NEWS AT A GLANCE

***FORTHCOMING EVENTS:

1. BGS2017 — 9. Congress of the Balkan Geophysical Society
05 Nov 2017 - 09 Nov 2017; Antalya, Turkey

Topics: Oil, Gas, Coal and Mineral Geophysics, Engineering Geophysics and Seismology

Event website: http://www.bgs2017.org

2. 51st ESLAB Symposium: 'Extreme Habitable Worlds'
04 Dec 2017; European Space Research and Technology Centre (ESA, Netherlands

Event website: http://esaconferencebureau.com/2017-events/eslab2017/

3. Exoplanets and Planet Formation
11 Dec 2017 - 15 Dec 2017; Shang Hai, China

Topics: astrophysics of exoplanets.

Event Website: https://indico.leeinst.sjtu.edu.cn/event/25/

4. 2nd International Convention on geophysics and geotechnics
08 Nov 2017 - 09 Nov 2017; Las Vegas Nevada, USA.

Topics: Modern Scientific Enhancements and Advancements in the Geophysics and Geotechnics

Event Website: geophysics@annualcongress.com

5. COBEE2018 — 4th International Conference On Building Energy Environment 2018
05 Feb 2018 - 09 Feb 2018; Melbourne, Australia

Topics: Air quality and thermal comfort, Acoustic comfort and noise control,

Infiltration and air distribution Sensors, Controls and management

Event Website: http://www.cobee2018.net

6. INDIA Com — 2018 5th International Conference on Computing for Sustainable Global Development
14 Mar 2018 - 16 Mar 2018; New Delhi, India

Topics: Computer Science and Information Technology

Event Website: http://bvicam.ac.in/indiacom/

7. 5th International Conference on Geology and soil science
21 Mar 2018 – 22 Mar2018; Bali Indonesia

Topics: Geology and earth science

Event Website: geology@earthscienceconferences.com

***AWARDS AND RECOGNITION:

* Ministry Of Earth Sciences awarded "The Life Time Excellence Award-2017" to Professor K. Gopalan for his significant contribution in the field of isotope geosciences.

* Ministry Of Earth Sciences awarded for excellence in "Atmospheric Science & Technology-2017" to Prof. K. Krishna Moorthy.

*In recognition of outstanding research contributions in the field of Earth System Science the Ministry of Earth Sciences honoured Dr. Dhanya C. T. with the "Young Researcher Award in the field of Earth System Science-2017".

* In recognition of outstanding research contributions in the field of Ocean Science and Technology the Ministry of Earth Sciences honoured Prof. P.N. Vinayachandran with the "National Award in the field of Ocean Science and Technology-2017".

***TECHNICAL NEWS:

Deep Ocean Tsunami Detection Buoys and latest developments

Deep-ocean tsunami detection buoys are used to confirm the existence of tsunami waves generated by undersea earthquakes. These buoys observe and record changes in sea level out in the deep ocean. This enhances the capability for early detection and real-time reporting of tsunamis before they reach land.

*Working principle of a Deep Ocean Tsunami Buoy:

A typical tsunami buoy system consists of two components; the pressure sensor anchored to the sea floor and the surface buoy. The sensor on the sea floor measures the change in height of the water column above by measuring associated changes in the water pressure. This water column height is communicated to the surface buoy by acoustic telemetry and then relayed via satellite to the tsunami warning centre.

*The system has two modes - 'standard' and 'event'.

Standard Mode: The system generally operates in 'standard' mode, where it routinely collects sea level information and reports via satellite at relatively low frequency transmission intervals (i.e. every 15 minutes). This helps to conserve battery life and hence extends the deployment life. The tsunami buoy is activated into 'event' mode when the pressure sensor first detects the faster moving seismic wave moving through the sea floor. It then commences reporting sea level information at one minute intervals to enable rapid verification of the possible existence of a tsunami. The system returns to standard mode after 4 hours if no further seismic events are detected.

*Availability of Data from Tsunami Detection Buoys:

Data from tsunami detection buoys are made freely available to the international community and the tsunami warning centres of other countries in real-time using the World Meteorological Organization's dedicated Global Telecommunication System (WMO GTS).

