 /iMST1 will be held at the National Institute for Space Research (INPE) in Sao Jose dos Campos, Brazil, from May 25th to May 31st, 2014.

Clezio Marcos De Nardin

Chair of Local Organizing Committee

Erhan Kudeki

Co-chair, MST workshop series

Werner Singer

Co-chair, MST workshop series

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David Hooper	NERC MST Radar Facility Project Scientist, UK
Iain Reid	The University of Adelaide, AUS
Jorge L. Chau	Leibniz-Institute of Atmospheric Physics e.V., DEU
Phillip Bruce Chilson	School of Meteorology, USA
Ralph Latteck	Leibniz Institute of Atmospheric Physics, DEU
Thomas Ulich	Sodankylä Geophysical Observatory, FIN
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Workshop schedule

Program Schedule

MST14/iMST1 Workshop

	SUN	MON	TUE	WED	THU	FRI	SAT	
Start	25/mai	26/mai	27/mai	28/mai	29/mai	30/mai	31/mai	
08:00	REGISTRATION	REGISTRATION		Lecture 3	Lecture 4	Lecture 5	FIELD TRIP	
08:30		Openning		(Heinselman)	(Chau)	(Vierinen)		
09:00		Lecture 1	Session 7 A	Session 3 A	Session 1 A	Session 5 A		
09:30		(Muschinski)						
10:00		Coffee Break						
10:30		Session 2	Session 7 B	Session 3 B	Session 1 B	Session 5 B		
11:00								
11:30								
12:00								
12:30			Lunch					
13:00		Time						
13:30								
14:00	REGISTRATION	Lecture 2	Session 6 A	Session 3 C	CITY PARKS TOUR	Closing Session	FIELD TRIP	
14:30		(Milla)				Brainstorming about outstanding questions & the next iMST		
15:00		Session 4 A						
15:30		Coffee Break						
16:00		Session 4 B	Session 6 B	Posters				
16:30								
17:00								
19:00			Theater Concert					
21:00			Conference Dinner					

Sunday, May 25

REGISTRATION

NB. Number in parentheses indicates the corresponding abstract number

Monday, May 26 - Morning

08:00-09:00 **Registration**

08:30-09:00 **Opening session**

09:00-10:00 **Lecture 1**

RADAR SCATTERING FROM LOWER AND MIDDLE ATMOSPHERE

Dr. Andreas Muschinski

10:00 – 10:30 Coffee Break

Presentation Session

2. MST SCATTERING, MICRO-SCALE PROCESSES AND TURBULENCE

Main Session Organizer: Phillip Bruce Chilson

Session Chairs: Gerald Lehmacher, Andreas Muschinski

10:30-10:45 **(2) POLAR MESOSPHERE WINTER ECHOES: NEW OBSERVATIONS AND RECENT RESULTS.**

E. Belova, S. Kirkwood

10:45-11:00 **(9) THREE-DIMENSIONAL RADAR IMAGING OF ATMOSPHERIC STRUCTURES USING MULTIPLE RECEIVERS AND MULTIPLE FREQUENCIES OF THE MU RADAR.**

Jenn-Shyong Chen, Jun-ichi Furumoto, Mamoru Yamamoto

11:00-11:15 **(53) MST-ISR-EEJ EXPERIMENTS AT JICAMARCA RADIO OBSERVATORY TO STUDY GRAVITY WAVE DYNAMICS.**

Lehmacher, G. A., Kudeki, E., Milla, M.

11:15-11:30 **(70) OBSERVATION OF KELVIN HELMHOLTZ-INSTABILITIES AND SPECTRAL WIDTH FROM RADAR MEASUREMENTS DURING THE WADIS-1 SOUNDING ROCKET CAMPAIGN.**

G. Stober, I. Strelnikova, S. Sommer, J. L. Chau, B. Strelnikov, R. Latteck

11:30-11:45 (71) (PROVISIONAL) THE DISTINCT ECHOES OF
ELECTROMAGNETIC WAVES OBTAINED FROM THE
ATMOSPHERIC MEDIUM OBTAINED BY THE MST RADAR AT THE
INDIAN TROPICAL STATION OF GADANKI.

Priyanka Ghosh, T. K. Ramkumar, M. Naveen, C. V. Naidu

11:45-12:05 (163) VERTICAL-VELOCITY BIASES CAUSED BY REFLECTIVITY
FLUXES
(invited)

Andreas Muschinski

12:05-14:00 Lunch Break

Monday, May 26 – Afternoon

14:00-14:30 Lecture 2

IONOSPHERIC COHERENT AND INCOHERENT SCATTER.

Dr. Marco Antonio Milla Bravo

Presentation Session

4. COHERENT AND INCOHERENT SCATTER RADAR TECHNIQUES, IONOSPHERIC SOUNDERS AND IMAGERS

Main Session Organizer: Clezio M. De Nardin

Session Chairs: Marco Milla, Mike Nicolls

14:30-14:50 (64) EISCAT 3D – A NEW INSTRUMENT FOR VECTOR IMAGING OF
THE POLAR IONOSPHERE.
(invited)

C.J. Heinselman

14:50-15:10 (162) RADAR, IN-SITU, AND CHEMICAL RELEASE MEASUREMENTS
OF "SUNSET ELECTRODYNAMICS" OF THE EQUATORIAL
IONOSPHERE DURING THE NASA EVEX CAMPAIGN AT
KWAJALEIN
(invited)

*Erhan Kudeki, Steven J. Franke, Pablo M. Reyes, Aaron C. Wallace,
Robert F. Pfaff, Miguel F. Larsen*

15:10-15:30 (160) CURRENT OPPORTUNITIES AT THE SONDRESTROM
GEOSPACE FACILITY.
(invited)

Anja Strømme

15:30-16:00 Coffee Break

16:00-16:15	(73) INCOHERENT SCATTER MEASUREMENTS WITH MAARSY. <i>J. L. Chau, R. Latteck</i>
16:15-16:30	(114) REVISITING THE MF RADAR TECHNIQUE <i>I. M. Reid, B. K. Dolman</i>
16:30-16:45	(6) THE PROTOTYPE INCOHERENT SCATTER RADAR AT NANCHANG UNIVERSITY. <i>Ming Yao</i>
16:45-17:00	(41) WIND AND SPECTRAL WIDTH ESTIMATION OF PMSE WITH COHERENT RADAR IMAGING <i>S. Sommer, J. L. Chau, G. Stober</i>
17:00	CLOSE

Tuesday, May 27 – Morning

Presentation Session

7. MIDDLE ATMOSPHERE DYNAMICS AND STRUCTURE

Main Session Organizer: Iain Reid

Session Chairs: Masaki Tsutsumi, Alan Liu

08:00-08:15	(100) REFLECTIONS ABOUT ANNUAL GRAVITY WAVE MOMENTUM FLUX MEASUREMENTS WITH RADARS IN THE MLT. <i>M. Placke, P. Hoffmann, E. Becker, M. Rapp</i>
08:15-08:30	(31) MULTI-YEAR RADAR OBSERVATIONS OF PLANETARY WAVES AT HIGH CONJUGATE LATITUDES. <i>D.C. Fritts, K. IMURA, D. Janches, N.J. Mitchell, W. Singer</i>
08:30-08:45	(50) THE RELATIONSHIP BETWEEN MESOPAUSE TEMPERATURE AND THE DAILY DURATION OF MID-LATITUDE MESOSPHERE SUMMER ECHOES (MSES). <i>D. A. Hooper, K. A. DAY, N. J. Mitchell, J. Rowlands</i>
08:45-09:00	(85) MIDDLE ATMOSPHERIC DYNAMICS AND SCATTERING CHARACTERISTICS AS OBSERVED BY MST RADAR OVER GADANKI DURING THE PASSAGE OF TROPICAL CYCLONES. <i>T K Ramkumar, M Naveen</i>

