

Tectonic History of the Laurasian Margin in the Greater Central Asia Region: An integrated Study of Gravity, Surface Geology and Plate Reconstructions

O. W. Baganz¹, Robert Hooper¹, and Michal Ruder²

¹ BHPBilliton, Houston, TX 77056, USA, phone: 713-961-8204,
<mailto:terry.baganz@bhpbilliton.com>

² Wintermoon Geotechnologies, Inc., Denver, CO 80206, USA

The emergence over the past few years of publicly-available high-resolution potential-field, topography and bathymetry data of global extent, coupled with digital geologic and structural maps have enabled regional studies of remote and inaccessible areas at previously unachievable scales. In this poster we present a new mega-regional compilation of data from greater Central Asia. Through the use of GIS to integrate potential-field data and their derivatives, with surface geology, structural elements, total sediment isopachs, geoseismic transects, and plate-reconstructions, it is possible to unravel the tectono-stratigraphic development of a very complex region with a multi-phase history of terrane accretion, amalgamation, and intra-plate deformation that began in the late Proterozoic, and continues to the Present-Day.

Potential-field maps for greater Central Asia, when integrated with other tectonostratigraphic and geodynamic data, can identify regions with relatively coherent signature, allowing the origin of core-regions and intervening deformed belts to be unravelled.

Following the Neoproterozoic break-up of Rodinia, the tectonic development of greater Central Asia has been dominated by two principal events. The closing of the greater 'Uralian' ocean-system, and the subsequent re-docking of Baltica and Siberia to create the northern 'Pangean' core of Eurasia. This was largely completed by the Lower Permian. Using an integrated approach, remnants of the preserved rifted continental-margins originally surrounding the cratonic cores of Baltica and Siberia, can be distinguished from the now highly-deformed regions of those ancient margins, versus the exotic Kazakh, Gondwanan and intra-oceanic terranes docked in the intervening deformed-belts. The southern margin of Eurasia has been affected by rifting, subduction, docking, and subsequent intraplate deformation associated with the opening and closing of a succession of Tethyan ocean-systems beginning in the Paleozoic. The potential field signature of the southern regions of greater Central Asia is dominated by deformed regions associated with the Cenozoic docking of greater Arabia and the Indian sub-continent with the southern margins of Eurasia. Again, using an integrated approach combining potential-field analysis with tectono-stratigraphic and geodynamic analysis, the complex docking and subsequent intraplate deformation of individual terranes and terrane fragments becomes understandable.