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HR: 10:35h

AN: **T32B-02**

TI: [Geochronological Evidence for the Tectonic and Topographic Evolution of SE Tibet](#)

AU: \* **Zeitler, P K**

EM: [peter.zeitler@lehigh.edu](mailto:peter.zeitler@lehigh.edu)

AF: *Earth and Environmental Sciences, Lehigh University, 31 Williams Drive, Bethlehem, PA 18015 United States*

AU: **Malloy, M A**

EM: [mmalloy@environcorp.com](mailto:mmalloy@environcorp.com)

AF: *Earth and Environmental Sciences, Lehigh University, 31 Williams Drive, Bethlehem, PA 18015 United States*

AU: **Kutney, M P**

EM: [mkutney@gmail.com](mailto:mkutney@gmail.com)

AF: *Earth and Environmental Sciences, Lehigh University, 31 Williams Drive, Bethlehem, PA 18015 United States*

AU: **Idleman, B D**

EM: [bd13@lehigh.edu](mailto:bd13@lehigh.edu)

AF: *Earth and Environmental Sciences, Lehigh University, 31 Williams Drive, Bethlehem, PA 18015 United States*

AU: **Liu, Y**

EM: [cdlyuping@cgs.gov.cn](mailto:cdlyuping@cgs.gov.cn)

AF: *Chengdu Institute of Geology and Mineral Resources, 82 North-3 Section, First Ring Road, Chengdu, 610082 China*

AU: **Kidd, W S**

EM: [wkidd@atmos.albany.edu](mailto:wkidd@atmos.albany.edu)

AF: *Earth and Atmospheric Sciences, University at Albany, Albany, NY 12222 United States*

AU: **Booth, A L**

EM: [mbooth@pangea.Stanford.EDU](mailto:mbooth@pangea.Stanford.EDU)

AF: *Geological and Environmental Sciences, Stanford University, Stanford, CA 94305 United States*

AB: We report an extensive suite of (U-Th)/He and Ar-Ar cooling ages on zircon, apatite, biotite and K-feldspar from terranes in SE Tibet, as well as U-Pb ages on zircons from basement gneisses and melt phases of the Namche Barwa-Gyala Peri massif. U-Pb ages and growth textures from accessory minerals along with metamorphic phase relations indicate that the largely Precambrian basement rocks of this massif have been experiencing a protracted anatexis and metamorphic episode marked by near-isothermal decompression paths; this episode likely continues at present. Neogene exhumation of current outcrop exposures amounts to some 10-15 kb over the past 10 m.y., corresponding to long-term rock-uplift rates of about 3-5 mm/yr. Ar-Ar biotite ages of less than 2 Ma are entirely confined within the bounding structures of the Namche Barwa - Gyala Peri massif. Zircon helium ages range from 0.3 Ma near the Tsango-po river's Big-Bend knickzone to over 50 Ma at distal and higher-elevation locations. In contrast to the biotite ages, the zircon cooling-age low extends across terranes and structures. Apatite helium ages and thermal histories derived from K-feldspar age spectra document divergent cooling histories above and below the knickzone: ages from drainages graded to the knickzone and below document accelerated Quaternary incision, whereas ages from drainages located upstream of the knickzone suggest relatively little erosion over the past 5 - 7 Ma. This pattern of ages and cooling histories suggests pinning of the Tsangpo knickpoint by rapid rock uplift within the massif at about 7 Ma, and is

also consistent with late-Tertiary capture of the Tsangpo and its diversion into the Brahmaputra system. Ongoing rock uplift at Namche Barwa establishes a high local base level of ~3,000 meters for the Tsangpo watershed in SE Tibet, resulting in the lower recent exhumation rates. Because of the extreme topography, sharp changes in erosion rate, and unknown initial conditions and rock properties, it is not realistic to use cooling ages to make precise estimates of erosion and incision rate within the Namche Barwa massif and the Tsangpo gorge, but simple thermal modeling suggests that rates of at least 5 mm/yr must have been in play over the past 1-2 million years. When combined, the petrological, U-Pb, and cooling-age data indicate that over the past 10 m.y. the Namche Barwa-Gyala Peri massif has been a locus of rapid rock uplift and erosion that requires both a focused mechanism for uplift as well as the mass-evacuation power of a river like the Tsangpo. Geodynamic models for the eastern terminus of the Himalayan orogen need to account for inception of anatexis in Indian-crust protolith at 10 Ma and then its continuation until exposure during rapid erosional exhumation.