09:00-09:15	(86) CHARACTERISTICS OF THE SEASONAL SCALE OSCILLATIONS OVER CACHOEIRA PAULISTA (22.7°S, 45°W) <i>A. Guharay, P.P. Batista, B.R. Clemesha</i>
09:15-09:30	(89) TIME VARIABILITY OF POLAR MESOSPHERE WINTER ECHO OBSERVED BY PANSY (PROGRAM OF THE ANTARCTIC SYOWA MST/IS) RADAR. <i>T. Nishiyama, K. Sato, M. Tsutsumi, T. Sato, T. Nakamura, K. Nishimura, Microsoft. Kohma, Y. Tomikawa, M. K. Ejiri, T. T. Tsuda</i>
09:30-09:50 (INVITED)	(94) RECENT RESULTS FROM CHINESE MERIDIAN PROJECT. <i>Chi Wang, Guotao Yang, Jiyao Xu</i>
10:00-10:30	COFFEE BREAK
10:30-10:45	(91) POLAR MESOSPHERE ECHOES OBSERVED AT 69°N DURING ENHANCED SOLAR/GEOMAGNETIC ACTIVITY IN 2012. <i>R. Latteck, I. Strelnikova, W. Singer, J. L. Chau</i>
10:45-11:00	(99) DIFFERENCES IN THE EASTERN AND WESTERN HEMISPHERE DURING SUDDEN STRATOSPHERIC WARMINGS. <i>V. Matthias, P. Hoffmann, G. Stober, A. Manson, C. Meek, P. Brown</i>
11:00-11:15	(111) LONG TERM OBSERVATIONS OF THE MLT REGION AT ADELAIDE (35°S). <i>I. M. Reid, A. J. Spargo, S. Kovalam, R. A. Vincent</i>
11:15-11:30	(117) CONVECTIVELY GENERATED GRAVITY WAVES: A SYNERGETIC APPROACH USING MST RADAR AND SATELLITE OBSERVATIONS. <i>Karanam Kishore Kumar</i>
11:30-11:45	(120) MESOPAUSE TEMPERATURES AND TIDES FROM METEOR DECAY TIMES AND LIDAR OBSERVATIONS AT HIGH AND MIDDLE NORTHERN LATITUDES. <i>W. Singer, R. Latteck, M. Kopp, J. Hoeffner, M. Gerding.</i>
11:45-12:00	(122) RESPONSE OF MIDDLE ATMOSPHERE AND IONOSPHERE IN LOW LATITUDE TO STRATOSPHERIC SUDDEN WARMING IN 2009. <i>J. S. Chen, N. Li, J. Wu</i>

12:00-12:15 (142) THERMOSPHERIC WINDS IN THE WHOLE ATMOSPHERE COMMUNITY CLIMATE MODEL – A COMPARISON WITH OBSERVATIONS.)

A. T. Chartier, G. S. Bust, J. J. Makela, H. Liu, J. Noto

12:15-13:45 LUNCH BREAK

Tuesday, May 27 – Afternoon

Presentation Session

6. METEOR STUDIES AND OBSERVATIONS

Main Session Organizer: Wayne Hocking

Session Chairs: Diego Janches, Rob Weryk

13:45-14:05 (69) A FORWARD SCATTER MULTI FREQUENCY METEOR RADAR SYSTEM APPROACH FOR MLT MEASUREMENTS.

G. Stober, J. L. Chau,

14:05-14:20 (17) ADVANCED METEOR RADAR AT TIRUPATI: SYSTEM DETAILS AND FIRST RESULTS.

Eswaraiah Sunkara, Vijaya Bhaskara Rao Sarangam, et al.

14:20-14:35 (12) THE SOUTHERN ARGENTINA AGILE METEOR RADAR (SAAMER): A PLATFORM FOR COMPREHENSIVE METEOR OBSERVATIONS AND STUDIES.

J.L. Hormaechea, D. Janches, G. Connon, D.Fritts et al.

14:35-14:55 (121) METEOROID MASS ESTIMATES USING SIMULTANEOUS (INVITED) RADAR-VIDEO OBSERVATIONS.

R. J. Weryk, P. G. Brown.

14:55-15:15 (116) METEOR RADAR OBSERVATIONS OF ATMOSPHERIC WAVE (INVITED) BUDGET IN THE LOW-LATITUDE MESOSPHERE LOWER THERMOSPHERE.

Karanam Kishore Kumar, Kandula Venkata Subrahmanyam, Geetha Ramkumar.

15:15-15:30 (40) MESOSPHERIC WINDS RETRIEVALS OBTAINED FROM SIMULTANEOUS 30MHZ AND 50MHZ JASMET (JICAMARCA ALL-SKY SPECULAR METEOR RADAR) OBSERVATIONS.

D. E. Scipion, G. Sugar, M. A. Milla et al.

15:30-16:00	COFFEE BREAK
16:00-16:20 (INVITED)	(32) GRAVITY WAVE MOMENTUM FLUXES INFERRED BY METEOR RADAR OVER CACHOEIRA PAULISTA. <i>V. F. Andrioli, B. R. Clemesha, P. P. Batista.</i>
16:20-16:35	(20) GRAVITY WAVE MOMENTUM FLUX DURING DISTURBED AND UNDISTURBED POLAR VORTEX CONDITIONS. <i>R.J. De Wit, P.J. Espy, R.E. Hibbins.</i>
16:35-16:50	(132) POSSIBLE RELATIONSHIP BETWEEN METEOR HEIGHT VARIATIONS AND SOLAR FLUX AT LOW LATITUDES IN THE SOUTHERN HEMISPHERE. <i>L. M. Lima, L. R. Araujo, P. P. Batista, B. R. Clemesha, H. Takahashi.</i>
16:50-17:05	(37) THE HYPERTHERMAL CHEMISTRY REGIME IN OVERDENSE METEORS AND RELATION TO OZONE DENSITY. <i>R. E. Sukara, W.K. Hocking.</i>
17:05-17:20	(11) RADAR DETECTABILITY STUDIES OF SLOW AND SMALL ZODIACAL CLOUD DUST PARTICLES. <i>D. Janches, J.M.C. Plane, D. Nesvorny, et al.</i>
17:20-17:35	(84) CONTINUOUS MEASUREMENTS OF METEOR HEAD ECHOES WITH MAARSY. <i>C. Schult, G. Stober, J. L. Chau.</i>
17:35	CLOSE
19:00	THEATER CONCERT
21:00	CONFERENCE DINNER

Wednesday, May 28 – Morning

08:00-09:00

Lecture 3**SPECTRAL AND MOMENT ESTIMATION AND FITTING.***Dr. Craig Heinselman*

Presentation Session

3. IONOSPHERIC IRREGULARITIES IN E AND F REGIONS.

*Main Session Organizer: Jorge L. Chau**Session Chairs: Amit Patra and Danny Scipi3n.*

09:00-09:20

**(90) A NONLINEAR AND NONLOCAL PERSPECTIVE ON E AND F
REGION IRREGULARITIES DETECTED BY RADARS.**

(INVITED)

J. P. St. Maurice

09:20-09:35

**(43) NEW RESULTS ON DAYTIME 150-KM RADAR ECHOES FROM
GADANKI, INDIA.**

A K Patra, P Pavan Chaitanya

09:35-09:50

**(1) ZONAL ELECTRIC FIELD AT THE EQUATORIAL E REGION: A
STUDY OF THE OBSERVED VERTICAL GRADIENTS AND THE
COLLISION FREQUENCY.**

C. M. Denardini, J. Moro, L. C. A. Resende, S. S. Chen

09:50-10:05

**(151) VHF RADAR OBSERVATIONS OF F-REGION FIELD-ALIGNED
IRREGULARITIES IN INDONESIA.**

Y. Otsuka, T. Dao, K. Shiokawa, Effendy, M. Nishioka, T. Tsugawa

10:05-10:30

COFFEE BREAK

10:30-10:50

**(26) STATISTICAL STUDY OF F-REGION FIELD-ALIGNED
IRREGULARITIES BASED ON EQUATORIAL ATMOSPHERE
RADAR IN INDONESIA.**

Tam Dao, Yuichi Otsuka, Kazou Shiokawa, Mamoru Yamamoto

10:50-11:05

**(78) STATISTICAL CHARACTERISTICS AND APPARENT TYPE OF
THE F-REGION FIELD-ALIGNED IRREGULARITIES IN MIDDLE-
LATITUDE FROM LONG-TERM OBSERVATIONS BY KOREA VHF
RADAR.**