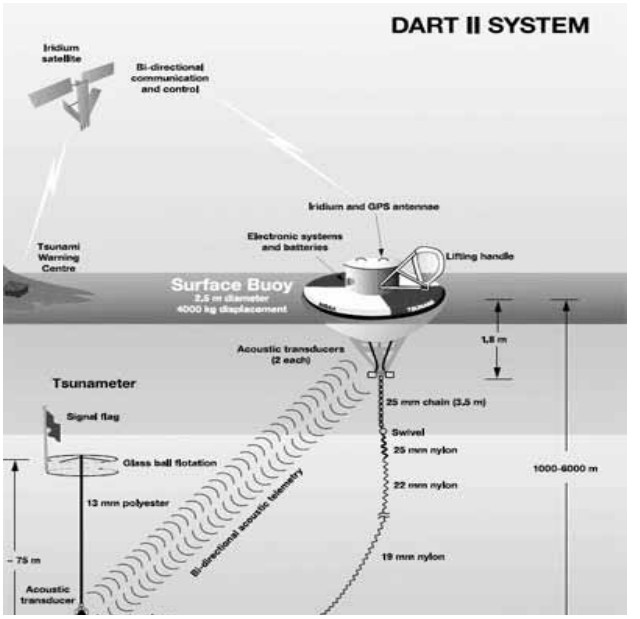

Figure 1. A schematic representation of a deep-ocean tsunami detection buoy (DART™).

*****Determination of location of deployment of Tsunami Buoy:

The tsunami buoy needs to be deployed nearer to the epicentre to enable timely detection of any tsunami and maximise the lead time of tsunami forecasts for coastal areas. Further, tsunami buoys may be preferably deployed in water deeper than 3000m to avoid contamination of observed signal by surface wind-waves. Also international maritime boundaries must also be considered when deploying tsunami buoy systems.

*****Life of a tsunami detection buoy:

The life cycle of a deployed tsunami buoy is approximately 2 to 4 years. The concerned agency has to replace the surface buoy and the sea-floor pressure sensor every one to two years.

*****Latest developments:

Deep-ocean tsunami detection buoy technology was initially developed in the United States of America by the Pacific Marine Environmental Laboratory (PMEL) of the National Oceanic and Atmospheric Administration (NOAA) as "DART™" (Deep-ocean Assessment and Reporting of Tsunami) buoys. Recently, the Science Applications International Corp. (SAIC), in collaboration with the U.S. National Oceanic and Atmospheric Administration (NOAA), is reported to be deploying commercially available fourth generation buoy systems worldwide, which can record water temperature and pressure at the sea floor every 15 seconds, and the pressure measurements are converted to values that indicate the height of the water surface above the ocean floor. The latest DART™ II systems contain two independent and redundant communications systems as back-up. These systems are capable of measuring sea-level changes of less than a millimetre in the deep ocean. These data are then sent via satellite to national weather services and warning centres every 6 hours under normal circumstances. When there is a tsunami event, such as a pressure anomaly, the buoys immediately send initial data reports followed by 17 reports over the following three hours before returning to normal reporting mode.

*****Future Challenges and Conclusion**:** Due to the complexity and uncertainty as to whether an undersea earthquake has the potential to generate a tsunami, the observation of sea levels is a critical factor in verifying whether a tsunami has actually been generated. The use of actual sea level observations, as compared with reliance on seismic observations alone, therefore helps to significantly reduce the risk of false tsunami warnings being issued. Short warning times and uncertainties related to tsunami hazard and early warning represent a big challenge to the scientific community in their effort to improve tsunami preparedness and implement strategies for tsunami early warning system. Recognizing these parameters and taking them into account should be the basis to develop a realistic preparedness strategy and an advanced warning system.

** This technical news has been compiled using internet information, basically to propagate the importance of Tsunami detection Buoys and latest developments.

