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of Earthqu

Indian Society of Earthquake Science

(Registered under Societies Act of 1860) Email : ises2009@gmail.com ♦ Web : www.ises.in

committee comprises of distinguished

scientists in their respective fields .

In a collaborative study of ISR and ISRO

it was presented that the horizontal

deformation in Kachchh was found to

Kachchh is continuing and expanding. It

was found that the vertical deforma-

tion in Kachchh region is high, which is

probably causing seismicity. The 2001

Bhuj earthquake has triggered seismic-

ity to 200 km distance and for a dec-

be negligible as deduced from GPS

measurements. Still seismicity in

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Indo-US Workshop

Indo-US Workshop on Intraplate Seismicity held at Institute of Seismological Research, Gandhinagar, Gujarat during January 15-18, 2012

The workshop was supported by Indo-US Science & Technology Forum (IUSSTF), New Delhi and Coordinated by BK Rastogi, Director General, Institute of Seismological Research, Gandhinagar, India and Susan E Hough, US Geological Survey, Pasadena, CA . Scientific agenda was to take stock of Intraplate Seismicity study in USA and India and come out with future directions to understand this least understood phenomenon.

Highlights of scientific presentations/deliberations:

There were 50 oral presentations and 25 poster presentations in the workshop. The posters were highly appreciated by the International



From the President's Desk

It is nice to see that finally 1st issue of ISES is being rolled out with 105 life members including 4 foreion members and I thank all the executive members for their co-operation and support. At the same time I am delighted to share some of the compliments recorded in the recently held Indo-US workshop at ISR .

Dr. Susan E. Hough ,USGS Scientists and Coordinator from US mentioned that the ISR has been proved to be a leader in the field of Intra-plate Seismicity. Extraordinarily important work has been carried out and lot of data sets have been generated, and can act as Centre for collaborative research to alleviate sufferings due to earthquakes.

Padmashri V.P.Dimri, President Indian Geophysical Union congratulated Govt. of Gujarat and ISR for wonderful work. Within five years, it is developed as a World Class Institute. All labs are of high quality. All types of data will be valuable for future studies. India is proud of ISR. It shall be declared as a Centre of Excellance .

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NEWS / EVENTS

- **Decennial 2011** Medal was conferred to Dr. B. K. Rastogi by The Indian Geophysical Union for his significant contribution in the field of Seismology, and for the establishment of ISR
- > Five PhD's were awarded and about Twenty research papers have been published in SCI Journal during 2011 by ISR .

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Bhoo-Kampan



MOU 's and Collaborative Projects of ISR

International Scientific	New Memorandum of Under-	Department of Geophysics, Kurukshetra
Collaboration	standing	University, Hariyana .
ISR has MoU 's with	Five MoU's were signed for col-	
i. PDPU, Gandhinagar,	laborative work with the following	A Memorandum of Understanding between ISR and Institute de Physique du Globe de
ii. NGRI, Hyderabad,		Strasbourg has been done for collabora-
iii. VelTech Univ., Chennai,	Aichi Institute of Technology & Kvoto University, Tovota, Aichi,	tive research aimed at global geodynam-
iv. Charotar Institute of Technology- Changa,	Japan	cation of various methods on super con-
v. Colorado University	Department of Earth Sciences, University of Trieste,Trieste, Italy	ducting gravimeter data.
and		
vi. National Center of Earthquake Engineering	Directeur de recherche au CNRS (émérite), Maison de Department	
Research, Taipei, Taiwan.	of Palaeontology, Eotvos Univer-	

sity, Hungary

Indo-US Workshop

model for explaining belts of seismically active zones in intraplate regions of India formed by the arrested ridge -push by continent-continent collision. Alternate model of uplift of the intraplate region by continuing ridgepush/ back-lash stress of plate tectonics was presented by BK Rastogi. Rastogi, Prantik Mandal and Pradeep Talwani explained occurrences of deeper crustal earthquakes in rift valleys of Kachchh and Narmada due to accumulation of stresses / strains around the mafic high density, high velocity bodies. Low velocity fractured, fluid-filled low velocity zones within them act as asperities or starting / nucleation zones. Such zones give large reverse-fault earthquakes up to M8 in Kachchh and M6.8 in Narmada. In other parts the upper crustal moderate / small earthquakes may be due to low velocity zones / fault weakening along reverse / strike slip faults.

Evidences were presented for a M9 earthquake in 1505 in Kashmir by Roger Bilham which many delegates found unconvincing. ETAS model to define anomalous behavior of the seismicity in many parts of the world before the large earthquakes in term of activation and quiescence was presented by VP Dimri and Abhay Bansal. John Ebel opined that in intraplate regions aftershocks of strong earthquakes can be observed for many hundreds of years or even longer. This may be because regional stresses build up very slowly within the tectonic plates, and thus relatively little of the intraplate seismicity reflects regional stress accumulation. Gravity model was presented by VM Tiwari and



Participants in Indo-US Workshop

Bijendra Singh and heat flow models by Sukanta Roy and ML Gupta to explain intraplate seismicity.Faults and structures from deep seismic studies were presented by Kalachand Sain, Dipankar Sarkar and PR Reddy. M Ravi Kumar presented the crustal structure from Receiver transfer Function and strain field from shear-wave splitting study. Crustal deformation results from GPS were presented by V K Gahalaut and stress field by Kalpana Gahalaut .

