

## MoES-NERC Workshop on The Changing Water Cycle

### UK participant Biographies

**Name:** Adebayo J. Adelaye, PhD, CEng, CWEM, MCIWEM

**Affiliation:** SBE, Heriot-Watt University, Edinburgh, EH14 4AS

I am currently a Senior Lecturer at Heriot-Watt University, Edinburgh. My research experience and involvement over the years have been uniquely broad-based, covering both surface and groundwater, and also embracing both the quantity and quality aspects of Water Science. Specifically, I have addressed and will continue to address through my research, publications in high impact factor Journals and other activities issues such as:

- Quantifying the impacts of climate change on water resources and their uncertainties;
- A better understanding of the role of evaporation in diminishing water resources availability and ways of coping with this;
- The development of robust and parsimonious water resources assessment methodologies and decision support tools which take into account the usual lack of the needed hydrometeorological and other data in most deprived communities;
- The sustainable use and modelling of groundwater resources, particularly in areas with limited natural recharge;
- Development of effective and cheap wastewater treatment systems that will render wastewater effluents suitable for beneficial re-use in groundwater recharge, irrigation and potable water systems;
- Rainwater harvesting and other source control alternatives as sustainable options for meeting water supply needs and for recharging groundwater reservoirs;
- Irrigation water management.
- The training of high calibre professionals in modern techniques for water resources planning, operation and management.

**Name:** Wouter Buytaert

**Affiliation:** Imperial College, London

Wouter Buytaert is a Research Fellow in hydrology at Imperial College London. In 2004 he finished a PhD in land and water management at the University of Leuven, Belgium. After this, he has held research positions at the universities of Leuven, Lancaster and Bristol.

His research activities focus on water resources and environmental change. He has a long standing research record in the tropics, particularly in South America, where he studies the effects of land use changes and climate change on the hydrology, ecology and soils. He is involved in similar projects in Europe and Africa. Buytaert applies both experimental field methods and computer models to assess and predict the impact of human activities on the environment. He has particular interests in rainfall-runoff modelling, downscaling, model coupling and uncertainty analysis.

**Name:** Nick Clifford

**Affiliation:** University of Nottingham

Nicholas Clifford is a physical geographer, Professor of River Science at the University of Nottingham, and Managing editor of the leading multi-disciplinary journal, *Progress in Physical Geography*. He completed his BA, MA and PhD at the University of Cambridge, and has held previous appointments at University College London and the University of Hull. He has more than 20 years of research experience dealing with river and estuarine flows and sediment transport, and more recently has specialised in the fields of water resource appraisal (from an eco-hydrology perspective) and in applied river management and river restoration. His interests extend to questions of environmental data provision, representation and use from a water resources, land use management and stakeholder participation perspective, and he is keen to explore multi- and trans-disciplinary potential. He has recently been the Deputy International Director of the *Universitas 21* world-wide university consortium's *Water futures and sustainable cities* project (<http://www.universitas21.com/water.html>), and he is involved in urban re-generation efforts with a waterfront and river corridor focus. More details of the range of current interests may be found at: [www.nottingham.ac.uk/geography/riverscience](http://www.nottingham.ac.uk/geography/riverscience)

**Name:** Mat Collins

**Affiliation:** Meteorological Office, Hadley Centre, UK

Dr Mat Collins is a climate change research scientists at the Met Office Hadley Centre, Exeter UK and from June this year will be Associate Professor in Climate Systems at the University of Exeter. His research interests are in global climate modelling and understanding global climate variability and change. Most recently he has been involved in generating a new set of probabilistic climate scenarios for the UK in which modelling uncertainties are quantified using ensemble techniques. He also has work in the area of understanding the impact of climate change on the El Nino Southern Oscillation, on modelling palaeoclimates and in decadal climate predictability.

**Name:** David Collins

**Affiliation:** University of Salford

As a glacier hydrologist, David Collins has maintained what is now the longest continuous series of measurements of Alpine glacier meltwater quality in existence, and generations of undergraduate and postgraduate students from the Universities of Manchester, Oxford and Salford have taken part in field-based projects at Findeln- and Gornergletscher near Zermatt in Switzerland. These measurements were pioneering in using water quality dynamics in meltwater as indicators of the structure and functioning of internal hydrological systems of glaciers. The records are sufficiently long to inform study of the effects of climatic warming on characteristics of runoff and water quality in glacierised basins. He is also interested in long-term climate-glacier-runoff relationships in basins with varying extents of glacier cover which relate to the question of whether the deglaciation discharge dividend first increases before decreasing. He has considerable experience of fieldwork in the Himalaya, instrumenting two basins in the Karakoram between 1987 and 1995. In the last 10 years he has become involved with modelling effects of climate change on meltwater discharge in the Himalayan basins, in international collaborative projects, currently with partners from the UK, India, Netherlands and Swiss institutions in the EU High Noon project estimating future water resources availability as warming over northern India causes glaciers to decline and changes monsoon precipitation patterns.

He was appointed to the Chair in Physical Geography at the University of Salford, in Manchester, in 1999, and is currently Associate Head for Research in the School of Environment & Life Sciences.

**Name:** Sally Daultry

**Affiliation:** University of Cambridge

Sally Daultry is representing a developing partnership between the University of Cambridge and the University of California San Diego relating to the science, technology, and policy of environment and sustainability. The partnership's first project, the Cambridge-UC San Diego Global Water Initiative, is intended to help promote adaptation to the impacts of climate change on water availability.

Changes in water availability are among the most urgent to understand on a regional basis. Africa and Asia were identified as initial areas of interest, where the combination of greenhouse warming and aerosol pollution will profoundly change the availability of water for upwards of one-sixth of the world's population. These considerations shape the first workshops undertaken by the Cambridge/UCSD initiative. UCSD hosted an international workshop on May 4-6, 2009, devoted to changes in water availability from mountain snows and glaciers in California and Himalayan Asia. Cambridge hosted a workshop on September 21-23, 2009, devoted to changing water availability in Africa. The workshops identified the scientific understanding, technological readiness, and decision support capacity needed to promote adaptation.

From the results of these workshops and other activities we are designing ways in which the Global Water Initiative can be an animating node for a network of networks connecting university research to regional and local adaptation.

**Name:** Alan Gadian

**Affiliation:** University of Leeds

Alan Gadian is a senior scientist in the Weather division of the National Centre for Atmospheric Science (NCAS) and based in the University of Leeds. Current active research include the COPS (Convective and Orographically induced Precipitation study), VOCALS a stratocumulus experiment, and an Antarctic Funding Initiative programme in a study of atmospheric waves over the Antarctic peninsula.

They all have a strong observational component, including use of the UK research aircraft, and state of the art modelling tools.

A new exciting project is to develop a regional nested climate model (resolution of ~3 km), to examine the changing weather and precipitation patterns in different climate scenarios, in conjunction and with active collaboration at NCAR ( <http://www.mmm.ucar.edu/facilities/nrcm/nrcm.php> ) Alan has produced a variety of published papers on clouds, and cloud modelling and some specifically relating to the development of precipitation, heat island effects, and "weather type processes", Other recent work also includes proposing the "Cloud Whitening" schemes as a method of reducing stratocumulus precipitation, and providing a temporary relief / mitigation scheme to combat global warming. He is on the NERC technologies panel, external examiner at the University of East Anglia, and editor of the Royal Meteorological Society Journal, Atmospheric Science Letters.

**Name:** Ian Gale

**Affiliation:** British Geological Survey

Ian Gale is a Principal Hydrogeologist in the British Geological Survey (BGS) Groundwater Science Programme and his interests currently lie in managed aquifer recharge (MAR) and thermal energy storage in aquifers as well as the impacts of CCS on deep saline aquifers. He has led collaborative projects in India investigating the effectiveness of MAR and is co-chair of the International Association of Hydrogeologists commission on MAR. He has 37 years experience in a wide range of hydrogeological issues in both UK and internationally as well as working on EU Framework programmes.

The BGS Groundwater Science programme of research involves about 50 hydroscintists, largely based at Wallingford, Oxfordshire and addresses groundwater quantity and quality issues in the context of environmental change. Foci of research include resource assessment, development and management (including the use of remote sensing), impacts of climate change, natural and anthropogenic groundwater quality issues, groundwater modelling and understanding uncertainty as well as socio-economic issues. BGS Groundwater scientists work closely with colleagues in CEH, other institutions and researchers and undertake a range of commissioned research projects, both in UK and internationally.

