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JUST HOW OLD IS THE TIBETAN PLATEAU

A study of the world's highest geological feature, the Tibetan Plateau, sometimes called the "roof of the world," has determined that the plateau rose to its current height much earlier than previously thought, according to a paper in the August 9th issue of the journal Nature, and it cannot go higher than it is now.

Bradley Hacker, a professor of geological sciences at the University of California, Santa Barbara, spent five weeks in central Tibet, with his U.S. European and Chinese colleagues, deriving the measurements that indicate this result.

According to the study, the plateau dates back 13.5 million years and has reached a maximum average height of five kilometers. Mountainous areas such as the Tibetan Plateau affect weather world-wide, explained Hacker, and "that is one reason for the great interest in the history of the area." The monsoons of India and Asia are caused by the plateau, for example.

He describes the area as a sort of top-hat shape, with India and Central Asia as the brim of the hat, and the flat top of the hat as the high ground of the Tibetan Plateau.

The Tibetan Plateau, including the Himalayan Mountains, is the result of the collision between two tectonic plates, that of India and Asia. In the area of the collision, known as a reverse fault, the crust thickens, but after a certain amount of thickening it weakens and spreads apart.

"Consider the analogy of stacking pats of butter on top of one another," explained Hacker. "Imagine that stacking each pat of butter also generates heat, so that a thicker stack of butter is hotter than a thin stack." In the case of the Earth, it is the heat generated by radioactive decay that ensues as more crust piles up, making the thickened crust weaker. Ultimately both the butter, and the Earth's crust, reach a certain maximum height and then begin to flow outward, producing a flat-topped spreading plateau. In the Tibetan Plateau, the maximum height of the plateau is five kilometers before the crust begins to spread out.

"There is a balance between the strength provided by the thickening of the crust and the weakness caused by heating from all that material," said Hacker.

Hacker and his co-authors determined the ages of normal faults, where the Earth's crust pulls apart and gets thinner, by measuring the decay of rubidium to strontium, and potassium to argon trapped in crystals.

"These results show that the Tibetan Plateau is in a steady state," said Hacker. "It will not get any higher."

Mount Everest and other high mountains of the Himalayas that are part of the Tibetan Plateau are balanced out by nearby, lower areas cut by major rivers such as the Indus, so that the average height is still only five kilometers, said Hacker.

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