

WANG Junpeng, Timothy KUSKY, WANG Lu, Ali POLAT, DENG Hao, WANG Chen and WANG Songjie, 2016. Structural Relationships along a Neoproterozoic Arc-Continent Collision Zone, North China Craton. *Acta Geologica Sinica* (English Edition), 90(supp. 1): 242-243.

Structural Relationships along a Neoproterozoic Arc-Continent Collision Zone, North China Craton

WANG Junpeng¹, Timothy KUSKY^{1, 2}, WANG Lu², Ali POLAT³, DENG Hao¹,
WANG Chen¹ and WANG Songjie¹

¹ Center for Global Tectonics, School of Earth Sciences, China University of Geosciences, Wuhan 430074, China

² State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Wuhan 430074, China

³ Department of Earth and Environmental Sciences, University of Windsor, Windsor, ON N9B 3P4, Canada

The Archean North China Craton is composed of the Western Block, Eastern Block and the intervening Central Orogenic Belt. A 4-10 km wide and 85 km long tectonic mélangé belt informally called the Zhanhuang tectonic mélangé is documented in the Zhanhuang Massif of the Central Orogenic Belt, separating the Eastern Block from an Archean arc terrane in the Central Orogenic Belt. The mélangé belt contains a structurally complex tectonic mixture of metapelites, metapsammities, marbles and quartzites mixed with exotic tectonic blocks of volcanic, mafic and ultramafic rocks, metabasalts that locally include relict pillow structures, and TTG gneisses. The Zhanhuang tectonic mélangé marks the suture of an arc-

continent collisional zone between the Western Zhanhuang Massif in the Central Orogenic Belt and Eastern Block of the North China Craton, and is one of the best-preserved Archean tectonic mélangés in the world. Here we show, using zircon U-Pb dating of various types of blocks from the Zhanhuang mélangé, that the formation and associated deformation of the Zhanhuang mélangé occurred in the Neoproterozoic (circa 2.5 Ga). High-precision (1:20-1:200) litho-structural mapping of three key outcrops reveals details of the internal fabrics and kinematics of the mélangé and regional structural relationships along the arc-continent collisional zone. A synthesis of studies on the tectonic evolution of the North China Craton coupled

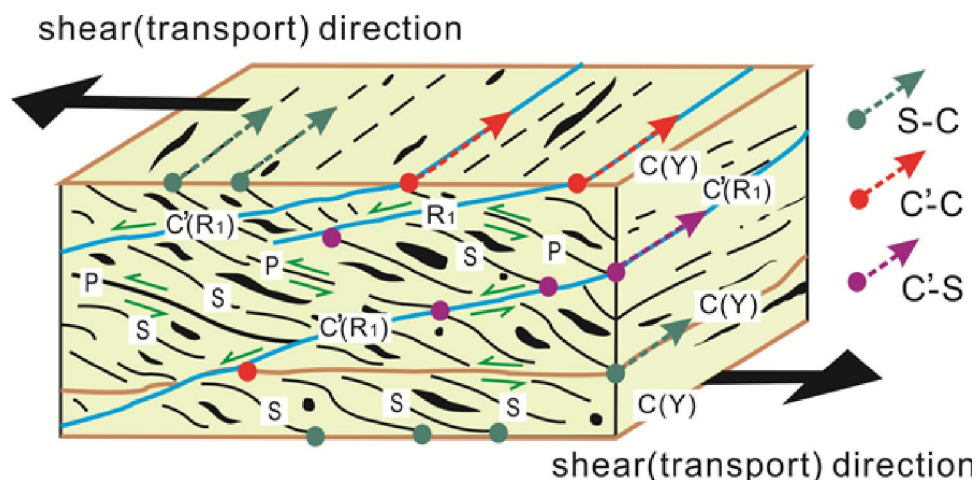


Fig. 1 Three-dimensional kinematic framework of C, S and C' fabrics in mélangé (Modified from Kusky and Bradley, 1999). C represents the main shearing plane; S represents preferred shape orientation of clasts or secondary foliation; C' represents preferred shape orientation of clasts or secondary foliation. Black arrows: direction of shearing or transportation; Blue line: boundary of C'surface; Brown line: boundary of Csurface; Black line: boundary of S surface; Purple dot: intersection line between S and C'; Red dot: intersection line between C and C'; Green dot: intersection line between S and C.