**Name:** David Hannah

**Affiliation:** University of Birmingham

e: [d.m.hannah@bham.ac.uk](mailto:d.m.hannah@bham.ac.uk); w: <http://www.gees.bham.ac.uk/staff/hannahdm.shtml>

I am a Reader in Hydrology at the University of Birmingham, UK. I was a member of the Scientific Writing Group for the NERC Changing Water Cycle Programme. My research is interdisciplinary and focuses on 3 distinct, yet complementary, themes within *hydroclimatology* (hydrology-climatology interface): (1) hydroclimatological processes within alpine, Arctic, mountain and glacierized river basins; (2) climate and river flow regimes; and (3) river energy budget and thermal dynamics. I have a strong crosscutting interest in *hydroecology*, specifically ecological response to hydroclimatological and physico-chemical habitat variability/change. I also develop *new methods* for monitoring, analysing and modelling environmental dynamics at range of space-time scales. My research has been funded by multiple sponsors, including EU (partner in ACQWA; <http://www.acqwa.ch>), UK research councils, UNESCO, UK Department for International Development (DFID), and UK Royal Society. I have 86 publications, of which 54 are in international journals. I edited a research level text on Hydroecology-Ecohydrology (2007) and special issues of Hydrological Processes on river and stream temperature (2008) and hyporheic hydrology (2009). I am a member of the editorial boards of the international journals Hydrological Processes and Ecohydrology. I am Secretary of the International Association of Hydrological Sciences: International Commission on Surface Water.

With respect to my water research expertise in South Asia, I was chief negotiator and sit on the review committee for a Memorandum of Understanding between the Society of Hydrology and Meteorology-Nepal and the University. In 2008, I was invited to participate in UNESCO IHP Hindu Kush Himalayan FRIEND, in recognition of my Nepalese work (details below). I would like to extend the regional focus of this research further across the Himalaya and downstream from these headwaters to provide a wider hydroclimatological perspective on South Asia. I have experience of working in the headwater of the Himalaya through a DFID-funded PhD studentship and a Royal Society grant to visit Nepal. This research focused on large-scale hydrology (Hannah D.M. *et al.*, 2005, Flow regimes of Himalayan rivers of Nepal, *Journal of Hydrology*, 308, 18-32) and climatology (e.g. Kansakar S.R. *et al.*, 2004, Spatial pattern in the precipitation regimes of Nepal, *International Journal of Climatology*, 24, 1645-1659).

**Name:** Ian Holman

**Affiliation:** Cranfield University

Dr Ian Holman leads the Integrated Land and Water Management Group at Cranfield University, where he is a Senior Lecturer within the Natural Resources Department. He is an interdisciplinary hydrogeologist and spatial pedologist with expertise in sustainable water resource management. His research interests centre on the interactions between climate/weather, soil, land use and management and hydrological response. This has included research on the detection and attribution of environmental change within surface water and groundwater records. He was lead author of the UK's first regional integrated assessment of the effects of climate and socio-economic change on land, water and biodiversity (RegIS) and has played a leading role in UK-China collaborative research on the impacts of climate change on food production. He is also Co-Chairman of the International Association of Hydrogeologists' Commission on Climate Change and Groundwater.

**Name:** Chris Kidd

**Affiliation:** University of Birmingham

Dr Chris Kidd obtained his first degree in Geography from the University of Nottingham and his PhD from the School of Geographical Sciences at the University of Bristol.

His main research interests focuses on satellite rainfall estimation, particularly utilising multi-spectral, multi-sensor, multi-satellite observations to derive quantitative rainfall estimates from local to global scales. He is also involved in the verification and validation of satellite and model rainfall estimates against surface reference data sets. From 2006 to 2008 he was the chair of the World Meteorological Organisation endorsed International Precipitation Working Group, and is currently chair of the science evaluation group for the Programme for the Evaluation of High Resolution Precipitation Products.

He has strong links with NASA, having been involved with the NASA WetNet project from its inception. From 1996 to 1998 he was a visiting fellow at the NASA Goddard Space Flight Center, working on the third Precipitation Inter-comparison Project, pre-launch simulations and post-launch analysis of data from the Tropical Rainfall Measuring Mission. He is currently a member of the NASA Precipitation Measurement Missions science team, contributing to the Global Precipitation Mission. He is currently co-lead scientist on the Polar Precipitation Mission proposal to the European Space Agency.

**Name:** Andy Morse

**Affiliation:** Reader, School of Environmental Science, University of Liverpool, UK

Background in Atmospheric Physics (PhD 1990). I was co-awarded 2006 WMO Norbert Gerbier-MUMM International Award.

I work on weather and climate impacts on health. I develop dynamic impacts models driven by tailored outputs from multi-model initial condition ensemble prediction systems, integrating from days to decades. My focus has been at seasonal scales i.e. 180 day lead times, especially in predicting monsoon systems. I am interested in the role of water on infectious diseases including malaria. The Liverpool Malaria Model was developed using seasonal forecasts and is now run with multiple regional climate model outputs for future projections. The techniques I use are transferable to other impacts e.g. water resources or agriculture. I want to develop the communication of uncertainty surrounding prediction especially from ensemble prediction

systems. I am interested in building teams to develop seamless and integrated climate modelling solutions for climate impacts on society and for supporting humanitarian purposes. I have significant project leadership and management experience e.g. FP6 ENSEMBLES, FP7 QWeCI that I coordinate and several NERC funded projects.

**Name:** Martin Mortimer

**Affiliation:** University of Liverpool

Professor Martin Mortimer holds the Chair of Agro-ecology in the University of Liverpool, UK. Martin is currently NERC science manager for UK-India collaboration on science of climate change and PI of the UKIERI programme 'The impact of climate change on water cycling and ecosystem functioning at the river basin scale.' His research focuses on adaptations to climate change for food security and particularly the application of agro-ecological studies to the sustainability of rice-based cropping systems in south and south-east Asia. In these systems, variation in water supply is the major factor governing the ecosystem services that underpin these cropping systems. Shortage of water for agriculture has already caused unprecedented changes in the ecology of agricultural landscapes in Asia which will be further accentuated by the increasing variance in seasonal water availability due to climate change. On-going projects include: Agro-ecosystem functioning in response to climate change and the development of sustainable cropping systems in irrigated direct seeded rice in India; Ecosystem services and decision support frameworks in agro-ecosystems; and Rice biodiversity and the evolution of 'weedy' rice. Previously Martin worked for the International Rice Research Institute (1995 -2002) and is currently convenor of the Food Security Network of the University of Liverpool, a consortium of industry and academic partners addressing both national and international dimensions of food security.

**Name:** Tim Reid

**Affiliation:** University of Dundee

Tim comes from a physics background, and has applied his skills in various areas of environmental modelling. These have taken a general focus on atmosphere-surface interactions, especially in the cryosphere. He is currently undertaking postdoctoral research at the University of Dundee, funded by the EU-FP7 ACQWA (Assessing Climate impacts on the Quantity and quality of WAter) project, with whom he is developing detailed energy-balance models for the melt and runoff from debris-covered glaciers. At Dundee he is part of an active research team investigating varied aspects of hydrology including glacial runoff, flood risk assessment, catchment management, limnology and coastal/estuarine processes. Tim also has a strong interest in science communication, and does regular freelance writing and editing work for Nature Publishing Group.

**Name:** Andy Turner

**Affiliation:** University of Reading

Andy Turner read physics at Oxford, specializing in Atmospheric/Oceanic and Planetary Physics and Geophysics, before moving to the University of Reading to undertake a PhD on "Behaviour of the monsoon-ENSO system in current and future climates of a GCM"; the monsoon in question being over India. In 2006 Andy commenced post-doctoral research funded by the EU-ENSEMBLES project, where he examined Indo-Pacific Climate Variability and Change. Andy is a leading participant in the joint UK Met Office - National Centre for Atmospheric Science Monsoon Working Group, which aims to improve the simulation, and our understanding, of monsoon processes in the Met Office Hadley Centre models. More recently Andy is working for NCAS-Climate in Reading as a monsoon scientist, and is preparing for a forthcoming project with the Met Office as part of the new Joint Climate Research Programme. Andy was elected to the WCRP CLIVAR Asian-Australian Monsoon Panel in 2008, which aims to promote and advise coordinated monsoon research. His recent research interests include the impact of systematic model biases on monsoon simulations and interactions with ENSO, the effect of anthropogenic climate change on the Indian monsoon (on long and intraseasonal timescales) and understanding the uncertainties involved in future climate projections of monsoon rainfall extremes. In addition, Andy has used GCM experiments to explore the complex interactions between snow forcing and monsoon rainfall.