DE: 1115 Radioisotope geochronology

DE: 1140 Thermochronology

DE: 1240 Satellite geodesy: results (6929, 7215, 7230, 7240)

DE: 6924 Interferometry (1207, 1209, 1242)

SC: Tectonophysics [T]

MN: 2006 Fall Meeting

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## Session Information

## Tectonophysics

2006 Fall Meeting

Wednesday Morning 2			
Time	Session	Location	Title
1020	T32B	MCS 301	<p><b>Geodynamics of Indentor Corners II</b> (joint with S) <i>Presiding: A Meltzer, Lehigh University; B Hallet, University of Washington</i> <a href="#">Print-friendly session details</a></p>
1020	T32B-01	MCS 301	<p>Links Between Lithospheric Structure and Topography SE Tibet *A Meltzer, S Sol, B Zurek, A Ault, P Zeitler, Y Liu, J Zhang <a href="#">Abstract</a></p>
1035	T32B-02	MCS 301	<p>Geochronological Evidence for the Tectonic and Topographic Evolution of SE Tibet *P K Zeitler, M A Malloy, M P Kutney, B D Idleman, Y Liu, W S Kidd, A L Booth <a href="#">Abstract</a></p>
1050	T32B-03	MCS 301	<p>Extreme Erosion of the Eastern Himalayan Syntaxis Traced by Isotopic Compositions of River and Bengal Fan Sediments *C France-Lanord, V Galy, R Pik, S K Singh INVITED <a href="#">Abstract</a></p>
1110	T32B-04	MCS 301	<p>The St. Elias orogen as an early stage in the development of indentor corners: Initial results from the STEEP project *T L Pavlis, R L Bruhn, P Koons, A Berger, J Spotila, A Barker, J Chapman, D Doser, G Pavlis INVITED <a href="#">Abstract</a></p>
1130	T32B-05	MCS 301	<p>Evidence for Mechanically-Coupled Asian Lithosphere from the Joint Analysis of Surface Deformation and Seismic Anisotropy Data *L M Flesch, P G Silver, C Wang, L Chang, W W Chan INVITED <a href="#">Abstract</a></p>
1150	T32B-06	MCS 301	<p>Constraints on Lithospheric Rheology from the Deformation Field Near the Himalayan Eastern Syntaxis *K Wallace, P Molnar, G Houseman <a href="#">Abstract</a></p>
1205	T32B-07	MCS 301	<p>Vorticity, Erosion, and Crust:Mantle Coupling at Plate Corners in South East Alaska and South East Tibet *P O Koons, A Barker, T L Pavlis, Y Liu, S Sol, P K Zeitler, A Meltzer <a href="#">Abstract</a></p>

**2006 AGU Fall Meeting**  
**11–15 December 2006, Monday–Friday**  
**Moscone Center West, 800 Howard Street**  
**San Francisco, CA, USA**

▶ [View videos of featured lectures](#)

▶ **Important:** [Hawaii Earthquake Late Breaking Session Schedule](#).

**WELCOME!**

Pickup your preregistration materials or register on-site at Moscone West, located at 800 Howard Street starting at 3:00 p.m. on Sunday, December 10. AGU members that must register at the meeting, please bring your AGU membership number to on-site registration.

**Make Plans to Attend the Following Union Activities**

- ▶ **The Earth's Radiation Belt presented by Dan N. Baker, UC, Boulder**  
Sunday, 1600h, Marriott, Salon 7
- ▶ **Atlantic Ocean Circulation and Climate: The Current View From the Geological Record presented by William Curry, WHOI**  
Wednesday, 1815h, Marriott, Salon 7
- ▶ **Climate Change: The Role of Science and the Media in Policy Making, Presented by the Honorable Al Gore**  
Thursday, 1230h, Marriott, Salon 8, 1230h - 1330h
- ▶ **AGU Honors Ceremony and Banquet**  
Wednesday, 1915h, Marriott  
The Ceremony is free. A ticket is required for the banquet.

**Visas**

Visa applicants from many countries must now apply at least 3 months in advance of their travel date. [See Visa Information for details.](#)

**Contact**

AGU Meetings Department  
2000 Florida Avenue, NW  
Washington, DC 20009 USA  
Phone: +1-800-966-2481, ext. 333 or +1-202-777-7330  
Fax: +1-202-328-0566  
E-mail: [fm-help@agu.org](mailto:fm-help@agu.org) (subject: 2006 Fall Meeting)