

Knowledge Activities and Products Publications, Presentations ..

Knowledge creation, knowledge enhancement, knowledge dissemination and knowledge management have been among the core activities of C-MMACS. Ever since its inception, C-MMACS has maintained a high knowledge output in terms of publications and other scientific programmes-knowledge synthesis and exchange through conferences, workshops, brainstorming sessions, etc.

Highlights

In the year 2004-05, C-MMACS has published 19 articles in SCI journals. C-MMACS scientists had participated in a number of national and international scientific events. And, as usual, C-MMACS had a vibrant year with visitors (30), invited talks (16) and other knowledge activities.



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6.1 Publications in Journals

Anand Kumar, Isotropic Finite-differences, *Journal of Computational Physics*, 201, 109-118, 2004.

V Anil Kumar and Dorgham Sisalem, TCP Based Denial-of-Service Attacks to Edge Networks: Analysis and Detection, LNCS, 3356, 214-223, 2004.

V Anil Kumar, Sophistication in Distributed Denial-of-service Attacks on the Internet, *Current Science*, 87(7), 885-888, 2004.

P Goswami and **G K Patra**, Characteristic Scale of Convective Organization and Monsoon Intensity, *Geophysical Research Letters*, 31(24), L24109, 2004.

P Goswami and G Liberti, Prognostic Model of Cloud Cover Based on Satellite Data, *Geophysical Research Letters*, 2004.

P Goswami, **S Sijikumar** and **A Mandal**, Seasonal Cycle and Intraseasonal Oscillations in the Interannual Variability over the Monsoon region, *Geophysical Research Letters*, March, 2005.

Imtiyaz A Parvez, F Vaccari and G F Panza, Site-specific Microzonation Study in Delhi Metropolitan City by 2-D Modeling of SH and P-SV Waves, *Pure and Applied Geophysics*, 161(5-6), 1165-1184, 2004.

P Jafarali, L Chattopadhyay, **G Prathap** and S Rajendran, Error Analysis of a Hybrid Beam Element with Timoshenko Stiffness and Classical mass, *International Journal of Computational Engineering Science*, 5(3), 495-508, 2004

S Mukherjee, **P Jafarali** and **G Prathap**, A Variational Basis for Error Analysis in Finite Element Elastodynamics, *Journal of Sound and Vibration*, 285(3), 615-635, 2004 .

Malay Mukul, Continued Deformation and Global Positioning System Based Geodesy, *Himalayan Geology*, 26(1), 193-198, 2005.

S Raja, R Sreedeeep and **G Prathap**, Bending Behavior of Hybrid-Actuated Piezoelectric Sandwich Beams, *Journal of Intelligent Material Systems and Structures*, 15, 611-619, 2004.

S Raja, D Dwarakanathan, P K Sinha and **G Prathap**, Bending Behavior of Piezo-Hygrothermo-Elastic Smart Laminated Composite Flat and Curved Plates with Active Control, *Journal of Reinforced Plastics and Composites*, 23, 265-290, 2004.

S Raja, P K Sinha, **G Prathap** and D Dwarakanathan, Influence of Active Stiffening on Dynamic Behaviour of Piezo-Hygro-Thermo-Elastic Composite Plates and Shells, *Journal of Sound and Vibration*, 278, 257-283, 2004.

S Raja, P K Sinha, **G Prathap** and D Dwarakanathan, Thermally Induced Vibration Control of Composite Plates and Shells with Piezoelectric Active Damping, *Smart Materials and Structures*, 13, 939-950, 2004.

S R Marur and **G Prathap**, Non-Linear Beam Vibration Problems and Simplifications in Finite Element Models, *Computational Mechanics online*, 19 November 2004.

K Radhakrishnan and **T R Ramamohan**, Effect of Hydrodynamic Interactions on Chaos Control in Semi-Dilute Suspensions of Periodically Forced Slender Rods in Simple Shear Flow, *Journal of Chemical Engineering of Japan*, 37(11), 1408-1414, 2004.

Sridevi Jade, B C Bhat, R Bendick, V K Gaur, P Molnar, **MB Ananda** and **P Dileep Kumar**, GPS Measurement from the Ladakh Himalaya, India: Tests of Plate-like or Continuous Deformation in Tibet, *Geological Society of America Bulletin*, 116(11), 1385 - 1391, 2004.