**Name:** Steven Wade

**Affiliation:** HR Wallingford

Steven is a research scientist and consultant with expertise in water resources planning, flood risk management and climate change impacts assessment. He is the Science Coordinator for the UK's First Climate Change Risk Assessment, which is a requirement of the Climate Change Act (2008). His work in the UK has focused on downscaling climate models to the catchment scale and providing practical guidelines and tools for UK water companies. He is Principal Investigator on two UK Research Council projects on the Adaptation and Resilience to Climate Change (ARCC) programme for the water sector and transport sectors. International research work includes a national assessment of climate change impacts on the water and agricultural sectors of Yemen (World Bank) and work on the development of hydrological design aids as part of India's Hydrology II project.

**Name:** Ned Garnett

**Affiliation:** Natural Environment Research Council (NERC)

Ned is Science and Innovation Manager for Atmospheric and Polar Sciences with the Natural Environment Research Council in the UK and is responsible for the delivery of the Changing Water Cycle Programme. His responsibilities with NERC relate to the development and delivery of programmes relating to Climate Science and also the strategic partnership with the UK Met Office.

Ned has a PhD from the Marine Science labs in North Wales and also spent a lot of his life in the private sector managing major software development programmes. He has worked for NERC for 7 years and in this time has had a number of other roles including coordination of the eScience programme and management of the development of the science elements of NERC's strategy '*Next Generation Science for Planet Earth 2007 – 2012*'.

**Profiles of Indian delegates**

Vinod K Gaur  
Distinguished Professor  
Indian Institute of Astrophysics,  
Bangalore 560 034  
Also Adjunct Professor  
Indian Institute of Science, Education and Research (IISER),  
Kolkata

Vinod Gaur studied Geophysics at Banaras University and at Imperial College where he discovered the hitherto unsuspected 'host rock effect' in geo-electromagnetics. For this discovery in 1959, he earned the degree of Doctor of Philosophy from the University of London. His academic career began, immediately thereafter, as a Scientist at the National Physical Laboratory, UK. Later in 1966, he joined the University of Roorkee as Professor where he initiated a modern academic programme in Geophysics incorporating the insightful contents of signal analysis, inverse theory and computational geophysics. These were subsequently propagated by the UGC to other universities by sponsoring short-term intensive courses that were organized by Gaur at Roorkee. In 1983, he moved to Hyderabad as Director of the National Geophysical Research Institute and set about restructuring the Institute's research programmes with scientific rigour, guided by hypothesis formulation and experiment design (Nature, April 12, 1984)

Gaur's landmark contributions to science include: i) discovery and explanation of the host-rock effect in the electromagnetic response of subsurface geological conductors (1959), ii) experimental confirmation of the hypothesis that the Indian plate under-thrusts the Asian plate @ ~ 1 cm /year, along the Main Himalayan Fault (1971) by direct measurement of slow deformation across a tunnel in the Tons valley, Uttaranchal , iii) discovery of the thick Deccan lithosphere, using the first seismic tomography experiments in India (1986) , iv) the first quantitative measurement of the Indian plate velocity with respect to the Eurasian, using Global Positioning System (GPS) Geodesy and an upper bound for the strain rate in the Southern Peninsula (1995), v) the first high resolution crustal images using broadband seismology, of the south Indian shield(1996) and of northeastern India (2005), and vi) the first Indian experiment to constrain global Carbon fluxes (2007) , over India and Central Asia, through inversion of ultra-high precision atmospheric concentration data (0.1 ppm), generated at the WMO accredited CO2 laboratory established by him at the Indian Astronomical Observatory, Hanle, Ladakh.

His contributions (PHYSICS TODAY, 2001) to advancing Scientific endeavours include: i) design of modern Geophysics curricula (UGC,1970s), ii) restructuring of NGRI research programmes, iii) integrated design and writing of CBSE VIII and X class Science books (1990), design and implementation of Marine Satellite and Ocean Information Services, and modern Antarctic Research (1989-92),as Secretary to the Government of India, and v) founding of a Science to People programme in Hyderabad (1984), now matured in a vibrant State-wide movement. Professor Gaur is a fellow of the Indian National Science Academy (INSA), the Indian Academy of Sciences and the Third World Academy of Sciences. His awards include the Bhatnagar Prize (1980), the Flinn Award of the American Geophysical Union (2000), the Saha Birth Centenary Award of the Indian Science Congress (2006), and INSA Lecture Awards: the GP Chatterji Memorial Lecture(1991) and the D N Wadia Medal Lecture(2007). He has also been conferred Doctorate of Science Degrees (Honoris Causa) by the Banaras Hindu University, the Andhra University at Waltair and the Jawahar Lal Nehru Technical University at Hyderabad.

**Dr. Shailesh Nayak – Secretary, Ministry of Earth sciences**

Dr. Shailesh Nayak is Secretary, Ministry of Earth Sciences since August 2008. He has been providing leadership for the programs related to science of climate change, weather services, polar science, ocean modeling, ocean survey, resources and technology.

He has obtained Ph. D. degree in Geology from the M.S University of Baroda in 1980. He joined the Space applications Centre in 1978 as a scientist and was elevated as the Director of Marine and Water Resources. He was mainly responsible for in conceptualizing, formulating and executing many national level projects related to application of satellite data on ocean colour, integrated coastal zone management, snow and glacier studies and water resources.

He was appointed as Director, Indian National Centre for Ocean Information Services (INCOIS), an autonomous institution under the Ministry of Earth Sciences, Hyderabad in May 2006. At INCOIS, he set up set up state-of-the-art Early Warning System for Tsunami and Storm Surges in the Indian Ocean. He was responsible for the conceptualization and development of Marine GIS. He made outstanding contributions in improving advisory services related to potential fishing zones, ocean state forecast and Indian Argo project.

He is the Chairman of the Research Advisory Committee of the National Institute of Oceanography, Goa and Centre for Earth Science Studies, Thiruvananthapuram. He has been member of many national committees related to earth science, coastal protection, mangrove and coral reef and coastal zone management formulated by the Ministry of Science and Technology, Ministry of Water Resources and Ministry of Environment and Forests, Govt. of India, respectively.

He has been recipient of the National Mineral Award for the year 2005. He was awarded the Indian National Remote Sensing Award for the year 1994 by the Indian Society of Remote Sensing, Dehradun. He is recognized as Ph.D. Guide by six universities and five students have obtained Ph. D. under his supervision.

He was Member of the editorial board of the Indian Journal of Marine Science and currently chair of Planet Earth and a editor of Geospatial Today. He is President, Indian Society of Remote Sensing, Dehradun. He is elected as the Chairman, Indian Ocean–Global Ocean Observing System (IO-GOOS) for the term 2008-10. He is Vice-Chair of the Inter-Governmental Coordinating Group on Indian Ocean Tsunami Warning System (ICG-IOTWS). He was President, International Society of Photogrammetry and Remote Sensing (ISPRS), Technical Commission (TC) IV on 'Geo-databases and Digital Mapping' for the term 2004-08. He has represented ISRO at the International Ocean Colour Coordinating Group and International Global Observation Strategy- Coastal theme.

He has published about 80 papers in International and National journals and atlases.

**Dr. S. Satheesh Chandra Shenoi**

Director

Indian National Centre for Ocean Information Services

“Ocean Valley”

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**Professional Positions:**

Director, (2009 - till date) Indian National Centre for Ocean Information Services, Hyderabad, Scientist 'G' (2008-2009), Scientist 'F' (2003-to present), Scientist 'E-II' (1998- 2003); Scientist 'E-I' (1993-1998); Scientist 'C' (1988-1993); Scientist 'B' (1983-1988); Trainee Scientist (1982-1983) at National Institute of Oceanography, Goa; Junior Research Fellow - CSIR (1981-1982) at Cochin University of Science & Technology, Kochi; Post-doctoral fellow (1993-95) at University of Miami, Miami, USA.