T. Y. Yang, Y. S. Kwak, H. S. Kil, Y. S. Lee, Y. D. Park

11:05-11:20 **(59) OBSERVATIONAL EVIDENCE OF LARGE SCALE PLASMA STRUCTURE TRAVELLING EFFECT ON 3-M FIELD-ALIGNED IRREGULARITY DRIFT VELOCITY IN MID-LATITUDE SPORADIC E REGION.**

Y.H.Chu, C.Y.Wang, C.L.Su

11:20-11:35 **(8) THE ATMOSPHERIC WAVE GRAVEYARD.**

Wayne K. Hocking

11:35-11:50 **(107) PRECURSOR F LAYER WAVE STRUCTURE, PREREVERSAL VERTICAL DRIFT, AND THEIR ROLES IN THE EQUATORIAL SPREAD F IRREGULARITY DEVELOPMENT.**

M. A. Abdu, E. A. Kherani, J. R. De Souza, I. S. Batista, J. Macdougall, E. R. De Paula, J. H. A. Sobral

11:50-12:10 **(136) F-REGION VERTICAL DRIFTS AND EQUATORIAL SPREAD F: AN INVESTIGATION COMBINING GROUND-BASED RADAR OBSERVATIONS AND IN-SITU SATELLITE MEASUREMENTS.**
(INVITED)

F. S. Rodrigues, J. M. Smith, E. R. De Paula

12:10-14:00 **Lunch Breack**

Wednesday, May 28 – Afternoon

Presentation Session

3. IONOSPHERIC IRREGULARITIES IN E AND F REGIONS. (2nd time)

14:00-14:15 **(95) IDENTIFICATION OF THE SOURCE FLUCTUATIONS PRESENT IN THE EQUATORIAL F-REGION VERTICAL PLASMA DRIFT OBSERVED ON BOTH QUIET AND DISTURBED DAYS USING MULTI-FREQUENCY HF DOPPLER RADAR.**

T. J. Mathew, S. R. P. Nayar

14:15-14:30 **(44) FIRST RESULTS FROM A NEWLY ESTABLISHED 30 MHZ RADAR INTERFEROMETER FROM GADANKI, INDIA.**

A K Patra, P Srinivasulu, M Durga Rao, A Jayaraman

14:30-14:45 **(119) EQUATORIAL MERIDIONAL WINDS ABOVE OUAGADOUGOU DURING NIGHTTIME WEAK SOLAR ACTIVITY CONDITIONS.**

Oyedemi S. Oyekola, J. A. Akinpelu, T. O. Aro

14:45-15:00 **(105) ON POST-MIDNIGHT EQUATORIAL F-LAYER
IRREGULARITIES OBSERVED WITH DIGISONDE AND 30 MHZ
COHERENT BACKSCATTER RADAR OVER SÃO LUÍS, BRAZIL.**

C. M. N. Candido, I. S. Batista, E. R. De Paula, F. Becker-Guedes, F. S. Rodrigues, M. A. Abdu, J. H. A. Sobral.

15:00-15:30 **COFFEE BREAK**

15:30-17:30
POSTER PRESENTATION OF ALL SESSIONS

17:30 **CLOSE**

Thursday, May 29 – Morning

08:00-09:00 **Lecture 4
RADAR INTERFEROMETRIC IMAGING.**

Dr. Jorge L. Chau

Presentation Session

1. METEOROLOGY AND FORECASTING/NOWCASTING.

Main Session Organizer: David Hooper

Session Chairs: Luiz Augusto Toledo Machado, Bronwyn Dolman.

09:00-09:20 **(15) NOWCASTING USING DUAL POLARIZATION RADAR.**

(INVITED) *Machado, Luiz A. T., Mattos, Enrique, Medina, Bruno*

09:20-09:35 **(23) OBSERVATION OF LOCAL CIRCULATION IN NORTH AREA OF
FUKUI PREFECTURE IN JAPAN BY USING TWO ADJOINING 1.3-
GHZ WIND PROFILER RADARS.**

Tomoyuki Nakajo, Hiroyuki Hashiguchi, Masayuki Yamamoto, Takashi Aoyama

09:35-09:50 **(77) CONVECTIVE INHIBITION DUE TO A POTENTIAL VORTICITY
INTRUSION IN TROPICAL LATITUDES. (withdraw)**

Sandhya M, S. Sridharan.

09:50-10:10	<p>(101) OPERATIONAL GROUND-BASED REMOTE SENSING OF WIND – BENEFITS AND CHALLENGES: EXPERIENCES FROM THE EUROPEAN WIND PROFILER NETWORK CWINDE.</p> <p><i>V. Lehmann, R. Leinweber, E.Päschke, S. Klink, A. Haefele, G. Martucci, M. Turp</i></p>
10:10:10:30	COFFEE BREAK
10:30:10:45	<p>(79) RELATIVE IMPACT OF WIND PROFILER VERSUS OTHER OBSERVING SYSTEM SEEN BY FSO ON A GLOBAL MODEL AND IMPACT EVALUATED USING DENIAL EXPERIMENT IN HIGH RESOLUTION MODEL.</p> <p><i>C. Gaffard, Z. Li, D. Simonin, D. Klugmann, D. Hooper, R. Marriott</i></p>
10:45-11:00	<p>(83) TROPOSPHERIC GRAVITY WAVES IN THE ARCTIC AND NON-ARCTIC ATMOSPHERE AND RELEVANCE TO THE “UNIVERSALITY” OF THE UNIVERSAL SPECTRUM.</p> <p><i>M. C. Wright, W. K. Hocking.</i></p>
11:00-11:15	<p>(102) IMPACT OF MESO-NET OBSERVATIONS ON SHORT-TERM PREDICTION OF INTENSE WEATHER SYSTEMS DURING PRWONAM: TWIN DEPRESSIONS SYSTEM.</p> <p><i>Kusuma G Rao, Ramakrishna Gumma,</i></p>
11:15-11:30	<p>(108) THE AUSTRALIAN OPERATIONAL WIND PROFILER NETWORK.</p> <p><i>B. K. Dolman, I. M. Reid, R. Mayo, J. Woithe, G. Jonas, A. Jenkins, T. Kane</i></p>
11:30-11:45	<p>(144) EFFECT OF SHALLOW CUMULUS CONVECTION OVER PALAU IN TROPICAL PACIFIC OCEAN.</p> <p><i>U.V.Murali Krishna, K. Krishna Reddy , R.Shirooka</i></p>
11:45-12:00	<p>(152) A MULTI-SENSOR APPROACH TO UNDERSTAND THE STRENGTHS AND LIMITATIONS OF DIFFERENT TECHNIQUES/SENSORS PROVIDING RAINDROP SIZE DISTRIBUTION.</p> <p><i>T Narayana Rao, S Satheeshkumar, M. Basheer, C N Ramkiran, K Suneelkumar, A Sandeep, K Krishna Reddy.</i></p>
12:00-14:00	Lunch Breack
14:00-17:00	CITY PARKS TOUR

Friday, May 30 – Morning

08:00-09:00 **Lecture 5**
HARDWARE AND SOFTWARE RECEIVERS, GNU RADIO APPS.
Dr. Juha Vierinen

Presentation Session

5. NEW INSTRUMENTS, SIGNAL PROCESSING, AND QUALITY CONTROL

Main Session Organizer: Ralph Latteck

Session Chairs: Fabiano Rodrigues, Juha Vierinen

09:00-09:16 **(33) PROGRAM OF THE ANTARCTIC SYOWA MST/IS RADAR**
 (invited) **(PANSY).**
K. Sato, M. Tsutsumi, T. Sato, T. Nakamura, A. Saito, Y. Tomikawa, K. Nishimura, M. Kohma, H. Yamagishi, T. Yamanouchi