Sridevi Jade, Estimates of Plate Velocity and Crustal Deformation in the Indian Subcontinent using GPS Geodesy, *Current Science*, 86(10), May 2004.

A Gnanadesikan, J P Dunne, R M Key, K Matsumoto, J L Sarmiento, R D Slater and **P S Swathi**, Oceanic Ventilation and Biogeochemical Cycling: Understanding the Physical Mechanisms that Produce Realistic Distributions of Tracers and Productivity, *Global Biogeochemical Cycles*, 18(4), 20 October 2004.

K Matsumoto, J L Sarmiento, R M Key, O Aumont, J L Bullister, K Caldeira, J M Campin, S C Doney, H Drange, J C Dutay, M Fellows, Y Gao, A Gnanadesikan, N Gruber, A Ishida, F Joos, K Lindsay, E Maier-Reimer, J C Marshall, R J Matear, P Monfray,

A Mouchet, R Najjar, G K Plattner,, R Schlitzer, R Slater, **P S Swathi**, I J Totterdell, M F Weirig, Y Yamanaka, A Yool, J C Orr, Evaluation of Ocean carbon Cycle Models with data based Metrics, *Geophysical Research Letter*,31, L07303, 2004.

6.2 Publications in Books/ Proceedings

V Anil Kumar and Dorgahm Sisalem, Analysis and Detection of Denial-of-Service Scenario Generated by TCP Receivers to Edge-network, *Proceedings of 12th International Conference on Advanced Computing and Communication, ADCOM-2004*.

Malay Mukul, Global Positioning System (GPS) based Crustal Deformation Studies in India: Glimpses of Geoscience Research in India, The Indian Report to IUGS 1999-2004, *Indian National Science Academy*, New Delhi, 2004.

Malay Mukul, Continental Deformation and Global Positioning System (GPS) based Geodesy: Abstracts, New Perspectives and Future Directions, WInGeo-2004, *Workshop on Indian Geotransects*, Dehradun, India, 25-26 November 2004.

Malay Mukul, Sridevi Jade, A Bhattacharyya, A Martin, A P Krishna and R Pariong, Active Deformation in the North Eastern Himalayas and the Shillong Plateau using GPS Based Geodesy: Implications for Deformation in the Eastern Himalayan Mountain Belt: Abstracts, *17th International Workshop on Electromagnetic Induction in the Earth*, Hyderabad, India, 18-23 October 2004.

Sridevi Jade, Dynamics of Continental Collision and Crustal Deformation in Indian Subcontinent using GPS Geodesy, *National Programme on GPS for Earthquake Hazard Assessment*, Seismology Division, DST, January 2005.

G K Patra, Tahir Ali, **V Anil Kumar** and **R P Thangavelu**, Multiparty Secure Key Exchange Algorithm Using Neural Cryptography, *Proceeding of National Workshop on Cryptography*, September 2004.

6.3 Presentations in Conferences/Symposia/Workshops

Anand Kumar, Isotropic Numerical Schemes, *Regional Research Institute*, Bangalore.

Anand Kumar, Isotropic Numerical Schemes for Image Processing, *Tata Institute of Fundamental Research*, Indian Institute of Science Campus, Bangalore.

V Anil Kumar and Dorgahm Sisalem, Analysis and Detection of Denial-of-Service Scenario generated by TCP Receivers to Edge-network, *12th International Conference on Advanced Computing and Communication, ADCOM-2004*, Ahmedabad, December 2004.

V Anil Kumar and Dorgham Sisalem, TCP Based Denial-of-Service Attacks to Edge Network: Analysis and Detection, *7th International Conference on Information Technology*, Hyderabad, December 2004.

Imtiyaz A Parvez, Influence of Source Distance on Site Effects in Delhi City, *5th Asian Seismological Commission General Assembly 2004*, Yerevan, Armenia, 18-21 October, 2004.

Malay Mukul, Continental Deformation and Global Positioning System (GPS) based Geodesy: Abstracts, New Perspectives and Future Directions, WInGeo-2004, *Workshop on Indian Geotransects*, Dehradun, 26 November 2004.