**Research Interests:**

Physical Oceanography, ocean circulation, air-sea interaction, satellite oceanography, operational oceanography.



**Major Research Contributions:**

Contributed to the understanding of the physical oceanography of the waters around India in the areas of role of ocean in the monsoonal processes, and the seasonal circulation in the north Indian Ocean. Also showed that the regional optimization of the coefficients will improve SST retrievals (by 50%) from satellite based infrared sensors.

Published more than 60 papers in national and international journals.

Reviewer for several national and international journals.

**Scholarships and Awards:**

Fellow, Indian Academy of Sciences (Bangalore), 2007.

Fellow, National Academy of Sciences, India (Allahabad), 2009

**Professional Memberships:**

Member, Governing Council, Ocean Society of India, Kochi 2006-till date

Jt. Secretary, Goa Vidnyan Parishath, Goa 2006- 2009.

**Dr Ajit Tyagi-Director General of Meteorology, India Meteorological Department**

Air Vice Marshal Ajit Tyagi, VSM (Retd.) was commissioned in Meteorological Branch in 1972. He is a post-graduate in Physics from Birla Institute of Technology and Science, Pilani and Ph.D. in Numerical Weather Prediction. The officer is Master in Business Administration and an alumnus of College of Defence Management, Secunderabad. During 35 years of service in the Air Force, he has held several command and staff appointments including active forecaster at front line air bases, Directing Staff at Met Faculty, Coimbatore, Project Research Scientist at IIT Delhi and command Meteorological Officer at various Commands. After his retirement from the Defence Service in January 2008, he is at present heading India Meteorological Department, under Ministry of Earth Sciences, as Director General of Meteorology.

AVM Tyagi has been actively engaged in the research and investigational studies connected with operational meteorological problems right from the initial stage in the IAF. He has more than 30 research papers published in leading journals and has carried out post-doctoral research work at Indian Institute of Tropical Meteorology, Pune. His area of expertise includes Aviation Meteorology, Mesoscale High Impact Weather Events and Nowcasting.

AVM Tyagi is a member of a number of Scientific Committees and Editorial Boards of Scientific Journals. He has initiated major modernization of Aviation Met Services in IAF in close coordination and collaboration with IMD and ISRO. He has successfully implemented Mesoscale Numerical Weather Prediction technique in the operational mode in IAF.

Air Vice Marshal Tyagi has been commended by Chief of the Air Staff and awarded the Vishist Seva Medal by the President of India for his distinguished service in the Air Force.

**Prof. P. C. Pandey- Indian Institute of Technology, (IIT) Kharagpur**

Professor P C Pandey, currently Emeritus Professor at Center for Oceans, Rivers, Atmosphere and Land Sciences (CORAL) at IIT Kharagpur holds a PhD in Physics-Microwaves. His areas of expertise lie in Satellite Oceanography/ Atmospheric Sciences, Polar Research, Climate Change Science, Remote Sensing, Disaster Management, Education & Research, Management and establishment of R&D institutions.

Prof Pandey was the founder Director of the National Centre for Antarctic and Ocean Research (NCAOR), Goa from May 1997 to August 2005, prior to which he was a scientist with the Space Application Centre, Ahmedabad.

Some major projects completed under Prof Pandey's Directorship at NACOR :

- Nine expeditions launched by NCAOR
- Completed the Legal Continent Shelf Programme (LCS) -highest priority and most prestigious National programme of the MOES (DOD) for submission to United Nations Convention on Law of the Sea (UNCLOS).
- First ever Indian Scientific cruise to Southern Ocean launched in 2004 onboard ORV Sagar Kanya with leading research institutions of the country thus initiating new research in Southern Oceanography
- First ever-Special expedition to Antarctica for Total Solar Eclipse successfully launched in November 2003.
- Initiated launching from Cape Town, since XIX IAE
- Establishment of the Ice Core Laboratory (State of the Art)

- Initiated & Identified the Location for India's Third Permanent Station in Antarctica and initiated Arctic Programme
- Established Polar Remote Sensing Lab for Climate Change Research at NCAOR, Goa

Some of the honours and awards received by Prof Pandey are listed below:

**Khosla National Award, Gold Medal and Citation** by Indian Institute of Technology, Roorkee, during convocation Ceremony, 15 November 2007

**Prof. K. R. Ramanathan Memorial Gold Medal and citation** by Indian Geophysical Union, Hyderabad, 22<sup>nd</sup> November 2007.

**Shri Om Prakash Bhasin Award** for Science & Technology for the Year 2004 in the field of Engineering including Energy and Aero Space, Award delivered by His Excellency **Dr A.P.J. Abdul Kalam, the President of India** on 26 October 2006 at New Delhi.

**Felicitation** by Shri Kapil Sibbal, Hon'ble Minister for S/T and Ocean Development, for outstanding achievements in Polar Science & Ocean Science and Technology, on 27 July 2004, on DOD foundation Day.

**Dr. Shanti Swarup Bhatnagar Award** in the discipline Earth, Ocean, Atmosphere and Planetary Sciences, **First Recipient** in the **Country** in the field of **Oceanography & Atmospheric Sciences**. 1989. Award delivered by the **Honorable Prime Minister** of India.

**Certificate of Recognition and Cash Award**, National Aeronautics and Space Administration (NASA), USA. 1985.

**Dr P.P.Majumdar** - Department of Civil Engineering, Indian Institute of Science, Bangalore

Dr. P P Mujumdar is currently serving as Professor and Chairman, Department of Civil Engineering at the Indian Institute of Science, Bangalore, India. His area of specialization is Water Resources with a focus on climate change impacts on hydrology/water resources, statistical downscaling of GCM outputs, urban flooding, planning and operation of large scale water resources systems, and uncertainty modeling. His recent research contributions include development of statistical downscaling models with fuzzy clustering, relevance vector machines and conditional random fields and addressing uncertainties in climate change impacts. He is serving as the Chairman of the Water Resources Management section of the International Association for Hydraulic Research (IAHR), as an external expert in the Scientific Committee of SWITCH, a UNESCO project on urban water, as a member of the Specialist Committee on Climate Change of the International Water Association (IWA), UK., and as an Editorial Board member of the journal *Advances in Water Resources*, published by Elsevier. He has been a member of several state- and national- committees dealing with urban flooding, and operational and environmental aspects of water resources in India. His areas of professional consultancy include urban stormwater drainage, floodplain management, river basin planning, reservoir operations, lift irrigation, hydropower development and impact assessment of water resources projects.

More details are available at <http://civil.iisc.ernet.in/~pradeep>

**Dr Manish Tiwari**- National Centre for Antarctic & Ocean Research, Goa

Dr. Manish Tiwari, born on 26<sup>th</sup> November 1975, carried out Ph.D. at *Physical Research Laboratory*, Ahmadabad, India on which he was awarded the "Young Scientist Medal" of the *Indian National Science Academy* (INSA) in the "Earth Sciences" section in the year 2009. He also received the "Young Scientist Award" of the "Indian Science Congress Association" presented by the *H'ble President of India* at the 94<sup>th</sup> Indian Science Congress at Annamalai University, Tamilnadu in 2007. His university education (B.Sc. with honours in Geology & M.Sc.-Geology) was carried out at Banaras Hindu University, Varanasi. Subsequently he qualified UGC-NET in the years 1999, 2000 & 2001 and also qualified for appearing in the 1<sup>st</sup> & 2<sup>nd</sup> SPM Fellowship based on the NET merit list in the year 2000 & 2001. Later, he was awarded the PhD Scholarship by Physical Research laboratory where he worked on marine sediment cores from Arabian Sea to document the past variations in the intensity of Indian monsoon using isotopic variations in planktic foraminifera. His work has been published in highly rated international & national journals. Presently, he is working as scientist at National Centre for Antarctic & Ocean Research, Goa with research interests in the application of stable isotopes in Quaternary Paleoclimatology, Paleomonsoon reconstruction and Paleoceanographic studies.

