The Tibetan plateau is for the most part underlain by rocks of pre-Cenozoic age, a fact that has hindered the identification of Cenozoic shortening structures that can be unequivocally related to the effects of India-Asia collision. Notably, however, the Qiangtang block contains a number of small, short wavelength basins filled with terrestrial sediments of early Tertiary age. Where these basins have been well studied, sedimentation is recognized as having occurred coevally with compressional deformation. The classic treatment of compressional basins appeals to accommodation space created by the flexure of an elastic plate in response to loads created by adjacent thrust fault bound ranges. It is unlikely that the Tertiary basins of the Qiangtang block formed in this manner. The wavelength of a classically modelled flexural basin is a basically a function of the thickness of the elastic plate and the density difference between sedimentary fill and ductile material underlying the plate. Assuming a model of elastic flexure, the very small wavelengths (5 - 30km) characteristic of Qiangtang basins would then imply extremely thin (1-5 km) effective elastic plate thicknesses. These very low values are difficult to reconcile with any reasonable characterization of crustal rheology. Instead, these relatively small basins likely record the creation of accommodation space created by differential uplift across the strike of folds and faults. Stratal geometries and sedimentation rates reflect the kinematics and geometries of local compressional structures and the mechanical basis for the creation of accommodation space remains uncertain. Finally, the origin of these basins makes it unlikely that early Tertiary sedimentation represents a significant fraction of the upper crust of Tibetan plateau.

T42B-0297 1330h POSTER

Age of Initiation of the India-Asia Collision in the eastern Himalayas

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We report on the provenance of the Jidula and Zongpubei Formations, located in the early Tertiary terrigenous sediments of the Tingri region, southern Tibet, which were deposited on the former northern margin of the Indian continent. Petrographical analysis of sandstones reveals that the monocrystalline quartz grains of cratonic origin are dominant in the Paleocene (Danian) Jidula Formation; in contrast there are significant amounts of immature framework grains with a distinct ophiolitic and volcanic arc influence present in the Eocene (Lutetian) Zongpubei Formation. Bulk sample major, trace and rare earth element concentrations in both sandstones and shales complement the petrographical data indicating that the source of the Jidula Formation primarily consisted of quartzose basement rocks, probably of Indian continental origin, while the Zongpubei Formation samples are mainly derived from an arc-trench system indicating the start of obduction of the Asian arc/subduction complex (Gangdese-Xigaze) during the deposition of the Zongpubei sedimentary rocks. The probe compositions of Cr-rich spinels in the Zongpubei sandstones are closely similar to those from fore-arc peridotites, so are most likely derived from the arc and ophiolite rocks along the Yarlung-Zangbo suture to the north. No spinels have been observed in the Jidula sandstones. These early Tertiary detrital clastics in the Tingri region record a marked change in provenance and sediment character starting with the deposition of the Zongpubei Formation. This change indicates that the onset of India-Asia collision and development of the foreland basin on the Indian passive margin started at 47 Ma in the eastern part of the Himalayas. This is about 4 Ma younger than the age determined by Garzanti et al.(1987, 1996) in the Zanskar section of the western Himalayas.

T42B-0298 1330h POSTER

Mesozoic-Cenozoic history of subduction within the Tethyan region as inferred from seismic tomography and plate tectonic reconstructions

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We have studied the large-scale history of subduction within the Tethyan region, the Alpine-Himalayan-Indonesian mountain chain that stretches from the Mediterranean to Southeast Asia. From tomographic images of the present mantle structure, the volumes and locations of the positive seismic velocity anomalies are determined. The large tomographic volumes, and the large depths at which they are found, indicate that they must have resulted from long periods of subduction in Cenozoic and Mesozoic times. We therefore examine the large-scale surface motions within the region since 200 Ma, the time window that is thought to be necessary to explain the inferred tomographic anomalies. From plate tectonic reconstructions, the amount of convergence and velocities, both relative and absolute, are determined using the relevant poles of rotation. In general, we find the tomographic volumes in the upper mantle in the eastern Mediterranean and Middle East to be similar to the tectonic volumes that are expected to have subducted during the Cenozoic. On the contrary, the results indicate that the Cenozoic amount of shortening in the Indian region was probably not accompanied by lithosphere subducting into the mantle. For all regions, the tomographic volumes found in the lower mantle are larger than the tectonic volumes expected to have subducted during mainly Mesozoic times. The volumes in the Indian region and the Middle East approximately differ a factor 1-2. However, the results suggest that much more material must have been subducted in the eastern Mediterranean than is calculated for the African-Eurasian convergence alone. This points to a major role of oceanic spreading during lithospheric subduction in the area.