*****Web Links**:**

1. http://www.bom.gov.au/tsunami/about/detection_buoys.shtml
2. http://www.srh.noaa.gov/jetstream/tsunami/dart.html
3. http://www.ndbc.noaa.gov/dart/dart.shtml
4. https://en.wikipedia.org/wiki/Deep-cean_Assessment_and_Reporting_of_Tsunamis
5. https://www.technologyreview.com/s/.../the-reliability-of-tsunami-detection-buoys
6. https://www.oceannews.com/feature-story
7. www.saic.com/buoy

*Compiled By: **Mr.Raja Acharya**, IMD, Regional Meteorological centre, Kolkata (MOES)

***OUTSTANDING CONTRIBUTION IN SEISMOLOGY AND GEOPHYSICS

Prof. Pradeep Talwani

Distinguished Emeritus Professor of Geophysics Department of Earth and Ocean Sciences University of South Carolina Columbia, South Carolina 29208

Personal Data: Born in India, Naturalized US Citizen

Academic Background: M.Sc. Applied Geophysics, 1962, Indian School of Mines; M.S. Geophysics, 1971, Stanford University; Ph.D. Geophysics, l973, Stanford University, Director, South Carolina Seismic Network.

Experience: A. INDUSTRIAL (1962-68) - Geophysicist in Gravity-Magnetic exploration parties with Oil and Natural Gas Commission India, 1962-68; Party chief 1965-68.

B. ACADEMIC - Assistant, Associate, and Full Professor, Department of Geology, University of South Carolina, September 1973-1977, 1977-1983, 1983 - present; Director of Graduate Studies in Geology, University of South Carolina, 1988-1991.

C. OTHER - Director of the South Carolina Seismic Network, 1990 - 2009; Board of Directors, Earthquake Education Center,1990-2007; Board of Directors, Drilling, Observation and Sampling of the Earth's Continental Crust (DOSECC), 1996-1998; National Science Foundation panel member on Urban Renewal Initiative, Fall 1998.

***Research Areas:** He is engaged in a broad range of research topics, using a dual approach, field studies in South Carolina and models and analyses, globally. The research topics include reservoir induced seismicity, fluid pressure flow in crystalline rocks, seismotectonics and neotectonics of stable continental regions, strain rate measurement using GPS, paleoseismology, crustal structure of the South Carolina Coastal Plain, the Charleston earthquake of 1886, seismic hazard analysis and seismicity of South Carolina.

Recently acquired potential field data suggest the presence of a buried meteorite impact crater in northeast South Carolina.

During the past five years he and his research team focused on the following topics:

Reservoir Induced Seismicity (RIS)**:** Locally researchers continue to monitor RIS at three locations in South Carolina. They have analyzed RIS at Koyna, India, in China and Brazil. Using seismicity patterns, stress measurements, and lake levels the research team under the stewardship of Prof.P.T have developed models to explain the nature of RIS. In most cases the RIS follows impoundment or rise in water levels over previous maximum, however at other locations seismicity continues for years. This protracted RIS is relatable to the amplitude and frequency of lake level changes. They have discovered that fractures associated with RIS have characteristic (~ 2 - 200 mD) seismogenic permeability.

Fluid Pressure Flow through Fractures: By monitoring water levels in Bad Creek Reservoir and in an observation well connected to it by a 250 m long, 1 m wide shear zone researchers under the guidance of Prof.P.T have made probably the first in situ determination of hydraulic diffusivity in a fracture. The pore pressure diffusion was found to decay exponentially and show frequency dependence. The data allowed for an in situ permeability estimation of the shear zone (~ .1 mdarcy).

Seismotectonics of Stable Continental Regions (SCR): The results of paleoseismological research, strain measurements, historical and current seismicity suggest that there are pockets of high strain located within SCR. Prof.P.T proposed that intersection model explains these observations. In this model intersection of faults and zones of weakness in the brittle crust provides a means to focus and accumulate stress in the ambient plate tectonic stress field. The stress accumulation rate is about two orders or magnitude greater than the plate as a whole, accounting for the short return periods (~ 500 years) for moderate earthquakes. The model predicts localized pockets of high strain rate accumulation in the continental interiors, a prediction that is being borne out as new data are gathered.

Neotectonics in SCR**:** Prof.P.T and team of researchers used direct and indirect observations to deduce ongoing neotectonic activity in SCR. These include GPS, stream geomorphology, observations in the Charleston area, seismicity, stratigraphy, relevelling and paleoseismology. Subtle uplift in the Coastal Plain has led to the discovery of a > 200 km long Zone of River Anomalies (ZRA).