Malay Mukul, Active Deformation in the North Eastern Himalayas and the Shillong Plateau using GPS Based Geodesy: Implications for Deformation in the Eastern Himalayan Mountain Belt, *17th International Workshop on Electromagnetic Induction in the Earth*, Hyderabad, 25 October 2004.

G K Patra, Tahir Ali, **V Anil Kumar** and **R P Thangavelu**, Multiparty Secure Key Exchange Algorithm Using Neural Cryptography, *National Workshop on Cryptography, Amrita Institute of Technology*, Kollam, Kerala, September 2004.

G Prathap, Verification, Validation and Variational Crimes in the Finite Element Method, *International Conference on Advances in Structural Integrity*, Indian Institute of Science, Bangalore, 14-17 July 2004.

G Prathap, Measurement, Mathematics and Modelling, Inaugural Lecture, *Recent Advances in Computational Techniques*, BMS College of Engineering, Bangalore, 2 August 2004.

K V Ramesh, Coupling of Mixed Layer Processors and Thermocline Variations in the Arabian Sea,

Indian Ocean Modeling Workshop, *International Pacific Research Centre*, Hawaii, USA 29 November-3 December 2004.

R Krishnan, **K V Ramesh**, Basanta Samal and M Majumdar, Contributions to Observing System Assessment Air-Sea Interactions in the Tropical Indian Ocean and Monsoon Environment, *Indian Ocean Modeling Workshop*, International Pacific Research Center (IPRC), University of Hawaii, Honolulu, USA, 29 November-3 December, 2004.

K V Ramesh, OGCM Study on the Inter-annual Variability of the Indian Ocean Associated with Indian Summer Monsoon Circulations, *National Workshop on Advanced Ocean State Forecast and Ocean Modeling*, SAC, Ahmedabad, India, 20-21 December 2004.

Sridevi Jade, Current Trends and Future of GPS, *National Seminar on Global Positioning System - Current Trends and Applications*, Aeronautical Society of India, Bangalore, 7th January 2005.

Sridevi Jade, Estimates of Plate Velocity, Crustal Deformation and Precipitable Water Vapor from GPS data in Indian Subcontinent, *IAG-IASPEI/IUGG Joint Capacity Building Workshop on Deformation Measurements and Understanding Natural Hazards in Developing Countries*, ICTP, Trieste, Italy, 17-23 January 2005.

6.4 Internal Reports

M K Sharada and **K S Yajnik**, *Ammonium inhibition of nitrate uptake: A Review*, TR CM 0501, February 2005.

P Jafarali, Mohammed Ameen, Somenath Mukherjee, *The Mode Shapes and Natural Frequencies of Timoshenko Beams*, RR CM 0403, June 2004.

Naresh Kumar, **Imtiyaz A Parvez** and H S Virk, *Estimation of Coda Waves Attenuation for NW Himalayan Region using Local Earthquakes*, RR CM 0404, September 2004.

K Asokan, C V Anil Kumar, J Dasan, K Radhakrishnan, K Satheesh Kumar and **T R Ramamohan**, *Review of Chaos in the Dynamics and Rheology of Suspensions of Orientable Particles in Simple Shear Flow Subject to an External Periodic Force*, RR CM 0405, October 2004.

V Anil Kumar and Dorgham Sisalem, *Analysis and Detection of TCP Based Denial-of-Service Attacks to Edge Network*, RR CM 0406, November 2004.

P Goswami and **P Rajeevan**, *Shift in Location of SST Maximum and the Puzzle of EL-Nino Monsoon Association*, RR CM 0407, November 2004.

G Prathap and S Mukherjee, *Management-by-Stress Model of Finite Element Computation*, RR CM 0408, December 2004.

G Prathap and **V Senthilkumar**, S Manju, *Mesh Distortion Immunity of Finite Elements and the Best-fit Paradigm*, RR CM 0501, February 2005.

K Sangeeta, S Mukherjee and **G Prathap**, *A Function Space Approach to Study Rank efficiency and Spurious Modes in Finite Element*, RR CM 0502, February 2005.

M K Sharada and **K S Yajnik**, *Inhibitory Effect of Ammonium on the Nitrate uptake by Phytoplankton: A Comparative Study of six Mathematical Models*, RR CM 0503, March 2005.