Major recommendations of the workshop:

- Modeling to infer cause of vertical upliftment in Kachchh,
- Development of Ground Motion Prediction Equation (GMPE) of India,
- Strong motion modeling for Kachchh,
 - Development of two arrays viz. Kachchh Lithosphere Investigation (KALI) and Kachchh Crustal Imaging Array (KACIA) in Kachchh to decipher details of crustal structure and
 - Preparation of high resolution aeromagnetic map of Gujarat.

Bhoo-Kampan

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GUEST SPOT: Padmashri Dr. Valdiya, Hon. Professor, JNCASR



Padmashri Dr Valdiya ,an eminent Scientist cum Professional Geologist in his recent visit to ISR and Science city ,Gujrat explained the correlation of Geography, Peoples and Geodynamics of India in the Puran and Epics.

Pātāl Lok, in all probability, encompassed the underground, subterranean caves with their spectacular chambers, the chambers interconnected by networks of tunnels formed by underground flowing and seeping water in limestone countries.



Patal Lok : Courtesy Dr.Valdiya

Dr.Valdiya explaining the Scientists

12 abodes (*dhā ms*) of Shiva

Dr.Valdiya also narrated and explained that all the 12 abodes (*dhā ms*) of Shiva are characterized by unique, rather spectacular landforms, and singular extraordinary geological features shaped by uncommon earth processes.

In the spectacular Science city auditorium with packed scientists and students, he has revealed the probable linkage of Sur-Asur Struggles and Bhagirath's Bringing of Ganga .

Sur-Asur struggles

Aborigine tribals (\bar{a} div \bar{a} sis) living in forests were, however, suspicious of rishis of the Sur group establishing \bar{a} shrams. They regarded this as attempts by the Surs to colonize their lands. Suspicion engineered hostility and caused conflicts and confrontations. This is the implication of Sur-Asur struggles and fightings.

The Gangā River

Bhagirath's bringing Gangā to Bhāratvarsh is interpreted as reviving the river, which must have dried up following series of landslides that dammed — caused blockage of Gangā in its upper reaches. Landslides might have been caused due to either great earthquakes or destructive cloud bursts.



Dr.Valdiya with Scientists at the field trip

Significant contributions of Institute of Seismological Research (ISR)

1. Preparation of catalogues of earthquakes for Indian sub-continent from historical time to present.

- 2. Earthquake monitoring and seismicity patterns in Gujarat
- 3. Preparation of geological fault map of Gujarat
- 4. Earthquake source information like seismic moment, focal mechanism and source-time function are derived though moment tensor analysis for about 20 earthquakes of magnitude 4-5 which occurred in Kachchh and Saurashtra during 2007-2011. This analysis has thrown light on tectonics of the two areas.
- 5. Long-distance delayed trigerring of earthquakes have been explained to be caused by rheological and visco-elastic changes. This explains the expansion of seismicity in Kachchh and Saurashtra. In summer, magnitude 4-5 earthquakes occur in Saurashtra due to rise in water table by 30m.

6.Modelling of Tsunami has been done for west coast in India if an earthquake occurs along Makran .

7. Preparation of ground motion prediction equation in Kachchh by strong motion observed data and simulation .

8. Earthquake hazard assessment and microzonation studies in Dholera Special Investment Region and Mundra LNG Terminal site .

Executive committee members:

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Raison d'être

To promote the cause of advanced study and exchange of ideas amongst the seismologists by discussion on subjects of interests in the field of Earthquake Science by organizing meetings, conferences, seminars, symposia, annual lecture programs etc.

To strengthen the level and dissemination of Earthquake Science by preparation and publication of teaching and training material and publishing research bulletins, journals, memoirs, monographs etc. and to synergize co-ordination of research and investigation in all disciplines related to Earthquake Science.

To execute research projects with the national and international collaborations and conductive to the objects of the Society in above mentioned and other objects for the benefit of its members with no profit motive Indian Society of Earthouake Science

Bhoo-Kampan

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Miscellaneous

- ISR pioneered in close grid 3D Magnetotelluric Survey and identified hidden faults in epicenter zone of 2001 Bhuj earthquake .
- Recently ISR has completed the Microzonation work of a very important and prestigious project of GoG, namely Guj. International Finance Tec. City (GIFT) Area, Gandhinagar.





Instruments testing and Planning for 3D MT survey

Field Operation in Progress near Bharudia Village, Kachchh Distt.

ISES at a glance

- During last two and half years ,the society had organized three Executive Committee meetings soon after registration on 29th July 2009 viz, on 9th Sept 2009, 7th Dec 2010 and 6th Sept 2011.
- The highlights of the meetings are : i) To Finalise brochure ,ii) Decision for institutional members and patrons, iii) To start ejournal iv) To start website v) Formation of Editorial Board for ejournal vi) Finalization of the vendor for development of the ejournal vi) Approval of Constitution of ISES.