

Survey to chart Himalaya quake risk

Mount Everest grows about 1 centimeter taller each year, driven by forces created in the ongoing collision between the Indian and Asian landmasses. Those same forces are straining the entire Himalayan region, making the area especially prone to large earthquakes. For a clearer picture of which faults pose the most pressing seismic risks, U.S. scientists will begin a long-term project next spring using space-age technology to survey tectonic changes along the Himalaya.

Roger Bilham and his colleagues at the University of Colorado in Boulder will measure distances between horizontal points with the satellite-based Global Positioning System (GPS), and vertical elevations with an extremely accurate gravity meter. By comparing sets of measurements collected several years apart in the same locations, the researchers hope to gauge how quickly the land surface warps under tectonic stresses as India and Asia collide at a rate of about 5 centimeters a year.

The project represents the first Himalayan application of GPS technology, which can distinguish changes as small as the width of a pencil over distances of almost 500 kilometers. The researchers say they have had some difficulty getting nations in the region to agree to the survey, since GPS relies on radio waves emitted by U.S. military satellites. However, Nepalese officials formally granted permission for the project earlier this month.

Nepal has suffered many disastrous earthquakes, including a 1934 quake that killed 11,000 people along its border with India. Bilham thinks the nation's swelling population — which doubles every 20 to 25 years — is compounding the earthquake threat. Population growth not only fills the quake-prone region with more residents but also forces the government to build new housing quickly — often paying too little attention to the seismic threat, he says. "Nepal's earthquake hazard is increasing by leaps and bounds," says Bilham, who hopes the new survey will help focus attention on the specific areas facing the greatest danger.

Climatic queries from Swedish trees

What was the summer temperature in northern Sweden during the year 1139? An international team of climatologists has come up with an answer that raises questions concerning some long-held theories about Earth's climatic history.

Scientists believe that during medieval times, the planet passed through a relatively warm phase, which lasted from 1100 through 1300 in Europe. But tree-ring records now suggest that the northern Scandinavian region, at least, did not experience such a phase.

K.R. Briffa from the University of East Anglia in Norwich, England, with colleagues from Sweden, Germany, Finland and Switzerland, studied a series of living and dead trees whose rings form a continuous record of summer temperatures in northern Scandinavia and Finland for each year since A.D. 500.

"Our reconstruction dispels any notion that summers in northern [Finland and Scandinavia] were consistently warm throughout that period," the researchers write in the Aug. 2 *NATURE*. Although the second half of the 12th century had warm summers, the first half was cool — and 1139 had the coldest summer in the whole record, they report.

The tree rings also fail to reflect the unusually long cold phase, called the Little Ice Age, that supposedly gripped Europe from 1550 to 1700 or 1800. Briffa and his co-workers say their findings imply that the climate swings of northern Scandinavia differed from those of the rest of Europe, or that the accepted climatic history of Europe needs correction — or both.

'Trans' fats: Worse than saturated?

For years, physicians have warned diners to sharply reduce their consumption of saturated fats, the leading source of fat calories in the U.S. diet. Saturated fats — which, like butter, remain solid at room temperature — can increase levels of serum cholesterol and the low-density lipoproteins (LDLs) that deposit cholesterol in heart arteries.

But what about unsaturated fats — such as corn and soybean oil — that have been "hardened" through hydrogenation into saturated-fat surrogates for use in margarines and shortening? A new study shows that this process subtly reconfigures ordinary unsaturated fatty acids into "trans" fatty acids, which elicit serum cholesterol changes comparable to — or even worse than — those caused by saturated fats.

For three consecutive three-week periods, 25 men and 34 women, mostly students, ate diets that varied nutritionally only in their major fats. One of the randomly assigned cycles featured liquid oleic acid, the main monounsaturated fatty acid in olive and canola oils; another offered meals high in the solid "trans" oleic acid. Saturated fats replaced oleic acid in yet another cycle.

The trans fatty acids raised serum cholesterol 5.8 percent above the levels seen with the liquid oleic-acid diet — or about half as much as the saturated-fat diet, report Ronald P. Mensink and Martijn B. Katan of the Agricultural University in Wageningen, the Netherlands. However, the trans fat's effect on lipoproteins "was more unfavorable than is suggested by the small increase in the serum total cholesterol concentration," they note in the Aug. 16 *NEW ENGLAND JOURNAL OF MEDICINE*.

Compared with saturated fat, trans fat sparked a greater increase in LDL-carried cholesterol and a greater reduction in high-density lipoproteins (HDLs), the so-called "good" lipoproteins. It thus produced the highest — i.e., unhealthiest — ratio of total cholesterol to HDL. That ratio, considered a powerful gauge of the risk of coronary artery disease, rose an average of 22.6 percent in volunteers on the trans-fat diet and only 13 percent during the saturated-fat cycle.

"It would seem prudent for patients at increased risk of atherosclerosis to avoid a high intake of trans fatty acids," the researchers conclude. In the typical U.S. diet, 2 to 4 percent of the calories come from trans fatty acids.

Even low-fat diets pose fat-linked risk

Many studies of women in Europe and North America have linked high-fat diets with breast cancer. A new Chinese study — focusing on diets considered low-fat by Western standards — strengthens the notion that the risk of breast cancer rises with an increase in fat consumption. On average, study participants derived only 22.7 percent of their calories from fat, whereas Americans average 38 to 40 percent.

Researchers from Shanghai Medical University and Canada's National Cancer Institute in Toronto interviewed 186 women with breast cancer, 186 healthy women living in the same urban Shanghai neighborhoods and 186 women hospitalized nearby with other malignancies associated with different risk factors. The 20 percent who consumed the most calories (a daily average of 3,142) and fat (34 percent of calories) had nearly double the breast cancer risk of the 20 percent who consumed the fewest calories (1,733) and least fat (13.8 percent), the scientists report in the Aug. 15 *CANCER RESEARCH*.

While the Shanghai women consumed nearly 70 percent of their fat calories in the form of monounsaturates, North Americans consume about 44 percent from monounsaturated fats and another 44 percent from saturated fats. Together with the Western findings, the new Chinese data suggest that for breast cancer risk, the quantity of fat consumed matters more than the type of fat selected.