

During the excursion, the Taxila Museum and the Geoscience Laboratories of the Geological Survey of Pakistan built with Japanese aid in 1991-92 were visited. The Taxila Museum houses mainly the stone implements, relics of Mohen-jo-Daro and Buddhist statues. The modern Geoscience Laboratories include among other things the rock magnetic and palaeomagnetic laboratories and an excellent cartographic unit.

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INTERNATIONAL SYMPOSIUM ON MULTIFACETED ASPECTS OF TREE RING ANALYSIS

Tree rings are recorded in trees growing in diversified geographical regions due to seasonal activity of cambium. Dating and analyses of tree rings in varied applications are categorised under specialised branch of science – *Dendrochronology*. An International Symposium on “Multifaceted Aspect of Tree Ring Analysis” was held at the Birbal Sahni Institute of Palaeobotany (BSIP), Lucknow during 15-19 November, 1999 which provided a platform to discuss the recent trends and developments in this emerging discipline. A large number of delegates including 13 from Germany, USA, Estonia, Japan, Switzerland, Brazil, Thailand and Republic of Korea attended the symposium. Highlights of this symposium are summarised here:

The papers were presented under 6 technical sessions, besides poster presentations. These include: Tree Rings and Monsoon Dynamics, Tropical Dendrochronology, Palaeoecology, Tree Rings in Natural Hazards, General Dendrochronology, and one special session on invited papers of broader interest.

The first lecture in the special session was of Prof. Dieter Eckstein, Director, Department of Wood Biology, University of Hamburg, Germany. He pointed out the problem of dating tree rings of tropical trees and emphasised special strategies for the development of climatically sensitive tropical tree ring chronologies from these trees. The other two lectures in this session were delivered respectively by Prof. J.S. Singh, Benaras Hindu University, on the Ecology of Central Himalaya and Prof. Ashok Sahni, Punjab University, on the palaeoecology scenario during the collision of India and Asia.

In the second session on Tree Ring and Monsoon Dynamics, Dr. Brenden Buckley, USA in his keynote lecture explained the potentiality of tree ring analysis in the long climatic reconstruction from *Pinus Kesiya* and *P. merkusii* of northeastern Thailand. On the basis of teleconnections recorded in tree ring indices and the sea surface temperature (SST) of the Bay of Bengal and Indian Ocean he felt that further study would provide clues to the synoptic scale monsoon variation. Dr. G.B. Pant, Director of Indian Institute of Tropical Meteorology, Pune stressed on the significance of tree ring data in developing high resolution climate on annual to inter-annual

scale in both temporal and spatial aspects. The other papers were on the climatic reconstruction from many regions of South East Asia using several tree ring parameters, i.e., ring width, density of early and late wood, and vessel size. Dr. Nathsuda Puminjumnong of Thailand discussed teak vessel density as an indicator of South East Asian monsoon temperature. Dr. H.P. Borgaonkar, IITM, Pune, pointed out that significance of tree ring density parameters over ring width data of Himalayan conifers for the reconstruction of pre-monsoon climate.

The third session dealt with Tropical Dendrochronology where the problems and prospects of tree ring analysis from tropical trees were discussed. The theme was focused on India, Laos and Brazil.

In the fourth session on Tree Rings in Natural Hazards, Prof. K.F. Kaiser of Switzerland gave the keynote lecture on the application of tree ring data in dating debris flow. He presented debris flow chronology based on tree ring dating of *Pinus mugo* of the Multetta debris fan, Val Müstair, eastern Swiss Alps. In another presentation, Dr. Terutaka Katoh of Japan discussed the prospects of tree ring width data of *Cryptomeria japonica* in analysing temporal snowfall variation.

In the fifth session on Palaeoecology, Prof. Kaiser, in another keynote address, presented a long record of fine resolution climate changes during Bölling and Allrøid period of late glacial time based on tree ring proxy data and it was compared to other proxy records derived from marine and ice cores. In other two presentations of this session, Dr. J.S. Guleria and Dr. Rajnikanth of BSIP, discussed the significance of tree ring analysis in fossil wood in terms of wood productivity, climatic inference and palaeolatitudinal position of the Indian sub-continent.

In the sixth session on General Dendrochronology, Dr. Won-Kyu Park of South Korea, in his keynote lecture, discussed the reconstruction of May precipitation back to AD 1731 of this county based on ring width data of *Pinus densiflora* and pointed out the prospect of extending this record far back by adding data from timbers used in old buildings. In another lecture, Dr. Osamu Kobayashi of Japan presented data indicating the implications of tree rings in climatic reconstruction of Nepal. Last lecture in this session was by Dr. Achim Brauning of Germany who signified reconstruction of different seasonal aspects of climate of Tibet using several tree ring parameters and also from several trees like *Pinus*, *Abies* and *Juniperus*. This multiseasonal climatic information will be useful to build up synoptical weather conditions, which will be better for understanding wind system dynamics and monsoon variability in South East Asia.

In the poster presentations, Dr. Seiji Ishibashi of Japan displayed tree rings data in application of forest management. He described new methodology to reconstruct diameter distribution of broad-leaved forest. Dr. Vandana Chaudhury of BSIP discussed on tree ring analysis of *Larix griffithiana* from Sikkim and Arunachal Pradesh in reconstructing May temperature. Dr. A. Bhattacharyya of BSIP presented a poster on the analysis of tree ring data of *Abies pindrow* to date the glacial advancement of recent past around Dokriani Bamak Glacier, Garhwal Himalaya.

A field trip was undertaken to Madhya Pradesh for the study of teak forests at Delvari and other sites since teak is established as the most potential tree for the dendrochronological studies from the tropical region

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