Strain Accumulation in the Charleston, South Carolina Region: By occupying 1930 circa triangulation sites and 1980 GPS sites with GPS instruments in 1993-94, 1999, and 2000 Prof.P.T and his team have discovered that localized strain rate accumulation is occurring at a rate of about 0.02 x 10-7 strain/yr. The direction of maximum compression was found to be N60°E in agreement with seismicity and borehole data.

Paleoseismology: Following the discovery of the first paleo-liquefaction feature in eastern United Stated by John Cox of USC in 1983, over 100 other locations have been discovered in the South Carolina Coastal Plain by scientists from USC, U.S. Geological Survey and Ebasco Services. Prof.P.T and his research team have re-analyzed all data and established that there were at least 7 prehistoric earthquakes, similar to the 1886 earthquake in the past 6000 years. Based on the four recent ones, they estimated a recurrence time of about 500 years for such events.

Crustal Structure of the South Carolina Coastal Plain: By carrying out detailed gravity surveys and combining the data with aeromagnetic and seismic reflection data the research team has delineated several buried faults and basins under the Coastal Plain. Recent gravity investigations by Eric Wildermuth have led to the discovery of a buried meteor impact crater in northeastern South Carolina. Data for gravity bases have been recompiled and a new gravity map has been made for the Coastal Plain of South Carolina.

The 1886 Charleston Earthquake: The exact cause and nature of the large 1886 earthquake that was felt over 2 M square miles is still a subject of research. Prof.P.T and team are analyzing the 1886 observations in light of current understanding of the crustal structures, seismicity and propagation characteristics. Hypocentral locations have been used to locate the seismogenic Ashley River and Woodstock faults thought to be responsible for the ongoing seismicity near Charleston.

Seismic Hazard Analysis in South Carolina**:** This is a new project aimed at assessing the seismic hazard in South Carolina using current understanding of the seismotectonics, seismicity and recurrence rates. The researchers have carried out Cone Penetrometer and Standard Penetration Tests in paleoliquefaction features. Currently they are working with the Soil Mechanics Lab in the School of Engineering to analyze the engineering properties of soil samples. The aim to obtain calibration data needed to estimate liquefaction potential in the Coastal Plain.

Seismic Activity in South Carolina**:** Researchers continue to monitor and analyze seismic activity on the South Carolina Seismic Network.

***Professional Affiliations:** (current and past) • American Geophysical Union (AGU) • Seismological Society of America (SSA) • Eastern Section Seismological Society of America (ES-SSA) (Former Chairman) • Geological Society of America (GSA) (Fellow) • Earthquake Engineering Research Institute (EERI) • American Association for the Advancement of Science (AAAS) • United States Committee on Large Dams (USCOLD).

***Professional Honours:** Recipient of the Distinguished Alumni Award, Indian School of Mines on the occasion of its Diamond Jubilee, 1987 • Nominated by CEO of South Carolina Electric and Gas Company for the Edison Electrical Institute's Power Engineering Educator Award, 1987 • Elected a Fellow of the Geological Society of America, 1992 • Recipient of Seismological Society of America (Eastern Section's) JSA Award for Contributions to Observational Seismology, 1999.Richard Russell Research Award for Science, Mathematics and Engineering, the highest research award given at USC, 2008.

***Invited Papers:** He has presented invited papers at Indian Science Congress, Penrose (GSA), Chapman (AGU), USGS Redbook, and NATO conferences and at one NSF workshop. Additionally, he has presented invited papers and has chaired sessions at the meetings of AGU, GSA, SSA, ESSSA, EERI, SE-GSA, etc.

***Keynote Lectures:** (Representative list) • International Symposium on Reservoir Induced Seismicity, Beijing, China, Nov.,1995. • Indo-US Workshop on Paleoseismicity, Dehra Dun, India, March, 1997. • Societe Geologique de France. Symposium on Fluids and Fractures in the Lithosphere, Nancy, France, March, 1999. • Workshop on Seismic Signatures of Fluid Transport, Berlin, Germany, Feb.2000. • Southeastern Section of the Geological Society of America Annual Meeting, Charleston, South Carolina, March, 2000. • Modern Trends in Geophysical Science and Technology, Celebrating the Golden Jubilee of Geophysics at Indian School of Mines, Dhanbad, India, 2007.

