A discussion-based National workshop on the above theme was held at the Centre of Advanced Study in Geology, University of Lucknow, Lucknow on 15th and 16th March, 2011. The meeting was convened by Dr. Sarajit Sensarma (Lucknow). In his welcome speech, Prof. N.L. Chhabra, Head, Centre of Advanced Study in Geology, University of Lucknow highlighted that for the first time the department has organised a meeting on a theme of global significance in Solid Earth research. In his introductory remarks, Prof. C. Leelanadam summarized the significance of the problems to be discussed vis-à-vis the magmatic provinces in India spanning the geologic time. Convener Dr. Sensarma presented a critical review of the recent international perspectives and advances on the chosen theme, and the knowledge gaps. Emphasis of the meeting was to discuss the perspectives and future prospects of integrated Solid Earth research in India.

Eleven talks were presented on the first day and two presentations were made on the concluding day followed by brainstorming discussion and subsequent recommendations. N.V. Chalapathi Rao presented recent discovery of Late Cretaceous diamondiferous kimberlites (orangeites) and mafic dykes in the Bastar craton synchronous with the Deccan Flood basalts at the K-T boundary that opens up new vistas of research in evaluating mantle plume hypothesis for LIP formation and in constraining recent geophysical arguments for lack of deep cratonic roots of the Indian lithosphere. Dynamic melting of a homogenous mantle is considered feasible and adequate to generate large amount of melts having wide range of chemical composition to form LIPs (K. Vijaya Kumar, SRTM University, Nanded). Utilizing high-quality geochronological and isotopic data, petrogenesis of various alkaline complexes along the craton-Eastern Ghats contact has been explained to be derived from enriched sub-continental lithosphere (D. Upadhyay, IIT-Kharagpur). Based on isotopic and trace element studies, mantle heterogeneity is shown to be necessary at local-scales to account for the petrogenesis of Ocean island Basalts from Mauritius (Debajyoti Paul). From high pressure experimental studies, it was shown that fluid absent melting of dense hydrous magnesium silicate Phase E stable at transition zone generate melts at mantle depths (Ashima Saikia). The role of water and volatiles in deep mantle melting processes needs to be studied in detail for production of large volume of magma generation (V. Rajamani, New Delhi). The importance of role of accessory phases such as oxides and sulphides in ore genesis and crustal processes was demonstrated from a comparative study of pyrites in Rajasthan and Southern Granulite terrain (K.L. Pruseth, IIT-Kharagpur). Combining seismology and isotopes, possible localization of mantle plume depth and its implications in understanding the LIP genesis was highlighted (S. Das Sharma, NGRI, Hyderabad); and Kutchh and Andaman are considered as promising areas where such studies can be initiated to test mantle melting models. Ubiquity of silicic volcanic rocks in almost all major LIPs, in smaller proportions, and mafic-silicic and silicic-silicic magma recharge as a common processes in LIP genesis, which is not yet part of the contemporary models of LIP formation, was highlighted (S. Sensarma). LIP and transcontinental reconstruction is suggested as an important area of research (S. Dasgupta, Allahabad). The Kandra igneous Complex in southern India is shown to be a palaeoproterozoic ophiolite based on lithological assemblage and new age data, perhaps the first ophiolite LIP recognized in the Gondwana supercontinent of Columbia (K. Vijaya Kumar, SRTM University, Nanded). The relationship between sedimentary basins, tectonism and deeper crust was discussed based on case studies from various peninsular and extra-peninsular sedimentary basins (I.B. Singh, University of Lucknow). Talat Ahmad (Delhi University) discussed both plume-rift and subduction tectonics in explaining extensive Proterozoic magmatism in the western and central Indian shields. Prof. C. Leelanandam, in his special lecture, narrated his experiences and underlined the importance of classical field and textural studies at different scales and their integration with the results obtained by instrument-based advanced research. Faculty members of the Dept. of Geology, University of Lucknow, officers from the Geological Survey of India, Lucknow including former Director General of GSI, Sri Ravi Shanker, and post-graduate students of geology actively participated.

A number of resolutions were made that include: (1) meetings are to be held frequently (once in two years at different venues) to discuss current standings and new ideas, (2) bring together active workers from different sub-disciplines and encourage more interdisciplinary research including geophysicists and geomorphologists to develop alternate models for LIPs, (3) more emphasis on mathematical modeling of magmatic processes, (4) need to expand existing laboratory and instrumentation facilities and establishment of new national facilities, (5) identify problems unique to the country, (6) study surface manifestations/role of deformation, (7) organize field work/workshop in known large igneous provinces with students/researchers and faculty from different universities/institutes, (8) emphasis should be on understanding the processes rather than products, (9) integrated study of Indian LIPs to be considered as a Thurst Area of Research in Earth Sciences in coming years.