09:16-09:28 **(7) AN ADAPTIVE METEOR CLUTTER REJECTION TECHNIQUE FOR**
MESOSPHERIC RADAR OBSERVATIONS.
T. Hashimoto

09:28-9:40 **(16) VERTICAL AND LATITUDINAL WAVE FORCING OBSERVED**
WITH NETWORK OF RADARS OVER INDIAN REGION.
Eswaraiah Sunkara, Venkat Ratnam Madineni, Vijaya Bhaskara Rao S, Kosalendra Eethamakula, Kishore Kumar Karanam, Sathish Kumar S, Gurubaran S,

09:40-09:52 **(34) DEVELOPMENT OF TURBULENCE DETECTION AND**
PREDICTION TECHNIQUES WITH WIND PROFILER RADAR FOR
AVIATION SAFETY.
H. Hashiguchi, S. Kawamura, A. Ahoro, Y. Kajiwara, K. Bessho, A. Kudo, M. Iwabuchi, S. Hoshino, M. Kurosu

09:52-10:04 **(36) EQUATORIAL MU RADAR PROJECT.**
H. Hashiguchi, T. Tsuda, M. Yamamoto, M.K. Yamamoto

10:04-10:30 **COFFEE BREAK**

10:30-10:46 **(140) SMALL FORM FACTOR IONOSONDE FOR DENSE INSTRUMENT**
 (invited) **NETWORKS.**
Juha Vierinen, Frank Lind, Philip Erickson

10:46-11:58	(56) DEVELOPMENT OF A RANGE-IMAGING BOUNDARY LAYER RADAR WITH OVERSAMPLING CAPABILITY. <i>Masayuki K. Yamamoto, Tong Gan, Toshiyuki Fujita, Noor Hafizah Binti Abdul Aziz, <u>Hiroyuki Hashiguchi</u>, Tomoyuki Nakajo, Hajime Okamoto, Tian-You Yu, Mamoru Yamamoto</i>
10:58-11:10	(57) ERROR ESTIMATION OF SPECTRAL PARAMETERS FOR HIGH-RESOLUTION WIND AND TURBULENCE MEASUREMENTS BY WIND PROFILER RADARS. <i><u>Tong Gan</u>, Masayuki K. Yamamoto, Hiroyuki Hashiguchi, Hajime Okamoto, Mamoru Yamamoto</i>
11:10-11:22	(80) SCIENTIFIC AND SIGNAL PROCESSING ASPECTS OF SOFTWARE BEAM STEERING TECHNIQUE ON MULTI RECEIVER WIND PROFILER RADAR. <i><u>V.N.Sureshbabu</u>, V.K.Anandan, S.Vijaya Bhaskara Rao</i>
11:22-11:38 (INVITED)	(159) PMSE – A UNIQUE SCIENCE LINK OF THE MESOSPHERE AND IONOSPHERE. <i><u>Jürgen Röttger</u></i>
11:38-11:50	(92) SPECTRAL ANALYSIS COMPARISONS OF FOURIER THEORY BASED METHODS AND MINIMUM VARIANCE (CAPON) METHODS. <i><u>M. Garbanzo-Salas</u>, W. Hocking.</i>
11:50-12:02	(96) A SIGNAL PROCESSING METHOD TO SUPPRESS RANGE SIDELobe OF BARKER CODE FOR HCOPAR. (withdraw) <i><u>Ailan Lan</u>, Jingye Yan, Jurgen Rottger</i>
12:02-12:14	(109) A NEW UHF WIND PROFILER FOR MEASURING WINDS AND PRECIPITATION. <i><u>I. M. Reid</u>, B. K. Dolman, R. Mayo, J. Woithe, G. Jonas, A. Jenkins</i>
12:14-12:26	(115) BEAMFORMING FOR ACCURATE WIND MEASUREMENT WITH PANSY RADAR. <i><u>K. Nishimura</u>, T. Sato, T. Nakamura, M. Tsutsumi, K. Sato</i>
12:26-12:38	(128) SIDELobe SUPPRESSION TECHNIQUE FOR ATMOSPHERIC RADARS IN THE PRESENCE OF STRONG CLUTTER. <i>K Ch Sri Kavva, <u>Sarat K Kotamraju</u></i>
12:38-14:00	LUNCH BREAK

Friday, May 30 – Afternoon

14:00-15:00 **CLOSING SESSIONS**

15:00-17:00 **BRAINSTORMING ABOUT OUTSTANDING QUESTIONS & THE NEXT IMST**

Saturday, May 31

08:00-17:00 **FIELD TRIP**

List of poster presentation

Poster Presentation: 15:30 – 17:30 Wednesday May 28, 2014

1. Meteorology and forecasting/nowcasting

(51) THE REPRESENTATIVENESS OF WINDS DERIVED FROM SINGLE CYCLES OF MST RADAR OBSERVATIONS.

D. A. Hooper, D. M. Edwards, C. F. Lee, G. Vaughan.

(55) SPACE WEATHER AND METEOROLOGY IMPLICATIONS FOR PRECISION AIR NAVIGATION.

Jorge Taramona

(62) WIND LIDAR STUDY OF KELVIN-HELMHOLTZ INSTABILITY IN THE LOWER TROPOSPHERE DURING CAIPEEX-IGOC-2011.

Subrata Kumar Das, Siddarth Shankar Das, R. D. Ruchit, K. K. Dani.

(63) WIND FIELD CONDITIONS IN THE NORTH-WESTERN MEDITERRANEAN BASIN MONITORED BY A NETWORK OF WIND PROFILER RADARS.

F. Saïd, B. Campistron, D. Lambert, H. Delbarre, M. Abadie, J.A. Aranda, E. Bargain, F. Besson, Y. Bezombes, J.L. Boichard, J.L. Bourrian, O. Bousquet, G. Canut, G. Cherel, S. Derrien, A. Doerenbecher, J.M. Donier, T. Douffet, P. Durand, J.B. Estrampes, A. Ezcurra, A. Frappier, J.A. Garcia-Moya, O. Garrouste, J.A. Guijarro, R. Guillot, C. Hervier, J.L. Jouve, J. Lovichi, M. Macaigne, M. M. Maruri, E. Pique, Y. Pointin, S. Prieur, E. Richard, C. Ruffin-Soler, A. Sokolov, D. Subra, J. Torres, M. Turp, B. Piguet,

(65) ANALYSIS OF THE SEMIDIURNAL ATMOSPHERIC TIDE BASED ON THE OBSERVATIONS OF A THREE VHF WIND PROFILER SYNOPTIC NETWORK.

B. Campistron, F. Saïd, K. E. Kim,

(110) WIND PROFILER RETRIEVAL OF THE RAINFALL DROP SIZE DISTRIBUTION.

B. K. Dolman, I. M. Reid

(125) CHARACTERIZATION OF VPR ON COMPLEX TERRAIN FOR QPE PURPOSES BASED ON EXPERIMENTAL OBSERVATIONS FROM MULTIPLE SCAN ELEVATIONS RADAR.

J. A. Romo, M. Maruri, L. Santamaría, I. Soreasu

(145) RAINDROP SIZE DISTRIBUTIONS DURING PASSAGE OF MJO AND CONVECTIVE PRECIPITATING CLOUD OVER GAN ISLAND, MALDIVES OVER EQUATORIAL INDIAN OCEAN.

R.Mastanaiah , K.Krishna Reddy.

(146) SIMULATION OF TROPICAL CYCLONES OVER BAY OF BENGAL DURING 2013 USING WRF MODEL.

M. Venkatrami Reddy, U. V. Murali Krishna, S. B. Surendra Prasad , K. Krishna Reddy.

(147) ATMOSPHERIC THERMAL STRUCTURE OBSERVED DURING (2006-2012) MAJOR SOLAR ECLIPSES.

S. B. Surendra Prasad, M. Venkatarami Reddy , K. Krishna Reddy.

(149) CHARACTERISTICS OF POST-SUNSET TURBULENCE IN THE ATMOSPHERIC BOUNDARY LAYER AT GADANKI, INDIA.