**Professor Rajiv Sinha-** Professor (Geosciences), Department of Civil Engineering, Indian Institute of Technology (IIT), Kanpur

Rajiv Sinha is a professor in geosciences at the Indian Institute of Technology Kanpur. He obtained his PhD in sedimentology from the Department of Earth Sciences, University of Cambridge, UK in 1992. He joined IIT Kanpur in 1994 as a faculty and since then has been consistently working on various aspects of water science with special reference to the Indian rivers.

Rajiv Sinha's major interest is to understand the geomorphic and hydrological response of river and delta systems to climate change during the Quaternary period. Along with his doctoral students at IIT Kanpur, he integrated the use of remote sensing and hydrological analysis for producing one of the best documented accounts of avulsive river systems draining the Gangetic plains. The new approaches to investigate river dynamics and floods have contributed significantly to finding long-term solutions to river-related hazards in the Gangetic plains.

Dr. Sinha was awarded Alexander von Humboldt fellowship in 2000 to work at the institute of Mineralogy and Geochemistry at Karlsruhe University in Germany. During his stay at Karlsruhe, he worked on the on the Sambhar playa sediments from the Thar Desert and generated an extensive data set on evaporite mineralogy, geochemistry, stable isotopes to unravel the chemical evolution of the Sambhar lake. Using an integrated mineralogical and geochemical approach, he also reconstructed the changes in salinity, lake level and the underlying climatic changes over the last 25 thousands years. This work has led to several publications in international and national journals.

Dr. Rajiv Sinha is also a recipient of AICTE Career Award in 1998, National Mineral Award in 2002, and S.S. Merh Award in 2006 for his contributions in Quaternary geology. He is currently leading several national and international projects at IIT Kanpur related to river response to climate change with a very clear emphasis on the Ganga plains. Dr. Sinha is a member of editorial board of three important international journals namely, Quaternary International (Elsevier), Earth Surface Processes and Landforms (Wiley Interscience), and The Open Geology Journal (Bentham). He is also one of the Associate Editor of the Journal of the Indian Association of Sedimentologists and the Indian Journal of Polar Research (NESA).

#### **Dr. Shakeel Ahmed**

Position & Affiliation: Director's Grade Scientist, NGRI, Hyderabad, India

Educationnel Qualifications: M.Sc.Tech (Geophysics) from BHU, Varanasi, India

PhD (Hydrogeology) from Paris School of Mines, France

#### Present Position/Responsibility (Scientific):

1. Heading the Indo-French Centre for Groundwater Research as Team Leader (India): an International Research Centre set-up at the National Geophysical Research Institute, Hyderabad in collaboration with BRGM, France for the advanced research in groundwater.
2. Director's Grade Scientist and Leading two major research activities in an in-house project under the 11<sup>th</sup> Five Year Plan of the Govt. of India during 2007-2012.
3. Leading an Indo-French Network project on Water Sciences (P2R) funded by the Govts of India and France.
4. Leading several short term projects on Hydrogeology for assessment and management of groundwater in hard rock aquifers.

#### Position/Responsibility (Professional):

1. Elected Vice President of the Muslim Association for Advancement of Science (MAAS)
2. Member of the Editorial Board of the International Journal Chemical and Environmental Research.
3. Chairman of the International Working Group on Groundwater Monitoring Network Optimization: Geostatistical Approach sponsored by the UNESCO.
4. Convener of the South East Asia Working Group on Hard Rock Hydrogeology of IAHR.
5. Ex-Associate Editor of the Hydrogeology Journal (Springer)
6. Member of the Steering Committee of Asian G-WADI program of UNESCO
7. Indian Coordinator of the Indo-Tunisian Collaboration in Water Technology

#### Current Research Interest and Specialization:

- Application of Geostatistical methods in data collection network design and parameter estimation of underground reservoirs.
- Numerical Modeling of aquifers for assessment and management of Groundwater Resources particularly in weathered-fractured coupled system
- Simulation of convective mass transport in aquifers & groundwater management under varying scenarios.

Award/Honors:

1. Recipient of MAAS Young Scientist Award for 1996 by the Muslim Association for the Advancement of Science, India.
2. Recipient of International Prize for Water Science for the year 2004 awarded by the Cannes Water Symposium, France.
3. Recipient of National Mineral Award 2006 in Groundwater awarded by the Ministry of Mines, Govt. of India.

Member of the Learned Societies:

- Fellow, Geological Society of India (L:1362)
- Muslim Association for Advancement of Science (**Member of the Governing Council**)
- International Association of Hydrogeologists
- International Association of Hydrological Sciences,
- Assoc of Geoscientists for International Development

### **Prof Gautam Barua**

Highest Qualification: Ph. D. from Indian Institute of Technology Kharagpur in 1995

Field of Specialisation: Subsurface Hydrology

Associate Professor, Department of Civil Engineering, Indian Institute of Technology Guwahati, North Guwahati, Guwahati – 781 039, Assam, India

Service Experience at IIT Guwahati:

Assistant Professor: March, 2002 to May, 2007;  
May, 2007 - Continuing

Associate Professor:

Courses Taught/Teaching at the Graduate Level:

Transport Processes in Porous Media

Advanced Fluid Mechanics

Advanced Hydrologic Analysis

Numerical Methods

Recent Presentation:

Barua, G. (2009). Presented a paper entitled 'Estimation of directional conductivities of an aquifer through inverse modeling' at the Fifth M.I.T. Conference on Computational Fluid and Solid Mechanics, being held on June 17-19, 2009, at the Massachusetts Institute of Technology (M.I.T.), Cambridge, Boston, U.S.A.

On Going Research Project:

Principal Investigator of the project entitled 'Analytical and inverse modeling for estimating aquifer parameters of confined aquifer' sponsored by the Department of Science and Technology (DST), Govt. of India. Co-Principal Investigator of the project is Dr. S.N. Bora, Associate Professor, Department of Mathematics, IIT Guwahati, Assam.

### **A.K. Gosain**

Dr. A. K. Gosain, is a Professor in the field of Water Resources Engineering and GIS Technologies, in the Civil Engineering Department, IIT Delhi. Prof. Gosain has been associated with the research and development work in the area of hydrological modeling, water management, climate change impact assessment, Geographic Information System, and many allied areas. Some of the recent works of Prof. Gosain include a significant contribution to the NATCOM – national project undertaken by the Ministry of Environment and Forests for making the National Communication to the United Nations Framework Convention on Climate Change (UNFCCC). Prof. Gosain and his team undertook the segment on Vulnerability Assessment & Adaptation for Water Sector and quantified the possible impact of the climate

change on the water resources by performing distributed hydrological modeling of the river basins of the country.

He has also been spearheading the research on appropriate technologies for water resource planning and management, first through a UNDP funded project with the Department of Science and Technology, and recently through a Department for International Development (DFID) funded collaborative project "Low Flows" with the University of Newcastle, UK. Through these initiatives, Prof. Gosain is demonstrating the use of latest technologies of hydrological modeling and GIS for providing scientific backup and sustainable approach to our watershed interventions.

Prof. Gosain has served on many prestigious assignments with the World Bank, IWMI, Sri Lanka, USAID and many Ministries and State Governments. Prof. Gosain has to his credit a very large number of sponsored research and consultancy projects. Prof. Gosain has to his credit about 90 papers published in refereed national and international journals and conferences. Fourteen students have completed their Ph. D. under his supervision. He has delivered a large number of invited lectures in India and abroad. Invited lectures in Harvard, USA in 1999 and in Karlsruhe University, Germany in 1996 are the prominent ones.

He introduced the GIS as an elective course in the undergraduate and postgraduate curriculum of the IIT Delhi. He has also been promoting the philosophy of Open Source Code GIS with a view to make these technologies usable for the end-users of the water and agriculture sector who do not have any paying capacity for such expensive but very useful tools.