T42B-0299 1330h POSTER

Variations of Standard Deviation of Gravity Anomalies in Chugoku District, Japan: Relationship with Distributions of Topographic Lineaments

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Relationship between distribution of topographic lineaments and variation of standard deviation of gravity anomalies in Chugoku district, Japan is investigated. Tectonic movement may disturb lateral continuities of crustal structures at weak zones. Lateral discontinuities of the density structure cause undulations of gravity anomaly field over them. Therefore, complexities of the gravity anomaly field might be an indicator of the past crustal instability. On the other hand, topographic lineaments are formed along zones of inherent crustal weakness, and the gravity anomaly complexity relates to distribution of surface lineaments. In order to verify this conjecture, we investigated gravity anomaly complexities in relation to the spatial distributions of topographic lineaments.

As an index of complexity of gravity anomaly field, we employed standard deviation (SD) of Bouguer anomalies. We divided the survey area into a set of regular grid cells with a mesh size of 1 km x 1 km, to the centers of which we assigned a representative SD value calculated from Bouguer anomalies inside a given search area. In this study, the nodes are centered in the regular grid cells and we used a circled search area centering at each node. We also need to revise the array data in a point-registered file of topographic lineaments because the distance between two neighboring points along each lineament does not have a constant value. The average distance is 186 m, and the standard deviation is 294 m. These deviations of the distances between neighbor points may cause implausible results. In order to import this lineament data into a statistic analysis, we reproduced a new set of array data with the constant value of 10 m for the distance between them. Then, we made a statistical analysis by referring the Bouguer anomaly SD values to the numbers of the lineament data points within 3 km from each node. Thus, we repeated the present method while the search radii for the SD determination are 5, 10, 15 and 20 km.

Frequency distribution of the lineament data points to SD values showed that locations of the lineaments tend to overlap the high SD areas of gravity anomaly field. These results imply an applicability of SD of Bouguer gravity anomalies in order to discuss the crustal weakness and the instability. Furthermore, this index derived from gravity anomaly might be effective even over the area covered by thick sediments and/or volcanic products, where fault-like structures are hard to be detected.

T42B-0300 1330h POSTER

Active Continental Growth During Transpressional Tectonics: Example from Southeastern Taiwan

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Based on structural analysis and regional kinematics data from GPS measurements, we propose a tectonic evolution model for the active continental growth in the southeastern Taiwan. The deformation structures in the Miocene deposits of the southeastern Central Range exhibit characteristics of early-stage orogenic processes. These brittle-ductile deformation features indicate complex tectonic processes involved, including underthrusting, exhumation, and left-lateral transpressional movements. The observed deformation processes in the southeastern Central Range evidently combine together and interact within a single, complex framework. In the E-W transects across the Central Range, regional foliation orientations generally display a fan-shaped pattern with dips to the mountain core on both sides. In addition, kilometer-scale overturned structures were mapped at the eastern flank of the southern Central Range, the earlier foreland thrust and fold structures were largely overturned. This overall upward flower structure is consistent with an early-proposed exhumation and vertical accretion model. In general, the kinematics data suggest left-lateral transpressional tectonic movement is currently important process in the southeastern Taiwan. And under such tectonic movement, we highlight the contribution of the Luzon arc accretion to the continental growth of East Asia.