* Corresponding author. E-mail: wangjp@cug.edu.cn

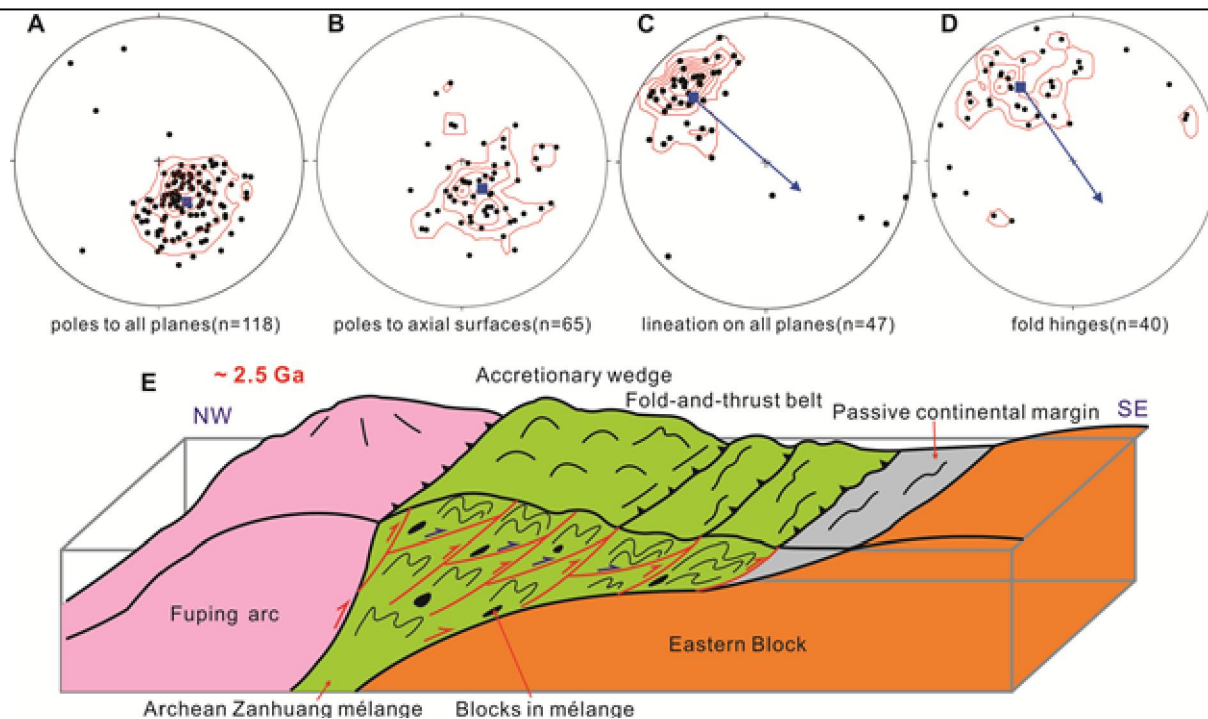


Fig. 2 A: Poles to all measured planes with 1% area contour. B: Poles to all measured axial surfaces with 1% area contour. C: All measured lineation on different planes. D: Projections of fold hinges with 1% area contour. The mean values of different fabrics are shown as the solid blue square. The blue solid lines represent the transport directions of hanging wall with the arrows pointing to the southeast. The data here is combined with the some data from our previous study (Wang et al., 2013). E: Model for tectonic evolution of an arc-continent collision in the North China craton in the late Neoproterozoic. Note that the Fuping arc collided with the Eastern Block, leading to the formation of the Zhanhuang mélangé with typical fold-and-thrust structures similar to the style of accretionary wedge. The blue and red arrows represent two generations of thrusts.

with our new fabric and kinematic analysis of the Zhanhuang mélangé further constrains the initial amalgamation timing and geometry of an arc-continent collision between the Fuping arc terrane in the Central Orogenic Belt and the Eastern Block with a northwest-dipping subduction polarity. The asymmetric structures and mixture of different blocks and matrices with folding and thrusting events in the Zhanhuang mélangé record

kinematic information that is consistent with a tectonic setting of an accretionary wedge that was thrust over the passive margin of the Eastern Block by 2.5 Ga. Litho-structural mapping shows that the classic mélangé and fold-and-thrust structures along the Neoproterozoic arc-continent collisional zone are broadly similar to Phanerozoic collisional belts.