### **Important Assignments and Projects**

- |            |  |
|------------|--|
| 2008-2009  | Member, the Indian National Committee, India-IIASA Programme, being implemented by TIFAC, as the NMO (National Member Organisation), DST, New Delhi, 2007.   |
| 2007-2008  | Member, Study Group on Himalayan Glaciers, Office of the Principal Scientific Adviser to Government of India, October 2007.  |
| 2007-2008  | Member, IIASA Water Dialogue Meeting, IIASA, Vienna, Austria, October 29-30, 2007.   |
| 2007-2008  | Member, Expert Committee on Impacts of Climate Change, under the Chairmanship of the Principal Scientific Adviser to Government of India, May 2007.  |
| 2003- 2004 | Member of the Task Force Sub-group on Interlinking of Rivers formulated by the Central Government under the Chairmanship of Mr Suresh Prabhu, Member of Parliament.  |
| 2001- 2003 | Principal Investigator, research project on 'GIS Based Hydrological Modeling for Water Quantity and Quality Assessment in River Basin - Pilot Study on Cauvery River Basin', sponsored by the Ministry of Environment and Forests.   |
| 1998-2000  | Member, National Standing Committee on Watershed Conservation and Development Programme, Council for Advancement of People's Action and Rural Technology (CAPART)  |
| 1999-2000  | Consultant to Andhra Pradesh Government, as a member of the review committee on the World Bank supported project on "Hazard Mitigation Studies", to review the work of the International Consultants appointed for the project   |
| 1996-2000  | Principal Investigator, collaborative research project on 'Development of Computer Aided Water Management System Using Medium Range Weather Forecasts', sponsored by the Department of Science & Technology, IARI and SCADA, Patna.  |
| 1997-99    | Chief Investigator, project on "Decision Making Support System for Integrated Water Management in the Irrigation Command Area Development", sponsored by Govt. of Andhra Pradesh. One of the sub-basins of River Krishna, namely Palleru Basin modeled using SWAT model. The continuous water balance approach has been used to evaluate the return flows into the river system due to the irrigation. |
| 1993       | Consultant to IIMI, Sri Lanka, to perform the application requirements analysis for MIS development activity in Gandak Project for their INDIA-IIMI project at WALMI, Patna,   |
| 1992-93    | Consultant on the project sponsored by the Institute of Hydraulics, University of Perugia, Italy, to develop a Mathematical Model for the Computation of Trasimeno Lake levels. The C++ in the WINDOWS environment was used with DBMS so as to make it a highly user-friendly application.   |

**Dr. S.K.Das-** Advisor, Ministry of Earth Sciences

Dr. Sk. Das is Scientific Secretary to the Earth Sciences Organisation and also an Adviser from Ministry of Earth Sciences, New Delhi. He graduated as a Mining Engineer from Kolkata University and obtained Masters of Business Administration from Leeds University, UK. Subsequently, he completed his Doctorate from Goa University in Marine Sciences.

Dr. Das has a distinguished career with wide varying experience of working with Planning Commission, Ministry of Environment and Forests before joining Department of Ocean Development. He has been steering several national programmes in the field of ocean science and technology. He has been responsible for developing a minesite of 1,50,000 square km in Indian Ocean Basin for harnessing metals from polymetallic nodules. His other areas of interest include Development of Ocean Technologies, Delineation of Continental Shelf, Exploration of Marine Resources including Gas Hydrates, Law of the Sea and International Cooperation.

**Dr. Swati Basu -** Advisor, Ministry of Earth Sciences

Swati Basu is working as an Adviser in the Ministry of Earth Sciences, responsible for planning, formulating and coordinating all National atmospheric science programs development of capacity building programs, promoting research and development in the field of earth sciences. Developing National and International collaborations.

Post graduate in Physics from University of Delhi and PhD in Atmospheric Sciences from IIT Delhi. Research interests include Air Pollution Modelling, Numerical Weather Prediction, monsoon studies, boundary layer studies, and climate change. Has more that 27 years of research experience.

**Dr. M.P.Wakdikar Advisor, Ministry of Earth Sciences**

Dr. M.P.Wakdikar, is an Adviser in Ministry of Earth Sciences. He is a civil engineering graduate from Indian Institute of Technology(IIT), Bombay with Master of Technology in Water Resources Engineering and Doctorate in the field of Stochastic Hydrology from the same institute, IIT Bombay. During his study at IIT Bombay, he developed dynamic stochastic models for seasonal monthly streamflow forecasts using Kalman Filter and also developed techniques for detection of outliers from the data. He also developed expertise in long term forecast of extreme hydrological events.

During his current assignment in Ministry of Earth Sciences, he is looking after programmes pertaining to Development of Ocean Technology, Exploration of gas hydrates, cobalt rich crusts, hydrothermal sulfides, and Law of the Sea.

**Dr. K.Somasundar – Senior Director, Ministry of Earth Sciences**

K.Somasundar is currently working as a Scientist in Ministry of Earth Sciences (MoES). He is responsible for coordination and implementation of national projects relating to Ocean Observational Network and Ocean Information Services including technology development relating to conversation of sea water into fresh water. His main area of research is biogeochemical process of the Indian Ocean in particular exploring the applications of remote sensing satellite data for understanding the upper ocean processes. He is also interested in air-sea interaction studies and role of upper ocean circulation on atmospheric processes in the India region. Prior to joining MoES, he had worked at National Institute of Oceanography, Goa, National Environmental Engineering Research Institute, Nagpur, and University of Hawaii and conducted research in multi-disciplinary oceanographic research besides having experience in acquisition and processing of met-ocean data. He also had experience in environmental impact assessment studies of coastal and offshore developmental activities. In 1982, he graduated from Andhra University with marine sciences as specialization and subsequently acquired Ph.D in marine chemistry in 1996.

**Dr. Parvinder Maini- Director, Ministry of Earth Sciences**

Dr. Parvinder Maini graduated from University of Hyderabad in 1990 with specialization in Statistics and subsequently did PhD (Meteorology) in 2006 from Andhra University. She is currently working as Scientist in Ministry of Earth Sciences. She is involved with the atmospheric science programmes of the Ministry and is responsible for promotion of Research & Development Activities through extra-mural funding of (a) focused research in areas of national importance and (b) human resource development in Earth Sciences. She is also responsible for planning, formulating and implementing a programme to assess the Economic Benefits of the services rendered by MoES.

Prior to joining the Ministry in 2009 she worked at the National Center for Medium Range Weather Forecasting(NCMRWF) for 18 years. Her major contribution at NCMRWF was in development of guidance tools for forecasting weather in various sectoral applications. This involved development of statistical-dynamical downscaling models for giving location specific weather in different spatial scales in the medium range. Her scientific work in this field was translated into operational use for giving location specific forecast at station level. She also carried out the Economic Benefits of the Agro Advisory Service of NCMRWF in 2007.

**Dr. Ashok Karumuri- Senior Scientist, IITM, Pune**

Dr. Ashok Karumuri has recently joined the newly established Climate Change Centre at the Indian Institute of Tropical Meteorology, Pune, as a Senior Scientist and Deputy Program Manager. He leads the in-house coupled model development team. The goal is to realize an earth system model that would be used to provide state of art long term projections for South Asia, while also working on the reduction of the uncertainties in the monsoon projections. In this regard, his research plans also touch upon decadal climate prediction.

During 2007-2009, Ashok was a Senior Research Scientist and Chief of the Climate operations at the APEC Climate Center, Korea. He also led the development of a coupled MME prediction system as well as that of an in-house coupled prediction model based on coupled SST nudging. Prior to this period, Ashok worked at the Frontier Research System for Global Change (FRCGC/JAMSTEC), Japan (2000-2007); his relevant contributions to the climate variability studies include the Indian Ocean Dipole variability, its impacts on the Australian winter climate as well as on the Indian monsoon-ENSO links, and more recently, discovery of the so called ENSO Modoki, its global impacts, and the possible role of the background changes in the recent occurrence of the Modokis. Ashok started his research career at the Indian Institute of Tropical Meteorology in monsoon modeling in 1994. He obtained his PhD from the Andhra University, India, in 1997.