T42B-0301 1330h POSTER

Preliminary Identification of Major Faults in the Namche Barwa: Results from a NASA Shuttle Radar Topography Mission (SRTM) DEM Calibrated With Field Mapping and Seismicity

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One of the most striking features of the Himalayan eastern syntaxis, Tibet, is the Tsangpo River Gorge, whose erosive power has created over 7000 m of local relief in the region of Namche Barwa. The erosion rate at Namche Barwa is rapid relative to other parts of the Himalaya, and the geodynamic/surface interaction is hypothesized to be very similar to the tectonic aneurism identified in the western syntaxis (Nanga Parbat and the Indus River, Pakistan) by Zeitler et al. (2001). Although the Namche Barwa is rapidly eroding, most of the active faults that accommodate exhumation have not been mapped. Based on the hypothesis that underlying tectonic processes are recorded in distinct topographic signatures, this study utilizes the NASA seamless Shuttle Radar Topography Mission (SRTM) digital elevation model (DEM) in conjunction with seismicity and field mapping to identify potential locations of active faults in this rapidly-eroding region for further field investigation. This type of calibration of remote-sensed DEM and TM (ETM+) data with field mapping and seismicity can by applied to identify active faults in other regions, such as the politically- and

1710 h **SM42E-05** Calibrating a Magnetotail Model for Storm/Substorm Forecasting: **W Horton**, S Siebert, M Mithaiwala, I Doxas

1725 h **SM42E-06** *INVITED* Vector and Scalar Field Visualization Techniques for Multispacecraft Space Physics Missions: **D A Roberts**, V Rezapkin, J Coleman, R Boller

1745 h **SM42E-07** Visualization and Data Analysis for CISM Models: **M Wiltberger**, T Guild, J G Lyon

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T42A MCC: Level 1 Thursday 1330h
The Structure and Physical Properties of Grain Boundaries in Rocks III Posters *(joint with V)*

Presiding: **A Schubnel**, Lassonde Institute; **S Majumder**, University of Minnesota

1330 h **T42A-0265** *POSTER* Mechanical compaction of Bleurswiller sandstone : elastic wave velocities and permeability evolution: **J Fortin**, A Schubnel, Y Gueguen

1330 h **T42A-0266** *POSTER* Reduction of ionic diffusivity in nanopore water of geomaterials: **T Hirono**, S Nakashima, C J Spiers

1330 h **T42A-0267** *POSTER* An Experimental Study of Pressure Solution of Halite Under the Confocal Microscope: **Z Karcz**, E Aharonov, D M Ertas, R J Johnston, R S Polizzotti, C H Scholz

1330 h **T42A-0268** *POSTER* Mobility of Water Molecules on Brucite and Talc Surfaces by *Ab Initio* Potential Energy Surface and Molecular Dynamics Simulations: **H Sakuma**, T Tsuchiya, K Kawamura, K Otsuki

1330 h **T42A-0269** *POSTER* The Influence of Second Phases on Grain Boundaries of Mylonitic Microfabrics: Evidences From Natural Carbonate Mylonites: A Ebert, **M Herwegh**, A Pfiffner

1330 h **T42A-0270** *POSTER* A Close View Into the 3D Geometry of Grain-to-Grain Contacts and Surface Roughness in Sandstones Using Laser Scanning Confocal Microscopy: B Menendez, C David, **L Louis**, A Martinez Nistal

1330 h **T42A-0271** *POSTER* On Grain Boundary Wetting During Deformation: **S Majumder**, P H Leo, D L Kohlstedt

1330 h **T42A-0272** *POSTER* Connectivity of molten Fe alloy in mantle peridotite based on in situ electrical conductivity measurements: **T Yoshino**, M J Walter, T Katsura

1330 h **T42A-0273** *POSTER* Compositional effect on the dihedral angle between olivine and Fe-S liquid up to 20 GPa: Possibility of percolative core formation: **H Terasaki**, D C Rubie, D J Frost, F Langenhorst

1330 h **T42A-0274** *POSTER* The role of interfaces in plastic flow of two-phase rocks: X Xiao, G Dresen, **B Evans**

1330 h **T42A-0275** *POSTER* Melt-Grown Grain Textures of Eutectic Mixtures of Water Ice with Magnesium- and Sodium-Sulfate Hydrates and Sulfuric-Acid Hydrate Using Cryogenic SEM (CSEM): **C McCarthy**, S Kirby, W Durham, L Stern