T. Narayana Rao, A Sandeep

(150) DIFFERENCES IN THE STRUCTURE AND EVOLUTION OF THE ATMOSPHERIC BOUNDARY LAYER OVER COASTAL AND INLAND STATIONS.

A Sandeep, T Narayana Rao

(155) THE CONVECTIVE INSTABILITY IN THE SHALLOW TROPOSPHERE: A NON-BOUSSINESQ APPROACH.

B.R. Tiwari, E.A. Kherani, J.H.A. Sobral.

2. MST scattering, micro-scale processes and turbulence

(88) ESTIMATING LENGTH SCALES FOR TROPOSPHERIC TURBULENCE FROM MU RADAR AND BALLOON DATA.

H. Luce, R. Wilson, F. Dalaudier, H. Hashiguchi, M. K. Yamamoto, M. Yamamoto, L. Kantha

(10) A STUDY ON THE RANGE-WEIGHTING FUNCTION FOR RANGE IMAGING OF THE CHUNG-LI VHF ATMOSPHERIC RADAR.

Jenn-Shyong Chen, Ching-Lun Su, Yen-Hsyang Chu, Ruey-Ming Kuong

(19) SCATTERING CROSS SECTION OF MESOSPHERIC ECHOES AND TURBULENCE PARAMETERS FROM GADANKI RADAR OBSERVATIONS.

D.Selvaraj, A. K. Patra, H. Chandra, H.S. Sinha, D. Uma

(28) SEASONAL VARIATION OF LOW LATITUDE MESOSPHERIC AND LOWER E REGION ECHOES AND NEUTRAL TURBULENCE PARAMETERS OVER GADANKI, INDIA.

D.Selvaraj, A. K. Patra

(35) TURBULENCE CHARACTERISTICS MEASURED BY THE BALLOON-BOARDED TANGUSTEN HIGH-RESOLUTION TEMPERATURE SENSOR TOGETHER WITH THE MU RADAR MEASUREMENT.

Jun-Ichi Furumoto, Kensaku Shimizu, Kohei Kai, Kuniaki Higashi, Hiroyuki Hashiguchi

(42) AVERAGE ASPECT SENSITIVITY OF PMSE USING A MULTI-BEAM EXPERIMENT WITH MAARSY.

S. Sommer, G. Stober, J. L. Chau

(143) FURTHER EVIDENCE FOR SUPERDARN POLAR MESOSPHERE SUMMER ECHOES (PMSE) AT SANAEIV, ANTARCTICA.

W.T.Sivla, O. Ogunjobi, V. Sivakumar

3. Ionospheric irregularities in E and F regions.

(5) VARIABILITY OF IONOSPHERIC F-REGION PARAMETERS OVER LOW (INDIAN) AND MID (JAPANESE) LATITUDE STATIONS.*D S V V D Prasad, P V S Rama Rao, K Niranjan***(135) OCCURRENCE OF SPORADIC-E LAYER DURING THE ENDING PHASE OF SOLAR CYCLE 23RD AND RISING PHASE OF SOLAR CYCLE 24TH OVER THE ANOMALY CREST REGION BHOPAL, INDIA.***Purushottam Bhawre, A. K. Gwal, Parvaiz A. Khan, Azad A. Mansoori, Sharad C. Tripathi, Aslam A. M, M. Waheed, P. K. Purohit***(131) THE DEVELOPMENT OF APPROACHES FOR IONOSPHERE IRREGULARITIES MODELING ON THE BASE OF GNSS DATA.***Iu. Cherniak, I. Zakharenkoav, A. Krankowski, I. Shagimuratov***(134) TIDS OVER TUCUMAN BY GPS RADIO INTERFEROMETRY.***V.H.Rios***(45) ON THE RADIO AND OPTICAL SIGNATURES OF ESF PRECURSOR: OBSERVATIONS FROM INDIAN SECTOR.***A K Patra, A Taori, P Pavan Chaitanya, S Sripathi***(54) AN IMPROVED MODEL OF THE MAGNETIC FIELD-LINE INTEGRATED CONDUCTIVITY IN THE BRAZILIAN EQUATORIAL E-REGION.***J. Moro, C. M. Denardini, E. P. A Olivio, L. C. A. Resende, S. S. Chen, N. J. Schuch***(60) IONOSPHERIC RESPONSE TO INTENSIFICATION IN ENERGETIC PARTICLE PRECIPITATION IN THE SAMA/BRAZILIAN REGION DURING A MAGNETIC STORM.***A.M.Santos, M. A. Abdu, J.H.A.Sobral, J. R. Souza***(82) TRAVELLING IONOSPHERIC DISTURBANCES EXCITED AHEAD OF THE TSUNAMI BY THE SECONDARY ACOUSTIC GRAVITY WAVES: SIMULATION AND OBSERVATIONS DURING THE TOHOKU-OKI TSUNAMI.***E.A. Kherani, L. Rolland, P. Lognonne, E.R. De Paula***(98) THE INFLUENCE OF THE TIDAL WINDS IN THE FORMATION OF BLANKETING SPORADIC E LAYERS IN AN EQUATORIAL REGION.***L. C. A. Resende, C. M. Denardini, I. S. Batista, A. J. Carrasco, V. F. Andrioli, J. Moro, S. S. Chen*

(123) EQUATORIAL PLASMA BUBBLES OBSERVATIONS DURING THE PERIOD 2002-2013 OVER LOW LATITUDE REGION.

D.J. Shetti, P.T. Patil

(154) SHEFFIELD UNIVERSITY PLASMASPHERE-IONOSPHERE MODEL AT INPE (SUPIM-INPE).

J. R. Souza, P. M. T. Santos, M. A. Abdu, G. J. Bailey, P. A. B. Nogueira

(4) ATMOSPHERIC AND IONOSPHERIC RESPONSE TO STRATOSPHERIC SUDDEN WARMING OF JANUARY 2013.

O.F. Jonah, E. R. De Paula, E. A. Kherani, S.L.G. Dutra, R. R. Paes

(3) LATITUDINAL VARIATIONS IN THE OCCURRENCE OF GPS L-BAND SCINTILLATIONS ASSOCIATED WITH THE DAY-TO-DAY VARIATIONS IN THE TOTAL ELECTRON CONTENT IN THE INDIAN LOW LATITUDE SECTOR.

P.V.S.Rama Rao, K.Venkatesh, S.Gopi Krishna, D.S.V.V.D.Prasad

(58) OBSERVATIONS OF TEC DEPLETIONS OVER INDIAN LOW LATITUDES.

Praveen Galav, Shweta Sharma, Rajesh Pandey

(106) PLASMA BUBBLE MONITORING BY GROUNDBASED GPS RECEIVER NETWORK AND AIRGLOW 6300 ALL SKY IMAGERS OVER SOUTH AMERICA.

H. Takahashi, C. M. Wrasse, C. M. D. Nardin, S. Costa, I. Paulino, P. A. Nogueira, E. De Paula, J. R. Souza, N. Santana, A. S. Ivo, V. C. Gomes, Y. Otsuka, K. Shiokawa

(67) Study of equatorial atmosphere/ionosphere under RISH/LAPAN collaboration.

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4. Coherent and incoherent scatter radar techniques, ionospheric sounders and imagers

(104) CLIMATOLOGY OF THE O⁺ TEMPERATURE OVER ARECIBO FOR THE HISTORICAL DEEP SOLAR MINIMUM USING INCOHERENT SCATTER RADAR AND OII 7320 Å TWILIGHT AIRGLOW DATA.

P. T. Santos, C. G. M. Brum, R. Kerr

(130) SOLAR AND SEASON VARIABILITY OF THE NIGHTTIME H⁺, O⁺ AND HE⁺ ION FRACTIONS OVER ARECIBO BASED ON ROCSAT SATELLITE AND INCOHERENT SCATTER RADAR DATA.

