



**Geological Society of America
Structural Geology & Tectonics Division**

2010

Outstanding Publication Award

Presented to Leigh H. Royden, B. Clark Burchfiel and Robert D. van der Hilst

Royden, L.H., Burchfiel, B.C., & van der Hilst, R.D. (2008) The geologic evolution of the Tibetan Plateau. *Science* 321,1054-1058.

Citation by Raymond Price

The Tibetan Plateau and the surrounding region --- the “roof of the world” --- has become a major focus for research and for important discoveries in structural geology and tectonics during the past several decades because the tectonic processes available for examination in this actively evolving continental collision orogenic belt provide a key to the elucidation of the tectonic processes that governed the evolution of older continental-collision orogenic belts, but also because of recent greatly increased accessibility to the area, and of the emergence of many very helpful new technologies for research in this remote and inhospitable region.

In this landmark paper, Wiki Royden, Clark Burchfiel and Rob van der Hilst have done a masterful job succinctly and elegantly integrating a large array of different kinds of tectonically relevant data within a simple but comprehensive description of the Late Cretaceous to Holocene evolution of the Tibetan Plateau and environs.

Recent advances in the understanding of the tectonics of this vast region are reviewed in three stages: pre–collisional, early Cenozoic, and late Cenozoic. They are also reviewed from many different perspectives, including:

- global plate kinematic reconstructions of convergence between India and Asia that are based on the seafloor magnetic anomaly record;
- the various constraints that are now available with regard to speculations about deep crustal and upper mantle deformational processes, and kinematics;
- the neotectonics of crustal faults and associated rock uplift; and the seismotectonics of a recent major earthquake.

A particularly informative and effective feature of this description of the tectonics of “the roof of the world” is the integration of 3-D models of the seismic velocity structure of the lithosphere and adjacent mantle, as illustrated by vertical and by deep horizontal seismic tomography images, with maps of the topography, the geology, the seismicity, and the available GPS measurements of the contemporary patterns of motion (relative to the interior of Asia) of the Indian craton and of the various parts of the deforming belt between the Indian craton and the interior of Asia.

The resulting regional tectonic model elucidates the interactions among: the continental crustal thickening due to convergence during ongoing continental collision, the concurrent roll- back subduction of oceanic lithosphere toward the Indian craton, and toward the interior of the ocean basins, the patterns of lateral extrusion of fragments of continental lithosphere, and the changing patterns of deep crustal lateral flow from beneath the Tibetan plateau.

The paper is particularly important because an improved understanding of the processes involved in the ongoing collision between India and Asia, provides actualistic models for interpreting older continental-collision orogens, in which available information is very much less complete and explicit.

Response by Leigh Royden

It is an honor to be standing before you to receive the Outstanding Publication Award on behalf of myself and my co-authors. I am especially grateful to, Ray Price, first, for nominating our paper for this prestigious award, second, for serving as our citationist, and lastly, for being here at all since he is scheduled tomorrow to receive an award from the Canadian Royal Geographical Society.

The paper on which this award is being bestowed is one of the shortest I have written, appearing in *Science* as a review article. It was assigned five journal pages to cover the entire region of Tibet, from collision to present, and was supposed to be comprehensive, innovative, and controversial. Now, I am not sure that this is possible, but we gave it our best effort. You have all heard the joke "if I had had more time, I would have written a shorter paper". I can safely say that for myself, and probably my coauthors, that this paper required more time per word than any other paper I have written.

Lastly, I would like to acknowledge my co-authors, Clark Burchfiel and Rob van der Hilst, without whom this paper would never have been written. I am fortunate to work with colleagues like these and together we span a wide range of geologic disciplines. Without this, and without the opportunity for collaboration, the work that we have carried out in Tibet would never have been possible.

In summary, it is an honor and a very great pleasure to receive the Outstanding Publication Award from the Structural Geology and Tectonics Division of the GSA.