P S Swathi, **M K Sharada**, **C Kalyani Devasena** and **K S Yajnik**, *Mathematical Modelling of Biogeochemical Cycles in Bay of Bengal*, RR CM 0504, March 2005.

C Kalyani Devasena, **P S Swathi** and **M K Sharada**, *Upper Ocean Thermal Structure Simulations and Comparisons with Observational for the years 2001 to 2003 under BOBPS Programme*, RR CM 0505, March 2005.

Anand Kumar, *Isotropic Numerical Schemes for Image Processing*, PD CM 0402, May 2004.

M B Ananda and **G Prathap**, *Annual Report on Manpower as on 31.12.2003*, PD CM 0403, June 2004.

A Stella Margaret, *Knowledge Creation and Dissemination during 2003*, PD CM 0404, June 2004.

Anand Kumar, *Isotropic Numerical Schemes*, PD CM 0405, July 2004.

Anand Kumar, *Isotropic Simulations of Plasmas*, PD CM 0406, September 2004.

Anand Kumar, *Diffusion of a Point Vortex using Isotropic Finite Differences*, PD CM 0407, November 2004.

A Stella Margret, *Knowledge Creation and Dissemination during 2004*, PD CM 501, January 2005.

Anand Kumar, *Directionally Unbiased Simulation of Turbulence*, PD CM 0502, February 2005.

K S Yajnik, *A Mathematical Model for the Coupled Dynamics of Rural and Urban Population: I*, PD CM 0503, March 2005.

Sridevi Jade, Radhakrishna, **P Dileep Kumar**, **M S M Vijayan**, Nilof S Pasha and Venkateswaran, *Remeasurement of GPS Locations in the West Southern Peninsular Shield of India (Sept-Oct 2004)*, PD CM 0504, March 2005.

M B Ananda, **P Dileep Kumar** and **Sridevi Jade**, *Study of the Seismic Vulnerability and Impact of the Tsunami effect in Andaman and Nicobar islands using GPS*, PD CM 0505, April 2005.

P Goswami, *A Multi-Institutional Project to Develop a Cutting-Edge Technology by Integrating Modelling, Material Development, Instrumentation, Field Testing and Impact Analysis*, PP CM 0401, July 2004.

TR Ramamohan, *Inertial Effects on Forced Particles in Unsteady Flows at Low Reynolds Numbers*, PP CM 0402, August 2004.

Imtiyaz A Parvez and Giuliano F Panza, *Realistic Site-Specific Seismic Hazard Assessment for Mega-Cities Utilizing Modelling Techniques*, PP CM 0403, November 2004.

6.5 Participation in Conference/Symposia/ Workshop/Seminars

P Goswami
3 Days Training Programme on Project Management, National Aerospace Laboratory, Bangalore, 22-24 December 2004.

International Colloquium on International Network of Tropical Atmospheric Radars (INTAR), NMRF/SVU, Tirupati, 20-22 January 2005.

Malay Mukul
Fluids in Earth Sciences, Indian Academy of Sciences, 10-13 January 2005.

R P Thangavelu
11th International Conference on High Performance Computing (HiPC 2004), 19-22 December 2004, Bangalore

6.6 Invited Talks

P Goswami
Frequency and Intensity of Tropical Cyclones and Storms, *Indo-Eu Workshop on Climate Change and Natural Disasters*, University of Hyderabad, Hyderabad, 6-10 September 2004.

Advance Forecasting of Cyclone Tracks using a Global General Circulation Model, *Conference on Tropical Cyclone-Observations, Understanding and Prediction*, Berhampur University, Berhampur, 5-6 January 2005.

An Integrated Approach to Develop Cloud Modification technology, *Weather modification and Cloud Seeding Technologies for Rain Water Enhancement*, JNT University, Hyderabad, 27-28 January 2005.

Ensemble Initial Conditions for LRF from 4-D Var Assimilation, *International Brainstorming Two Days Meeting on Modelling and Prediction over Indian Monsoon Region: Vision 2015*, NCMRWF Conference Hall, Noida, 1-2 February 2005.

Malay Mukul
Global Positioning System (GPS) Geodesy and its Application to Lithospheric Deformation, Ashutosh College, Kolkata, 6 April, 2004.