E. Cabassa-Miranda, C. G. M. Brum, S. Raizada

(129) THE PLASMASPHERE ELECTRON CONTENT ESTIMATION ON THE BASE OF RADIO-MEASUREMENTS

Iu. Cherniak, I. Zakharenkova, A. Krankowski

(47) A NEW WIDE SCANNING 30-MHZ IONOSPHERIC RADAR AT NARL

P Srinivasulu, M Durga Rao, P Yasodha, A K Patra, P Kamaraj, A Jayaraman

(48) SYSTEM DESCRIPTION AND SAMPLE OBSERVATIONS OF THE NEWLY DEVELOPED 53-MHZ ACTIVE PHASED ARRAY RADAR AT NARL.

P Srinivasulu, P. Kamaraj, P. Yasodha, M. Durga Rao, A Jayaraman

(49) MULTI INSTRUMENT STUDIES ON THE VARIATIONS OF TOPSIDE IONOSPHERIC SCALE HEIGHT AND ITS EFFECT ON THE SHAPE OF THE ELECTRON DENSITY PROFILE

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(141) REPORT ON MULTI-BEAM INCOHERENT SCATTER RADAR MODES AT THE JICAMARCA RADIO OBSERVATORY.

Marco Milla

(113) STRONG SPATIAL ANISOTROPY IN ULF DOPPLER SHIFT OSCILLATIONS OBSERVED IN HF GROUND SCATTER ECHOES FROM VERY HIGH LATITUDES.

G. Scoular, P. Ponomarenko, J.-P. St.-Maurice

5. New instruments, signal processing, and quality control.

(30) SPACE AND ATMOSPHERIC SCIENCES AT SOUTH OF BRAZIL.

N. J. Schuch, C. M. Denardini, J. Moro, L. Z. Da Costa, T. R. Mânica, P. F. Moro, J. F. M. Wendt, Claudio Machado Paulo

(87) INTRODUCTION TO THE WUZHAI MEDIUM FREQUENCY RADAR AND THE INITIAL RESULTS.

Li Chen, Zhang Yue, Zhang Hong, Du Lei, Yan Yong

(93) COMPARISON OF TWO SPECTRAL ANALYSIS TOOLS USED IN A BOUNDARY-LAYER VHF-RADAR LOCATED IN COSTA RICA.

M. Garbanzo-Salas, W. Hocking

(112) PERFORMANCE ANALYSIS OF VARIOUS SA TECHNIQUES ON HORIZONTAL WIND ESTIMATION.

Shridhar Kumar, V K Anandan, T Narayana Rao, M Purnachandra Rao,

(124) A CONSTRAINT BASED APPROACH FOR SPECTRUM ESTIMATION AND ANALYSIS FOR BETTER ACCURACY IN MST RADAR SYSTEMS.

Sarat K Kotamraju, K Ch Sri Kavya,

(153) ESTIMATION OF CLOUD MOTION VECTORS USING MULTI-INSTRUMENTATION OVER A TROPICAL STATION - GADANKI.

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(156) RECENT RADAR DEVELOPMENT AT ATRAD.

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6. Meteor studies and observations

(133) METEOR WIND BEHAVIOR DURING SOLAR CYCLE 23 AT CACHOEIRA PAULISTA, BRAZIL.*L.R. Araujo, L.M. Lima, P.P. Batista, B.R. Clemesha, H. Takahashi.***(13) METEOR STREM SURVEY IN THE SOUTHERN HEMISPHERE USING SAAMER.***D. Da Silva, D. Janches, J.L. Hormaechea, C. Brunini, D. C. Fritts, W. Hocking***(21) NEW EXPERIMENTS IN METEOR SCIENCE ENABLED THROUGH MULTISTATIC SPECULAR METEOR RADAR.***C. V. V. Vaudrin***(38) MEASUREMENTS OF MESOSPHERIC OZONE DENSITY USING OVERDENSE METEOR DATA.***R. E. Sukara, W.K. Hocking***(52) MST RADAR STUDIES OF LEONID METEOR SHOWER 1996 - 2010.***Rakesh Chandra Narwa, K Chenna Reddy, Yellaiah G,***(61) MONTHLY AVERAGED GRAVITY WAVE MOMENTUM FLUXES FROM METEOR RADAR MEASUREMENTS AT SANTA MARIA (29.7°S, 53.7°W).***Batista, P. P., Andrioli, V. F., Clemesha, B. R., Schuch, N. J.***(127) VERTICAL WINDS ESTIMATES USED TO CALCULATE MOMENTUM FLUX TRANSPORTED BY EQUATORIAL PLANETARY WAVES IN THE MLT.***F. Egito, P. P. Batista, B. R. Clemesha, R. A. Buriti***(72) NON-SPECULAR METEOR TRAILS FROM NON-FIELD-ALIGNED IRREGULARITIES: CAN THEY BE EXPLAINED BY PRESENCE OF CHARGED METEOR DUST?***J. L. Chau, I. Strelnikova, C. Schult, M. M. Oppenheim, M. C. Kelley, G. Stober, W. Singer***(22) VALIDATION OF MODERN THEORIES OF METEOR TRAIL SCATTER AND DIFFUSION WITH SPECULAR MULTISATATIC METEOR RADAR.***C. V. V. Vaudrin***(18) VERTICAL AND LATITUDINAL WAVE FORCING OBSERVED WITH NETWORK OF RADARS OVER INDIAN REGION.***S. Eswaraiah, M. Venkat Ratnam, et al.*

7. Middle Atmosphere Dynamics and Structure.

(27) LONG-TERM VARIABILITIES OF LUNAR SEMI-DIURNAL TIDE IN LOW-LATITUDE MESOSPHERIC WINDS AND EQUATORIAL ELECTROJET AND THEIR RELATIONSHIP WITH POLAR STRATOSPHERIC WARMING.

S. Sathishkumar, S. Sridharan, S. Gurubaran

(66) PARAMETER ESTIMATION ERRORS OF MESOSPHERIC NIGHTGLOW OBSERVABLES

F. Vargas, G. Swenson, C. Gardner, A. Mangogna

(68) THE TEMPERATURE OF SPORADIC SODIUM LAYERS OBSERVED AT 23 S.

B R Clemesha, D M Simonich, P P Batista

(75) LONG-TERM OBSERVATIONS OF D-REGION ELECTRON DENSITIES AT HIGH AND MIDDLE NORTHERN LATITUDES

W. Singer, R. Latteck, D. Keuer, M. Zecha, M. Friedrich

(103) STUDIES ON SMALL SCALE WIND DYNAMICS BY AN INTERFEROMETRIC PROFILER RADAR AT MID-LATITUDE

V.N.Sureshbabu, V.K.Anandan, S.Vijaya Bhaskara Rao

(118) SIMULTANEOUS OBSERVATIONS OF DIURNAL TIDES IN TROPOSPHERE-LOWER STRATOSPHERE AND MESOSPHERE-LOWER THERMOSPHERE REGION OVER KOTATABANG (0.2°S AND 100.2°E).

Karanam Kishore Kumar, Kandula Venkata Subrahmanyam

(137) MESOSPHERE AND LOWER THERMOSPHERE ZONAL WIND VARIATIONS OVER LOW LATITUDES: RELATION TO LOCAL STRATOSPHERIC ZONAL WINDS AND GLOBAL CIRCULATION ANOMALIES

G. Kishore Kumar, K. Kishore Kumar, W. Singer, C. Zülicke, S. Gurubaran, G. Baumgarten, G. Ramkumar, S. Sathishkumar, M. Rapp

(138) TROPICAL TROPOPAUSE DYNAMICS CAMPAIGNS FOR INVESTIGATING THE ROLE OF DEEP CONVECTION IN MODULATING THE TROPICAL TROPOPAUSE LAYER CHARACTERISTICS AT SUB-DAILY SCALES. (withdraw)

Alladi Hemanth Kumar, M Venkat Ratnam, B V Krishna Murthy, S V Sunil Kumar

(139) IDENTIFICATION OF HIGH FREQUENCY GRAVITY WAVE SOURCES USING RAY TRACING METHOD OVER A TROPICAL LATITUDE: FIRST RESULTS.