***Contributed Papers:** He and his students have presented more than 400 talks at various international, national, and regional conferences and published over 100 papers in refereed journals.

***Technical Reports:** Over the years he has written over a hundred technical reports. These were usually the annual or final reports to various funding agencies. He also brought out the annual Bulletin of the South Carolina Seismic Network.

***Invited Seminars:** Presented invited seminars at various universities and research organizations including the USGS Office of Earthquake Studies; University of Ruhr, Bochum, Germany, Institute de Physique du Globe, Strasbourg, France, Stanford, MIT, University of California at Santa Barbara and Riverside, University of Mexico, University of North Carolina, Clemson, North Carolina State and many research institutes and Universities.

***Outside Reviewing:** Regularly review research proposals for USGS, NSF, NASA, DOE, ACS, Canadian Government, US-Israel Science Foundation, and various US agencies.

***Consulting**: Consultant to E. I. du Pont de Nemours & Co, review of seismic data and presentation of additional data before the Savannah River Plant seismic studies review panel (1980). Consultant to Oak Ridge National Laboratory regarding seismicity in the south eastern United States. Study done for the Crystalline Repository Development (1982-83). Consultant on Rondout team for the EPRI study on "An Evaluation of Seismic Source Zones in the Eastern United States, East of 105 Degrees" (1984-85). Consultant to Lawrence Livermore National Labs on Seismic Hazards in Eastern U.S., (1988 to 1997). (Attended various workshops). Ex Officio Member of the Earth Science Advisory Committee to Westinghouse SRL on the restart of the K-reactor, (1989-1994). Consultant to Canadian Atomic Energy Control Board on Seismic Issues associated with Darlington and Pickering Reactors, (1990-1992). Advisory Panel Member to Geological Survey of Canada on the Seismic Zonation Map of Canada, (1992). Served on the Senior External Events Review Group - a group of senior scientists and engineers to advise DOE on the New Production Reactor, (1990-1993). Lawrence Livermore National Laboratories. Expert evaluator for —SSHAC Recommendations Trial Implementation Project, (1996-1997). Atlanta Testing and Engineering. —Seismic Hazards in Eastern U.S. (Summer 1997 and Spring 1998). Parsons Brinckerhoff, Inc., New York. —Seismic Hazard Estimation for the Proposed New Bridges on the Cooper River (SC-DOT), (1999). EPRI regarding seismic hazard assessment in South and Eastern US.

***Grantsmanship:** He has been successful in obtaining external research funding from various funding agencies, such as, U.S. Geological Survey, National Science Foundation, Nuclear Regulatory Commission, American Chemical Society, SCUREF,US-Israel Bi-national Science Foundation, S.C. Department of Transportation etc for more than eight million dollars

P.R.Reddy

Quotations on Tsunami

* “In my mind of course natural disaster like tsunami, and these things, also I think indirectly may relate to human behavior. But then major sort of problems actually they're due to a lack of moral principle”.

-Tenzin Gyatso, 14th Dalai Lama (1935--) Buddhist Monk was recognized as the reincarnation of the previous 13th Dalai Lama

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* “We think we have a responsibility. And I think it's important for all of us in the Western world to realize that we've all been blessed a lot and if you go to these parts they don't have a lot, even before the tsunami”.

-Kevin B. Rollins (1952--) is an American businessman and philanthropist.

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* “We would be doing the children of South Asia a great disservice if we allowed ourselves to believe that the need of children to belong to a loving, permanent family was washed away by the waves of the tsunami”.

-Mary Landrieu (1955--) is an American politician, entrepreneur, and former U.S. Senator from the state of Louisiana.

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*“You'll never be just anything. A tsunami can never be just a wave (...) Waves are banal. Tsunamis reshape the Earth”.

-Karen Marie Moning, (1964--) is an American author

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* “Every week a tsunami rips through poor towns and villages all over the world ... That tsunami is hunger”.

-Colin Farrell (1976--) is an Irish actor