Deformation and Kinematics of the Himalayan Mountain Belt: An Overview, Theme Talk during DSTFAST Track Group Monitoring Workshop-cum-screening Expert Committee Meeting: IISc, Bangalore, 17 June, 2004.

GPS measurements in earthquake prediction studies, Indian Meteorological Department, New Delhi. Brainstorming session on Earthquake Precursory Studies, 13 August, 2004.

An overview of the Global Positioning System (GPS) Geodesy and its applications, North Eastern Space Applications Centre (NESAC), Govt of India, Department of Space, Shillong, 24 September, 2004.

Tectonics of the Darjeeling-Sikkim Himalayas. Theme Talk, G. B. Pant Institute of Himalayan

Environment and Development, Pangthang, Gangtok during 5th Meeting of the Expert Committee on National GPS Programme, 16 February, 2005.

Sridevi Jade

Global Navigation Satellite Systems (GNSS)/GPS Overview, Seminar on Mathematical Modelling and Computer Simulation, Software Development Institute (SDI), Airforce, Bangalore, 13 January 2005

GPS Remeasurements to Quantify Deformation in Uttaranchal and Ladakh Himalayas, G B Pant Institute of Himalayan Environment and Development, Pangthang, Gangtok during 5th Meeting of the Expert Committee on National GPS Programme, 15 February 2005.

Effect of December 26th, 2004 Earthquake on GPS Network of Stations, G B Pant Institute of Himalayan Environment and Development, Pangthang, Gangtok during 5th Meeting of the Expert Committee on National GPS Programme, 15 February 2005.

Deformation and Motion of Indian subcontinent from National Network of GPS Stations, GB Pant Institute of Himalayan Environment and Development, Pangthang, Gangtok during 5th Meeting of the Expert Committee on National GPS Programme, 15 February 2005.

Estimates of Precipitable water Vapor obtained from C-MMACS permanent network of GPS stations, G B Pant Institute of Himalayan Environment and Development, Pangthang, Gangtok during 5th Meeting of the Expert Committee on National GPS Programme, 15 February 2005.

6.7 Workshops/Conferences/Scientific Meetings

Discussion Meeting on Development of an Integrated Cloud Modification Technology, at NAL, Bangalore, Co-ordinator: Dr P Goswami, 21 May 2004

Responding to the societal distress caused by growing water stress in many parts of the country, and taking cognizance of scientific advances in the last couple of decades in a number of critical areas, CSIR has entrusted C-MMACS to develop a comprehensive programme for developing a cutting edge cloud modification technology that will provide

the country leadership in this vital area. As a follow up action, C-MMACS has organised two Discussion Meetings involving potential participants, experts and potential users, under the chairmanship of Dr D R Sikka to discuss the draft proposal. A comprehensive multi-institutional project proposal for development of an integrated cloud modification technology has resulted from the meeting.

Workshop on Mathematical Modelling, MES College, Bangalore, Co-ordinator : M K Sharada, September 2 - 3, 2004

This workshop was organised by M K Sharada of C-MMACS at MES, College, Bangalore. The main objective of this workshop was to give an introduction to graduate and post graduate students on Mathematical Modelling Techniques and Applications of Mathematical Modelling in various fields. The lectures were given by Scientists of C-MMACS and Prof P Vaidya from IAS, Bangalore.

Discussion Meeting towards Signing of MoU between CSIR/C-MMACS and CNRS, France, 27 September 2004

A high level French delegation of 12 persons and Scientific staff of C-MMACS were present. The first objective is to develop and conduct research projects, of mutual interest, between Indian and French Scientists in the field of weather and climate. Secondly, to contribute through research activities in the field of weather and climate, to the training of students as well as specialists from India and France. And thirdly, to disseminate information about the collaborative Indo-French research conducted within the framework of the MoU.

Seminar on Mathematical Modelling and Computer Simulation, SDI, Airforce, Bangalore, Co-ordinator: M K Sharada, January 2005.

The Programme was oriented for Scientists, Engineers and Students working in or interested in studying mathematical modelling and computer simulation and its application to Physical, Chemical or Biological sciences, etc. Minimum operational knowledge on Unix operating system was required.