**Sushil Gupta** Director, Central Ground Water Authority

Sushil Gupta is currently working as Regional Director in Central Ground Water Authority (CGWA), Govt. Of India, and is presently posted at New Delhi. He did his post graduation in Applied Geology in the year 1974 from University Of Roorkee (Now IIT), U.P., and was awarded the University Gold Medal. Sri Gupta joined CGWB through the Geologist's exam in 1977. He has vast experience in the following fields (In all kinds of terrain: Alluvial, meta-sedimentary and hard rock)

- Hydrogeological surveys involving well inventory, study of ground water level fluctuations, historical trend of water levels, computation of water balance of the area, identifying areas with fresh quality of ground water and recommending areas where further development of the resource could be undertaken.
- Exploratory drilling for ground water - involving selection of drilling sites, designing well assembly, conducting aquifer pumping tests, analysis of pumping test data for determination of hydraulic parameters, preparation of sub-surface aquifer geometry diagrams.
- Detailed ground water budgeting for the purpose of planning development of ground water resources including pollution aspects and management of the ground water resources.
- Conservation and Artificial Recharge to Ground Water
- Data Base Management in Ground Water
- Regulation and Control of Ground Water

Sri Gupta has more than 50 technical reports to his credit and has contributed several scientific papers in various National and International seminars. Some of the papers are listed below:

- ❖ *Over Development Of Groundwater In Delhi – Need For Conservation And Artificial Recharge*
- ❖ *Revitalization of Tubewells yielding Saline Water in Delhi - A Case Study*
- ❖ *Augmenting Water Supply through Roof Top Rainfall Harvesting in Indore City, Madhya Pradesh*
- ❖ *Genesis of Fluoride in Ground Water of Jabalpur City, Madhya Pradesh*
- ❖ *Management of Water Resources Through Conservation and Artificial Recharge in Tumar Watershed, Mandsaur District, Madhya Pradesh*
- ❖ *Impact of Mining on Ground Water Regime – A Case Study from Faridabad, Haryana*
- ❖ *Environmental Impact Assessment of Ground Water Development in Khajuraho Area, Chhatarpur dist, Madhya Pradesh*
- ❖ *Artificial Recharge and Conservation of Ground Water in Madhya Pradesh – An Overview*
- ❖ *Ground Water Development And Management in Jabalpur City, Madhya Pradesh*

**Dr. Ashis Kumar Mitra**

Ph.D, I.I.T. Delhi, India  
Scientist - E, NCMRWF

Ministry of Earth Sciences, India

Scientific Research Experience and Interest :

After Ph.D, have been working at National Center for Medium Range Weather Forecasting (NCMRWF), Ministry of Earth Sciences, Government of India, and have twenty years research experience in global atmospheric modeling including global data assimilation system. Experience in monsoon system studies with various physical processes. Also worked in model verification and diagnostics especially for monsoon. Was



involved in development of gridded rainfall datasets of rainfall for model verification for monsoon. This was achieved by merging satellite and rain-gauge daily rainfall data. Several research papers have been published related to said topics.

Current interest is in simulation/prediction of monsoon as a coupled land-ocean-atmosphere system for different space-time scale. Worked as a visiting scientist at FSU, USA on coupled ocean-atmosphere modelling for monsoon. During that have gained experience on multi-model ensemble forecasting. Recently had visited UK Met. Office under UKIERI programme and worked on monsoon in UKMO's latest coupled model. These coupled models have good potential to improve the monsoon precipitation forecasts from days to a season, and then beyond to climate scales. A lot of exciting high-resolution coupled modelling with assimilation needs to be done now to reap the benefits in monsoon simulation/prediction. As, monsoon simulation is like a bench-mark for any model, by improving the skill of monsoon in coupled model, the overall performance of the model could be improved further.

### **Ashwini Kumar Bohra**

Director, National Centre for Medium Range Weather Forecasting  
Earth Sciences; Government of India)

(Ministry of

Ph.D.(Physics)

Membership of Professional/Academic Societies:

Life member of Indian Meteorological Society

Life Member of Indian Water Resources Society

Field of Specialization: Numerical Modeling for Weather and Climate Prediction

Current Research Interests:

- i. Monsoon understanding and prediction
- ii. Extreme Weather Events
- iii. Non-conventional data utilisation in NWP
- iv. Physical initialisation
- v. Earth System Framework Modeling

### **R D Singh, Director**

#### **National Institute of Hydrology, Roorkee**

R. D. Singh did B.E. in Civil Engineering and M.E. in Civil Engineering, with Specialisation in Hydraulics and Irrigation Engineering, from University of Roorkee. He obtained M. Sc. (Hydrology) degree from University College Galway, Ireland. Presently he is working as Director, National Institute of Hydrology, Roorkee. Before taking over as Director, NIH, he was holding the charge of Nodal Officer Hydrology Project-II which is a World Bank Funded Project currently under progress at NIH for Peninsular region of India. He has research & development experience of more than 28 years in different areas of Hydrology and Water Resources.

He has published more than 190 research papers in the reputed International & National Journals, International & National Seminar/Symposia, Workshops etc. He was awarded C.B.I.P. Medal for his one of the papers in the area of Flood Estimation and Flood Management presented in the CBIP R & D session. He received certificate of merit for one of his research papers contributed to the Journal of Institution of Engineers. He guided more than twelve M.E., M. Tech. and M. Phil dissertations. During his service at NIH, he has worked on more than twenty five consultancy projects for solving the real life hydrological problems.

He has also worked for five International Collaborative projects. He has an extensive experience in the area of Surface Water Hydrology which includes flood estimation, flood management, hydrological modeling, climate change and its impact on water resources. For three of the International Projects (World Bank funded, CEC funded and UNDP funded projects), he has been the Coordinator and Nodal Officer.

He has visited number of countries which include USA, UK, Ireland, Denmark, Sweden, Holland, France, Germany etc. He visited Paris France as a leader of Delegation and attended Inter Governmental Council (IGC) meeting of UNESCO during June, 2008. He also visited Geneva, Switzerland as principal delegate to attend 13<sup>th</sup> Congress of Hydrology of WMO

## **Mr. Ashok Kumar Kharya**

Director, Planning & Development, Central Water Commission, New Delhi (India).

Mr. A.K. Kharya is presently looking after climate change issues pertaining to water resources in India, entrusted to Central Water Commission. The first and foremost are to take up various strategies and activities identified in the National Water Mission formulated as a part of National Action Plan for Climate Change. The Mission document is under consideration of the Government for approval, a section of which pertaining to surface water management was prepared by a sub-committee under Chairman, CWC and Mr. Kharya was its Member-Secretary. Prior to the Mission document in June 2008, CWC published a document viz. "Preliminary Consolidated Report on Effect of Climate Change on Water Resources" which was prepared by him. He has co-authored "Water Resources Assessment – A National Perspective" – A technical guide to water resources engineers and planners being published by NRSC, Hyderabad. He has represented Central Water Commission in various workshops, seminars etc. on the issues related to impacts of climate change on water resources. He is working in the field of water resources sector since last 22 years in various capacities.

Mr. Kharya has worked for mathematical model development particularly for flood forecasting using MIKE 11 for about three years and river data management of the country for about one and half year as Director in CWC, New Delhi. He has been actively involved in the constitution of "North-East Water Resources Authority (NEWRA)". He was involved in implementation of the world bank aided project viz. Hydrology Project-II, particularly CWC's component of development of Hydrological Design Aid (HDA). He spent around three years in Brahmaputra and Barak basins of North-east India collecting hydrological data and issuing flood forecasting as Superintending Engineer at Guwahati. He also coordinated with China, Bhutan and Bangladesh for data collection and transmission of flood warnings as per bilateral arrangements with these countries.

As an Executive Engineer, he was involved in field investigations and preparation of Detailed Project Report of Pancheshwar Multipurpose Project – a joint project between India and Nepal for about four years. The Pancheshwar Project envisages an installation of 5600 MW and irrigation to about 0.37 MHa. Prior to his field stint, he worked in Project Appraisal Directorate for techno-economic examination of Major & Medium Irrigation and Multipurpose Projects.

He joined Central Water Engineering Service (CWES) in 1988 after completing his Masters in Stress and Vibration Analysis from MANIT, Bhopal. He has done his Bachelors in Civil Engineering from Engineering College, Rewa. After joining services he has been put to field assignment of hydrological data collection and flood forecasting for about three years.

He is a member of Institution of Engineers (INDIA), Life member of Indian Water Resources Society, Indian Water Works Association and Indian Geotechnical Society (Delhi Chapter).

Phone: +9111-26102186 (Office) +919818247513 (Mob.)

E-mail: ashokkharya@gmail.com

## **Dr. A.S. RAJAWAT**

Dr. A.S. Rajawat, Scientist SG is working in Earth Sciences and Hydrology Division, Marine and Earth Sciences Group, Remote Sensing Applications Area, Space Applications Centre, (ISRO), since 31st May, 1983 (More than 25 years) and has specialized in geological applications of remote sensing and GIS. His major fields of work has been towards ground water exploration and recharge, mineral exploration, disaster applications, coastal processes and impact of Sea Level Rise related studies.