1330 h **T42A-0276** *POSTER* Investigation Of The Transition To Nonlinear Acoustics In Driven Rods: **D Pasqualini**, T Jim, S Habib, K Heitmann, P Johnson

1330 h **T42A-0277** *POSTER* α-β Inversion in Quartz From Low Frequency Electrical Impedance Spectroscopy: **N Bagdassarov**

1330 h **T42A-0278** *POSTER* Damage and elastic recovery of calcite-rich rocks deformed in the cataclastic regime: **A Schubnel**, J Fortin, L Burlini, Y Gueguen

1330 h **T42A-0279** *POSTER* Modeling constitutive behavior and compaction localization for high porosity sandstone: **E R Grueschow**, J W Rudnicki

1330 h **T42A-0280** *POSTER* Rheological Behaviour and Microstructures of Natural Gypsum Experimentally Deformed in Simple Shear: **V Barberini**, L Burlini, E H Rutter, M Dapiaggi

1330 h **T42A-0281** *POSTER* Physical Properties of the Interface between a Mineral Inclusion and the Host Mineral: Monazite Inclusions in Fluorapatite: **D E Harlov**, R Wirth, H Foerster

1330 h **T42A-0282** *POSTER* The Impact of Olivine-Orthopyroxene Phase Boundaries on Mechanical Absorption: Inferences from Resonant Ultrasound Spectroscopy (RUS): J Lan, Y Wang, R S Lakes, **R F Cooper**

1330 h **T42A-0283** *POSTER* Anomalous Thermal Relaxation Induced by the Granular Composition of Berea Sandstone: **T Ulrich**, K R McCall, R Guyer

1330 h **T42A-0284** *POSTER* Microstructural Evolution and Grain Boundary Structure During Static Recrystallization in Synthetic Polycrystals of Sodium Chloride Containing Saturated Brine: J Urai, **O Schenk**

1330 h **T42A-0285** *POSTER* Grain-Scale Distribution of Aqueous Fluid in Wherlites: **T Ouchi**, M Nakamura

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T42B MCC: Level 1 Thursday 1330h
The Tectonics of Tibet and East Asia Posters

Presiding: **A Meltzer**, Lehigh University; **A L Ault**, Lehigh University

1330 h **T42B-0286** *POSTER* Tectonic Evolution of South China Coastal Provinces Since the Mid-Mesozoic: **L Chan**, M F Pubellier, P V Phung, M Mechti, K F Leung, F Ego

1330 h **T42B-0287** *POSTER* A Lower Paleozoic Plate Tectonic Model for the North Qilian Mountains, NW China: **H Yang**, C Tseng, G Zuo, H Wu, Z Xu, J Yang

1330 h **T42B-0288** *POSTER* Geochemical and Geochronologic Constraints on the Tectonic Evolution of Southeastern Tibet: **A L Booth**, P K Zeitler, W S Kidd, J L Wooden, B Idleman, L Yuping, C P Chamberlain

1330 h **T42B-0289** *POSTER* Tectonic Evolution of Mirs Bay Basin in Guangdong, South China: **K Leung**, L S Chan, M Pubellier

1330 h **T42B-0290** *POSTER* Rising the Himalayan-Tibetan plateau: A 3-D finite element model: **Y Yang**, M Liu

1330 h **T42B-0291** *POSTER* Rapid Erosion at the Tsangpo Knickpoint and Exhumation of Southeastern Tibet: **M A Malloy**, P K Zeitler, B D Idleman, P W Reiners, L Zheng

1330 h **T42B-0292** *POSTER* The Eastern Syntaxis Seismic Experiment: **A Meltzer**, S Sol, B Zurek, Z Xuanyang, Z Jianlong, T Wenqing

1330 h **T42B-0293** *POSTER* Preliminary results of 10Be analyses from the eastern Himalayan syntaxis: evidence for unsteady erosion on two spatial scales.: **N J Finnegan**, B Hallet, J O Stone, D R Montgomery

1330 h **T42B-0294** *POSTER* Kinematic modeling of Neotectonic velocity field of the Persia-Tibet-Burma Orogen: **Z Liu**, P Bird