6.8 Guest Lectures

Anurag Gupta, *Noether's Theorem and Conservation Laws in Elasticity*, Structural Engineering, Mechanics & Materials, University of California, Berkeley, CA 94720, USA, 14 May 2004

Prabir K Patra, *Inverse Modelling of Atmospheric Carbon Dioxide (Time-dependent and time-independent inversions)*, Frontier Research System for Global Change, Yokohama, Japan, 09 August 2004.

M S Phanikumar, *3D Microbial Transport Modelling and Field-Scale Biodegradation at the School Craft, Michigan Site*, Dept of Civil & Environmental Engineering, Michigan State University, East Lansing, MI 48824, 23 November 2004.

M S Phanikumar, *NOAA Centre of Excellence for Great Lakes and Human Health*, Dept of Civil & Environmental Engineering, Michigan State University, East Lansing, MI 48824, 23 November 2004.

R Muralikrishna, *Error analysis of Large Deformation of Beams using Classical Beam Element*, EACOE & Ph D Scholar, 20 January 2005.

L P Vinnik, *Exploring the Earth's Mantle by S Receiver Functions*, Institute of Physics of the Earth, Moscow, 25 January 2005.

Enda O'Brian, *Performance and Optimization of Meteorological Models on Distributed-Memory Clusters*, High Performance Computing Expertise Center, Hewlett Packard, Galway, Ireland, 09 March 2005.

D Raja Reddy, *Water Management in Agriculture-An Overview*, Acharya N G Ranga Agricultural University, Hyderabad, 17 March 2005.

Arun Chakraborty, *Atmosphere Ocean Coupled Model for Weather and Climate: Present Status and Future Scope (A Great Challenge to the Scientists)*, Department of Earth and Planetary ScienHes, Tokyo, Japan, 23 March 2005.

6.9 In-house Seminars

G Prathap: *Management-by-Stress Model of Finite Element Computation*, 15 December 2004

G Prathap: *the Measure of All Things*, 17 December 2004.

Malay Mukul: *Tectonics of the Darjeeling-Sikkim Himalayas - Implications for Himalayan Deformation*, 11 February, 2005.

V Senthil Kumar: *Mesh Distortion Immunity of Finite Elements and the Best-fit Paradigm*, 24 March, 2005.

6.10 Visitors at C-MMACS

Roger Bilham, Professor
Department of Earth Sciences, University of Boulder,
Colorado, USA
21 - 22 June 2004

Bill La Rosa, Senior Vice President
SGI, USA
05 August 2004

Richard Michael Russel, Vice President (Sales)
Cray Inc, USA
07 September 2004

Peyrihres Carine, French Journalist
Alliance Francaise de Bangalore
14 September 2004

Bruno Rouot
Alliance Francaise de Bangalore
14 September 2004

Jean Phillippe Duvel, Christian Peskine, Minh-Ha Pham Delegue, Antoine Petit, Pascal Barbry, Paul Vigny, Bernard Larrousturou, Sofia Nadir, Jean-Luc Clement, Gerard Lenclud
CNRS, France
27 September 2004

M J Harrison
GFDL, Princeton, USA
30 September 2004 - 26 October 2004

S M Griffies
Head, Ocean Group
GFDL, Princeton, USA
02 - 30 October 2004

Maria Benito Herrero
SGI, USA
11 - 16 October 2004

Prof P Bhattacharya, Former VC of Tezpur University
Guwahati, Assam
16 - 18 October 2004

Farian Lim
International Senior Sales Manager - TOPCON
TOPCON South Asia Pte Ltd. Danpian, Singapore
06 November 2004

Mark Adrain Lehrer, Sales Manager
Mellanox Technologies, UK
08 November 2004

Balthasar Novak, Professor
University of Stuttgart, Germany
05 January 2005

Huppert Herbert, Scientist & Fellow of Royal
Society, Cambridge University, UK
10-14 January 2005

L P Vinnik, Professor
Institute of Physics, USSR
17-30 January 2005

Richard Michael Russell, Sales Director
USA
28 January 2005

Max Gutberlet, Sales Manager
Quant-X Service & Consulting, Austria
28 January 2005

David Blaskovich, VP Sales
IBM Deep Computing, USA
28 February 2005

Per Nyberg, Marketing Manager
Cray Inc, Canada
28 February 2005

Edna O'Brien, Principle Engineer
HP, Ireland
9 March 2005