He has obtained his Ph.D. in Geology from Vikram University, Ujjain for work entitled "Reconstruction, evolution and significance of palaeodrainage network in Western Rajasthan: an investigation based on multisensor satellite data and Geographic Information System (GIS)", in 2006 and Masters Degree in Geology from University of Garhwal in 1982. He has contributed around 40 scientific papers in various International/National Journals/Symposium Proceedings besides around 30 project reports.

He is Fellow – Geological Society of India and Life Member of Indian Society of Remote Sensing; Indian Society of Geomatics; Indian Meteorological Society and Indian National Cartographic Association.

He has attended Training Course on the Groundwater Development in Great Britain (First leg: November 22 – December 16, 1994) and India (Second leg upto February 17, 1995) provided by the British Government through Scott Wilson Kirkpatrick Consulting Engineers and Binnie Thames Water Management and Operation

Consultants and Second United Nations International Training Course on “Remote Sensing Applications to Geological Sciences”, at Potsdam, German Democratic Republic from October 05-22, 1989.

### **Shri N.Y. Apte**

Shri N.Y. Apte is a Civil Engineer by qualification and is looking after the activities related to Hydrometeorology in India Meteorological Department since 1981. Currently he is holding the post of Dy. Director General of Meteorology in the department.

Sri Apte has to his credit 29 years experience in the field. He has worked as Flood Meteorological Officer at Jalpaiguri and responsible for issuing Quantitative Precipitation Forecast for Flood warnings for river Tista. His paper “ Dynamic approach to Quantitative Precipitation Forecast” ( Mausam 1986) was awarded Third SAARC award for young scientist.

He was Rapporture of 13<sup>th</sup> Working Group on Hydrology (RA –II) and compiled report on Hydrological Drought and Climate related Issues in 2004.

He represented India in Expert Group Meeting on Innovative Strategies towards Flood Resilient Cities in Asia – Pacific organized by UN ESCAP and presented paper on Urban Floods in Context of India.

He is project officer to World Bank assisted Hydrology Project Phase I and II.

His area of interest is Estimation of probable maximum precipitation for water storage structures. He also participated in Antarctica Expedition and Glacier Expedition. He also associated with rainfall monitoring in India.

### **Sekhar MUDDU, Ph.D**

Indian Institute of Science, Bangalore

I work in the research areas including groundwater hydrology, numerical modeling, and environmental engineering. My interests include analysis of flow and reactive transport in groundwater systems, field-scale experiments in watershed hydrology, hydroclimatic & anthropogenic controls on groundwater, numerical methods, geospatial & geophysical methods, optimization & inverse problems, and modeling of environmental hydraulic processes.

#### **Appointments**

12/2007-to date	Associate Professor, Indian Institute of Science, Bangalore, India.
12/1996-12/2007	Assistant Professor, Indian Institute of Science, Bangalore, India.
5/2009-7/2009	Visiting Scientist Fellowship of INRA, France
4/2006-12/2006	Fellowship of CNRS, France - “ <b>Poste Rouge</b> ”, LMTG, Toulouse, France.
5/2005-7/2005	Visiting Scientist, University of Paul Sabatier, Toulouse, France.
6/2004-7/2004	Visiting Scientist, LMTG, Observatoire Midi-Pyrenees, Toulouse.
7/2002	Visiting Scientist, University of California, San Diego, USA.
3/2001-5/2001	Visiting Scientist, Department of Mathematics and Computing Science, Technical University of Eindhoven, The Netherlands.
12/1993-12/1996	Lecturer, Indian Institute of Science, Bangalore, India.
2/1993-11/1993	Project Leader, Transoft International, Paris & Bangalore, India. (Developed “ <i>Pollusol</i> ” – a <i>Fluidyn</i> code)

#### **(d) Project funding**

##### Research Projects:

1. An integrated study of hydrology and mineralogy for assessment of water quantity and quality in the sub-catchment/ watershed, Sponsored by IRD, France. Duration: 7 years (2001-2008) [PI].
2. Application of integrated surface water and groundwater models using remote sensing and GIS for Gundal river basin. Sponsored by ISRO-STC. Duration: 2 years (2003-2005) [PI].
3. Hydro-bio-geochemical cycles in two experimental watersheds of South India. Sponsored by IFCPAR, India, Duration: 3 years (2005-2008) [co-PI].
4. Characterization of groundwater flow regime in fractured aquifer system. Sponsored by AICTE, Duration: 3 Years (2006-2009) [PI].
5. Retrieval of root zone soil moisture from near-surface measurements. Sponsored by ISRO-STC. Duration: 2 Years (2008-2010) [PI].
6. Sustainable groundwater management in an urban environment. Sponsored by Arghyam (an NGO) Duration: 3 years (2008-2011) [PI].

7. Assessing groundwater storage changes and sustainability due to climate change in the semi-arid watersheds of South India. Sponsored by CMMACS, NAL, Bangalore under the COPEC project. Duration: 3 years (2010-2013) [PI] (*Tentatively Accepted*).
8. Near surface soil moisture retrieval using RISAT SAR data and its assimilation for root zone soil moisture estimation at watershed scale. Sponsored by ISRO. Duration: 3 years [PI] (2010-2013).
9. Validation of MT rain rate products and its application in hydrology in the Kabini river basin. Sponsored by ISRO. Duration: 3 years [PI] (2010-2013).
10. Assimilation of remote sensing data for modeling the land surface fluxes at watershed scale using a distributed hydrological model. Sponsored by ISRO-STC. Duration: 2 Years [PI] (*Under Review*).

Industrial consultancy:

Conducted over more than 30 consulting projects in the areas of urban groundwater hydrology, hydraulic model studies for pump-sump design, and hydraulic analysis & design of surge protection systems for water supply projects. Selected projects are listed below:

1. Geo-hydrological study along the tunnel of upper Badhra project. Karnataka Neervari Nigam Limited, Bangalore (*under progress*) [PI].
2. Geo-Hydrological studies along the Metro- rail alignment in Bangalore. Bangalore Metro Rail Corporation Ltd., Bangalore, June 2007. [PI].
3. Impact of Iron Ore mining in the Kudemukh National Park, Karnataka Forest Department, Jan. 2001 [co-PI].
4. Sump model study for BAHR STPP Stage I (3x660MW) CW pump house, National Thermal Power Corporation, New Delhi Dec. 2007 [co-PI].
5. Hydraulic model study for raw water pump sump and forebay – SIPAT Stage II. M/s. Degremont Ltd., New Delhi, September 2007 [co-PI].
6. National Circum-stances: Forests, other natural eco-systems and water resources – “write-up” project, M/s. Winrock International, New Delhi, November 2003 [co-PI].
7. Sardar Sarovar canal drinking water supply project, M/s. Montgomery Watson Consultants, August 2000 [co-PI].

**Dr. Surinder Kaur, India**

India Meteorological Department

I have about 25 years of experience of working in the field of hydro meteorological services / products for development / management of water resources. I have worked in the field of Design Storm Studies carried out for construction of hydraulic structures covering depth-duration-frequency analysis of rainfall. The statistical method is generally used for small and medium structures like rail/road bridges, irrigation/drainage systems etc. It involves extreme rainfall analysis. The regional study are carried out covering almost whole India and published in form of reports/ atlas for the use by design engineers.. For large hydraulic structures like dams, reservoirs etc on demand by the project authorities, Design Storm Studies(rainfall magnitude and time distribution) are carried out for use as main input for design engineers in estimating design flood.

I was associated with the project “Flood Forecasting (Meteorological Component)” under the INDO-US collaboration programme of Ministry of Home Affairs (Natural Disaster Management Division). The project was taken up with the objective of improving hydro meteorological forecasting and early warning systems in India. Quantitative Precipitation Forecast (QPF) is the main component in flood forecasting

The monthly climatic water balance studies are carried out for few basins which help in quantifying the water surplus and deficient quantities during different months for management of water resources. The rainfall in India is highly variable in time and space. Real time rainfall statistics in the form of Rainfall Summary of India, (Sub division wise and District wise) are prepared and disseminated to planners and management authorities.