M. Pramitha, M. Venkat Ratnam, Alok Taori, B.V. Krishnamurthy

(148) SEASONAL VARIATION OF VERTICAL EDDY DIFFUSION COEFFICIENT IN THE MESOSPHERE AND RELATION TO THE THERMOSPHERE AND IONOSPHERE: MU RADAR OBSERVATIONS.

Y. Otsuka, M. Yamamoto

(157) MOMENTUM FLUX MEASUREMENTS AT ADELAIDE.

I.M. Reid, A. J. Spargo, A.D. Mackinnon

(158) METEOR RADAR AND AIRGLOW OBSERVATIONS AT COMMANDANT FERRAZ ANTARCTIC STATION: GRAVITY WAVES CHARACTERISTICS AND TIDES.

J. V. Bageston, P. P. Batista, H. Takahashi, D. Gobbi, C. M. Wrasse, N. M. P. Leme, D. C. Fritts, D. Janches

(97) GENERATION AND PROPAGATION OF AGWS EXCITED BY THE AURORAL HEATING AND PRECIPITATION DURING QUIET TIME.

R.R. Paes, E.A. Kherani, I.S. Batista

Detailed Scientific Program Content

1. Meteorology and forecasting/nowcasting.

Session Chairs: Luiz Augusto Toledo Machado, Bronwyn Dolman

MSO: David Hooper

Topics: This session focuses on all meteorological phenomena of the boundary-layer, troposphere, and lower-stratosphere that are observed by wind-profiling radars - or that are of relevance to wind-profiler observations. The ability of these radars to continuously measure winds at intervals as small as a few minutes remains a key strength. Although it is possible to launch radiosondes as frequently as hourly during limited campaign periods, routine observations are seldom made at intervals of less than 12 hours. Consequently, radar measurements have played a dominant role in observational studies of the shorter-period gravity waves. Moreover, national meteorological services are increasingly looking to these radars as an alternative to radiosondes for routine observations. The radars are competitive in terms of both cost and accuracy of measurements. They are also more-likely to capture the highest-impact weather events, which seldom last for more than a few hours at any location. These factors are becoming increasingly relevant as the resolution of numerical weather prediction models continues to improve. The radars are also capable of providing more than just winds. Under suitable circumstances, they can provide information about atmospheric stability, humidity fields, precipitation, and turbulence. Topics for this session include:

- weather systems and related synoptic- and meso-scale phenomena
- gravity wave generation, propagation, interaction, and dissipation (for altitudes no higher than the lower stratosphere)
- turbulence (in the context of atmospheric structure rather than of the scattering mechanism)
- wind-profiling networks
- data assimilation, nowcasting, and forecasting
- water vapour, clouds, convection, and precipitation (in the context of atmospheric structure rather than of the scattering mechanism)
- observations made by complementary instruments
- special observation campaigns

2. MST scattering, micro-scale processes and turbulence.

** This session is dedicated to the memory of **Prof. Ben Balsley***

Session Chairs: Gerald Lehmacher, Andreas Muschinski

MSO: Phillip Bruce Chilson

Topics: There is a long and rich history of using radar across a wide range of frequency bands to investigate atmospheric turbulence along with small- and micro-scale processes. Results from theoretical, modelling, and observational studies have convincingly demonstrated the utility of using MST radar to investigate a multitude of such processes including wind-shear-induced turbulence; the presence of steep vertical gradients in dynamic and thermodynamic fields; dynamic instabilities and their role in the production of turbulence; impacts of charged ice particles on the movements of free electrons near the mesopause; the decay of plasma trails created by ablating meteors; vertical transport of momentum; and many others. To better understand these and other related atmospheric phenomena, the MST research community has continued to innovate radar and signal processing technologies and develop novel ways of integrating observations from complementary instruments. These include improvements to the spatial and temporal resolution of radar through the introduction of larger antennas; higher power transmitters, sophisticated wave forms, and interferometric and imaging techniques; detailed studies of factors contributing to Doppler spectrum widths and backscattered signal power; and utilizing techniques that exploit intrinsic scattering properties of the atmosphere such as aspect sensitivity. Examples of complementary observations include in-situ measurements from instrumented balloons, rockets, aircraft (manned and unmanned), and towers. This session aims to focus on topics related to radio-wave scatter, atmospheric turbulence, and small- to micro-scale atmospheric phenomena. The session is dedicated to the memory of Ben Balsley and his innovative work in these areas and the significant and lasting impact that he has had and continues to have on our community. In keeping with the legacy of Ben Balsley's style of research, contributions with a focus of collaborative investigations (field campaigns, multi-institutional studies, multi-sensor observations) from the boundary layer to the mesosphere are particularly welcomed.

3. Ionospheric irregularities in E and F regions.

Session Chairs: Amit Patra and Danny Scipi3n

MSO: Jorge L. Chau

Topics: Research on ionospheric plasma irregularities has benefited greatly from an advancement in the knowledge and application of radar techniques that measure the coherent echoes coming from plasma irregularities. Observational capability has been advanced from a single beam slit camera mode to electronic beam-scanning capability. This provides two-dimensional spatial images of the irregularity distribution, in-beam imaging of the spatial distribution of the small scale structures, application of aperiodic pulses for accurate spectral measurements for overspread targets, viz., F region turbulence, bi-static radar technique to estimate electron density profiles, etc. These techniques have also been used to diagnose the ionosphere effectively, i.e., measure physical parameters that are usually measured by incoherent scatter radars or in-situ probes. Coordinated observations made using the incoherent scatter technique, meteor/MF radar, lidar, and in-situ measurements have advanced our understanding remarkably. While significant progress has been made, there remain many unresolved issues of which several are mutually coupled. They include equatorial spread F (ESF) irregularities, irregularity processes in the daytime and nighttime valley region (around 150 km), auroral and equatorial electrojet processes and associated plasma irregularities, midlatitude spread F irregularities and their coupling with the E region. In addition, there are vertical and lateral coupling effects arising from lower atmospheric forcing, e.g., tidal, gravity wave, and planetary scale wave effects, including the Sudden Stratospheric Warming. Coherent radar observations for diagnosing the ionospheric state parameters and validation during these events, would be of great interest. This session welcomes all scientific and technical papers dealing with these issues and encourages multi-technique approaches to address them. In addition, coordinated observations in campaign mode addressing global scale issues, such as high latitude low latitude coupling, effect of the medium scale traveling ionospheric disturbances (MSTID) and tropical/extra-tropical wave forcing on ESF, would be of interest to the community at large.

4. Coherent and incoherent scatter radar techniques, ionospheric sounders and imagers.

Session Chairs: Marco Milla, Mike Nicolls

MSO: Clezio M. De Nardin

Topics: Coherent as opposed to incoherent radar scattering from distributed atmospheric/ ionospheric targets can be described under a single formalism based on the radiation of accelerated electrons obeying different types of statistics. Coherent and incoherent scattered radar signals can likewise be processed using identical techniques and algorithms. Inferences made from radar spectra and ACF obtained under coherent and incoherent scattering will have commonalities and distinctions reflecting the differences in the underlying statistics of the re-radiating electrons causing the scatter. This session includes invited papers and contributions focusing on synergistic and contrasting aspects of coherent and incoherent scatter and their advanced applications. Papers focusing on the synergies between different coherent scatter types and ionospheric sounders and imagers are also included.

5. New instruments, signal processing, and quality control.

Session Chairs: Fabiano Rodrigues, Juha Vierinen

MSO: Ralph Latteck

Topics: Instrument design and performance, signal processing algorithms and data quality control are the basis of remote sensing of the MST region using atmospheric radars. Advances in radar technology allow the deployment of new and modern phased-array atmospheric and ionospheric radar systems such as PANSY in Antarctica, MAARSY in northern Norway, EISCAT 3D in Scandinavia or the AMISR systems. Several existing radar facilities are expected to be or were lately upgraded for new capabilities. This session will provide a forum for discussing the application, design, implementation, and engineering aspects of new or upgraded MST and Incoherent Scatter radar systems as well as related signal processing algorithms and quality control methods. Beside the introduction to completely new planned or installed radar facilities this also includes the development of new radar system components such as transceivers, receivers or digitizers. New approaches to signal-processing or the re-evaluation of older or existing techniques as used for e.g. the rejection of poor data or outliers, or filtering, should be discussed as well in this session. The session is directed to develop synergies between the various user groups which study the lower, middle and upper atmosphere and the ionosphere.

