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Report on the Mongolian Dendroecological Study Week

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Following the Mongolian Dendrochronological field study week in Gunt in 2000 a second Mongolian Dendroecological field study week was held in Terelj, June 2003. Both study weeks were organized and sponsored by the Department of Forestry, National University of Mongolia (NUM) and the Tree Ring Laboratory, Lamont Doherty Earth Observatory (LDEO) at Columbia University, USA and the Mongolian-American Tree-Ring Project (MATRIP).

The first study week was led by Dr. N. Baatarbileg (Department of Forestry, NUM), Dr. Gordon Jacoby and Ph.D candidate N. Davi (Tree Ring Lab, LDEO). They presented tree-ring techniques, applications of methods, discussions of use and importance of tree-ring-based science. Other lectures were presented by Dr. Ch. Dugarjav (Institute of Botany, MAS), Dr. J. Tsogtbaatar (Institute of Geoecology, MAS), Prof. S. Damdinsuren (Department of Biophysics, NUM), Dr. R. Tsolmon (School of Economics, NUM), Dr. R.Mijiddorj (Center for Ecology and Sustainable Development, Mongolian University of Science and Technology) and N. Davi, Tree Ring Lab, LDEO.

The second study week was an exercise in tree-ring research and was designed to give beginners an introduction in: 1) basic principles and methodology, 2) training in dendrochronological techniques including field sampling, core processing and data analysis to address climatological and ecological questions. 3) report preparation and presentation of results. Participants were divided into four groups to investigate specific climatological or ecological problems using tree-ring analysis. The leaders chose especially the Terelj region in the green zone of Ulaanbaatar, since the area has been facing problems such as insect infestations (gypsy moth), forest fires, deforestation and other forest disturbances. After an introduction, each group spent 2-3 days in the field gathering samples and data to answer specific problems. The rest of the week was spent analyzing data. Participants were taught individually and in their groups how to use equipment and software for tree-ring analysis. Equipment was provided to the Department of Forestry, Institute of Biology at the NUM and Institute of Geo-Ecology, Mongolian Academy of Sciences.

Researchers from US as well as from several different institutions in Mongolia presented lectures during evening meetings. About 30 undergraduates and researchers from National University of Mongolia, Agricultural University of Mongolia, Science and Technology University of Mongolia, Institute of Geoecology and "Oi mod" forestry research center of Armona Corporation participated. At the end of the week, participants made informal poster presentations to describe the results of their work. The four groups selected group names according to their fieldweek research aims.

Group 1. Dendroclimatology Hiking Group "DHG" tested different sites for precipitation response. Moisture stress is common in Mongolian trees. There are missing ring problems in larch trees, which make it difficult to establish correct dates for each individual ring. Assigning an exact calendar year to each ring (crossdating) is essential when comparing tree-rings to precipitation records. The oldest age found in this study was over 370 years. Some trees in Mongolia can be over 800 years old. Multi-century scale precipitation reconstructions based on tree-rings are useful and important for resource management.

Group 2. Sambuu's Stem Slayers Group "SSS" determined stem movement around the tree center by identifying reaction woods (dark wider rings caused by tree tilting). They suggested some possible reasons for movement and examined how trees react to these disturbances. Stem movement around the center of some trees began post 1972 when fire damaged the trees when they were nearly 10 years old. One tree growing on a steep valley slope had horizontal growth caused by soil movement. In 1990 it curved up toward the

sunlight. One tree that was growing on a gentle slope in a closed area had a curved stem. Their results showed that disturbances could be dated by tree-ring analysis.

Group 3. Secret Rings Group determined logging dates, forest history, and vegetation composition changes. They also identified a fire date. An area was chosen by this group to study forest impacted by clear and selective cutting. In the 1930s some trees were cut by axe. In 1980 and 1993 trees were cut by chainsaw. In 1941 there was a fire in this area of the forest. The vegetation composition changed because of the cuttings and the forest fire. Therefore the tree rings produced a stand history for this location.

Group 4. Zadgai Bituu Chiigtei Group "ZBC-ECO TREE" compared tree growth from open and closed canopy forest at mid elevation forests and at a lower elevation forest submerged in water. The open canopy forest tree growth rings are narrow. The closed canopy forest tree rings are mixed, some narrow and some wider. At low elevation sites near the river (moisture) too much water limited tree growth. These results showed how ecology can influence the growth rate of trees.

In summary, the students all learned and practiced tree-ring analysis techniques and some of the ways that they can be used to learn about climate variations (precipitation), ecology, and forest history.

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