1330 h **T42B-0295** *POSTER* Source Mechanisms, Velocity Structures and Himalaya Tectonics: **F T Wu**, A F Sheehan, G Huang, G Monsalve

1330 h **T42B-0296** *POSTER* Mechanisms for creating accommodation space during early Tertiary sedimentation in Tibet.: **C Studnicki-Gizbert**, B C Burchfiel

1330 h **T42B-0297** *POSTER* Age of Initiation of the India-Asia Collision in the eastern Himalayas: **B Zhu**, W Kidd, D Rowley, B Currie

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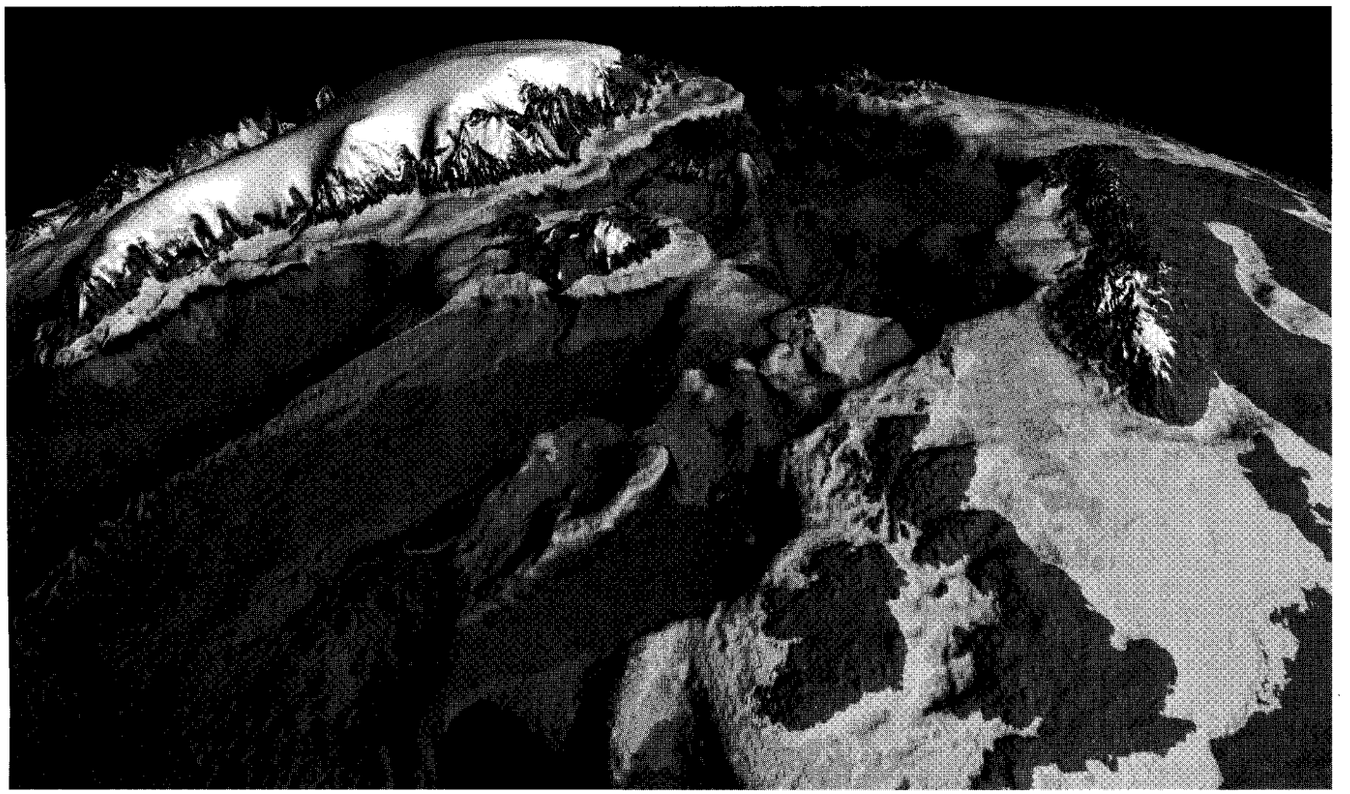

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