The main topics of the session are:

- new radar designs and installations
- new radar sub-components (transceiver, receivers, digitizers)
- upgrades of existing radar facilities
- new approaches to signal-processing
- re-evaluation of signal-processing and analysis techniques

6. Meteor studies and observations.

Session Chairs: Diego Janches, Rob Weryk

MSO: Wayne Hocking

Topics: Meteor studies have had a chequered history, from a very active period prior to the 1970's, to a relative calm in the 1980's and early 1990's, and then an explosion of research from the late 1990's.

Meteors now have many uses, both for astronomical studies as well as tracers and samplers of upper atmosphere chemistry and dynamics. Their potential impact on spacecraft and satellites is also becoming more important. The ability to routinely measure tens of thousands of meteoroids per day, and to see echoes via non-specular processes, has opened doors to a great many new studies. Powerful new computer simulations have also allowed new insights into meteor-trail formation, ablation modelling, and trail evolution.

In this session, we will consider papers on any aspect of meteor science as long as MST radar is involved in some way. Topics may include both specular and head echo studies, as well as modelling of the processes of trail formation and radio-wave scatter. Meteor chemistry, especially the very high-temperature chemistry involved in overdense trail formation and destruction, is also important.

Atmospheric parameters deduced from meteor studies, such as winds and temperatures, and their resulting dynamics, also still constitute an area of active interest. Tides and planetary-wave studies are also included. In addition, papers in the new and growing field of momentum-flux and small-scale dynamical studies using meteor methods are relevant.

Some more powerful MST-type radars also appear to be able to detect signatures of space debris entering the atmosphere, and if these are confirmed, it gives yet another tool to the meteor tool-box. Papers in this area are certainly of interest.

Finally, the number of dedicated meteor radars is growing steadily, as well as the number of applications of meteor studies on existing equipment. Reports of these studies are included, although emphasis will be given to new networks that have been developed, allowing extensive multi-site studies.

Areas of particular importance are:

- Specular echoes
- Head echoes
- Non-specular scatter
- Formation of meteor trails, ablation modelling and radio scatter
- Meteor Chemistry
- Atmospheric winds studied via meteor trails (concentration on basic science)
- Atmospheric temperatures deduced from meteor trails
- Momentum flux, small scale dynamics, turbulence from meteor trails
- Space debris studies using MST radar
- New meteor networks
- Some limited astronomical studies (may be included if they were made with MST type radars).

7. Middle Atmosphere Dynamics and Structure.

Session Chairs: Masaki Tsutsumi, Alan Liu

MSO: Iain Reid

Topics: The middle atmosphere, the region between 10 and 100 km, remains a critical region of study of the coupling between the lowest part of the atmosphere, the troposphere, where significant gravity wave generation takes place, and the thermosphere. It is also the region that shields the surface from a major part of the ionizing radiations from the Sun. The strong interplay between the chemistry, dynamics and thermal structure of the middle atmosphere, and the potential for changes in these relationships in a changing climate scenario, underscore the importance of better understanding the region. Indeed, there are already indications of long-term changes in the mean winds, gravity wave activity and electron densities in parts of the region. Radar studies have contributed significantly to an improved understanding of the Middle Atmosphere and its important role. However, the region between about 20 and 50 km, a significant part of the Middle Atmosphere, remains inaccessible to radar. For this reason, coordinated studies using a variety of techniques, including balloon borne instruments, rockets, lidar, satellite observations and modeling are required to fully understand it. In this session, standalone radar studies, as well as coordinated multi-instrument investigations of the 10 to 100 km height region are particularly encouraged. Topics of particular interest include both case studies and climatologies of turbulence, gravity waves, tides and planetary waves, and possible long-term changes and coupling from the troposphere to the thermosphere.

About the Invited Speakers

Résumé:

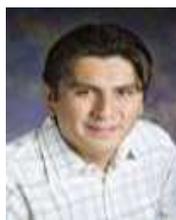
Dr. Andreas Muschinski earned his physics diploma (1990) from the Institute for Geophysics and Meteorology (now the Institute for Geophysics and Extraterrestrial Physics) at the Technical University of Braunschweig, Germany and his PhD (1992) and habilitation (1998) in Meteorology from the Physics Department at the University of Hanover, Germany. He has 22 years of post-doctoral research experience in areas related to turbulence and propagation (light, radio waves, sound, gravity waves) in the atmosphere. He worked at the University of Hannover, Germany (1990-98), the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado Boulder, CO, affiliated with the NOAA Environmental Technology Laboratory (1998-2004), and the Dept. of Electrical and Computer Engineering at the University of Massachusetts Amherst, MA (2004-2011). Since 2011, he has been a Senior Research Scientist at the CoRA office of NorthWest Research Associates (NWRA) in Boulder, CO and an Adjunct Professor at the ECEE Dept. of the University of Colorado Boulder.



**Dr. Andreas
Muschinski**

Résumé:

Marco A. Milla received his Bachelor's degree in electrical engineering from the Pontificia Universidad Católica del Perú, Lima, Peru, in 1997 and M.S. and Ph.D. degrees from the University of Illinois, Urbana, in 2006 and 2010, respectively. In 2009, he joined the Jicamarca Radio Observatory where he continues his research on the development of incoherent scatter radar techniques for the estimation of ionospheric state parameters. In particular, he has studied Coulomb collisions and magnetoionic propagation effects on the incoherent scatter spectrum measured with antenna beams pointed perpendicular to the Earth's magnetic field. In recognition of this work, Milla was recipient of the Sunanda and Santimay Basu Early Career Award in Sun-Earth Systems Science in December 2012.



**Dr. Marco
Antonio Milla
Bravo**



**Dr. Craig
Heinselman**

Résumé:

The EISCAT Council has appointed a new Director to take over from Dr Esa Turunen when he leaves at the end of the year. Dr Craig Heinselman will join EISCAT on 1st January 2013 as the new Director of the EISCAT Scientific Association. Dr Heinselman is today working at SRI International, Stanford, USA, as Principal investigator and project leader for the Advanced Modular Incoherent Scatter Radar (AMISR) Operation and Maintenance. He will have his office at the EISCAT Headquarters in Kiruna, Sweden, where he will also live.

Résumé:

Jorge L. Chau is currently the Head of the Radar and Rocket Department at the Leibniz Institute of Atmospheric Physics in Kühlungsborn, Germany. He has served as the Director of the Jicamarca Radio Observatory, in Peru, between 2001 and 2012. His research has focused on radar studies of the equatorial neutral atmosphere and ionosphere. He is interested in the development of radar techniques to improve the atmospheric/ionospheric measurements as well as to improve the understanding of atmospheric/ionospheric physics at low, mid and high latitudes. Topics of ongoing research include the development of radar imaging techniques for 2D and 3D applications, radar studies of non-specular meteor trails as well as high latitude E region irregularities, atmospheric/ionospheric coupling studies, and meteor-head echo studies with radars to determine the sources of the sporadic and shower meteor populations as well as other parameters of aeronautical and astronomical importance.



**Dr. Jorge L.
Chau**



**Dr. Juha
Vierinen**

Résumé:

Juha Vierinen has 10 years of experience with applying probability theory to different scientific measurement problems, starting with equations and often ending with applying the idea in practice. His doctoral thesis is titled: “On statistical theory of radar measurements”. The thesis explores the application of Bayesian statistics and inverse problems to various radar measurement problems such as: synthetic aperture radar, space debris, meteors, and ionospheric incoherent scatter. Juha is currently employed by the MIT Haystack Observatory, where he develops signal processing methods for high power large aperture radar remote sensing. In his spare time, Juha develops small low cost geophysical radio remote sensing instruments based on the software defined radio paradigm. Examples of instruments developed by him include: a wide band riometer, a low cost FM radio passive radar, a beacon satellite receiver for ionospheric tomography, and a low power ionosonde.

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