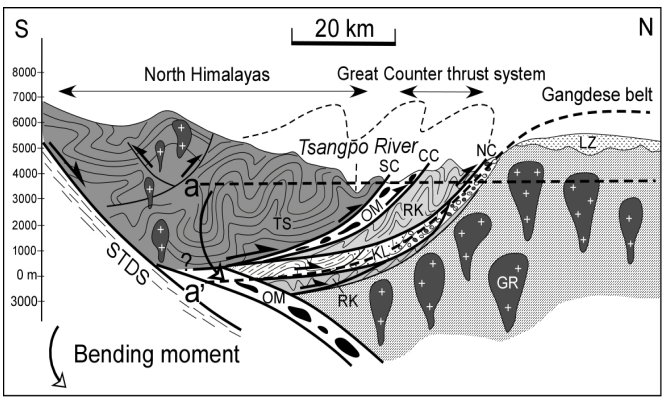
WANG Erchie, MENG Kai and WANG Gang, 2013. Evidence for Crustal Bending as a Mechanism for the Uplift of the Gangdese Magmatic Belt in Southern Tibet. *Acta Geologica Sinica* (English Edition), 87(supp.): 77.

Evidence for Crustal Bending as a Mechanism for the Uplift of the Gangdese Magmatic Belt in Southern Tibet

WANG Erchie[1], MENG Kai[1] and WANG Gang[2]

1 Institute of Geology and Geophysics, CAS, Beijing 100029, china
2 College of Earth Sciences, Chengdu University of Technology, Chengdu 610059, china

The Gangdese magmatic belt, with an average elevation of 6000 m, marks the southern edge of the central Tibetan plateau, extending roughly east-west for ~2500 km. It flanks the Zangbu River to its south, which flows from the west to the east along the Tsangpo suture zone between the Indian and Eurasian plates. Although this belt may therefore contain more information on the interaction between these two plates than any other tectonic element within the Tibetan plateau, questions related to its uplift mechanism and history, as well as its deformation features in response to continental collision have yet to be explored. The Gangdese belt is mainly composed of granite (GR) sourced from the subducted Indian plate, and the volcanic and sedimentary rocks that resulted from the early and late stages of intracontinental convergence between the two plates. Along the topographically high areas of the Gangdese belt, both the granite and their country rocks are mantled by a set of acid and intermediate volcanic sequence, namely Lingzizong, with ages ranging from 65 Ma to 42 Ma (LZ). This volcanic rock sequence remains mostly horizontal, which gives rise to the flat topography at the crest of the belt. The Gangdese belt is fringed on its south by a set of coarse-grained sediments, the Kailas (Gangrenbuqi) conglomerate (KL), which consistently tilt to the south at various angles, creating the steep topography at the southern edge of the belt. The Kailas conglomerate is sourced from the underlying granite and volcanic rocks to its north, with age of deposition dated as 26-24 Ma. The contrasting deformation features between the Lingzizong volcanic sequence and the Gangrenbuqi conglomerate imply that the Gangdese belt experienced deformation with a mechanism differing from all other mountain belts within the plateau, such as the Himalayas, Longmen Shan, Qilian Shan and Kunlun Shan, and that its uplift cannot be attributed simply to shortening. The Gangrenbuqi conglomerate is truncated on its south by the Himalayan Counter thrust system. The main part of this thrust system consists of three branch faults, namely South, Central and North thrust (SC, CC and NC), that dip consistently to the south, along which, from south to north, the Mesozoic Tethys sequence (TS), ophiolite mélange (OM), the Cretaceous flysch (Rikaze Group) (RK) piled up against the Kailas conglomerate. By inference, prior to the incision of the Tsangpo River drainage system, the Tsangpo suture zone must have been an orogenic belt with high topography. The features documented in this study of this region's internal and external deformation and sedimentation, suggest that the tectonic loading of the Tsangpo suture zone carried by the Himalayan Counter thrust system resulted in vertical bending of the crust, which caused the uplift of the Gangdese belt. According to this interpretation, the Gangdese belt corresponds to a fore-budge undergoing uplift and denudation, whereas the Kailas conglomerate was formed as the foreland basin deposit sourced from the fore-budge, developing within the footwall of the Himalayan Counter thrust system. If the age of the Kailas conglomerate is correct, it provides a timing for the uplift of the Gangdese belt of 26-24 Ma, which is then also the timing for the initiation of the Himalayan Great Counter thrust system.



Structural cross-section of the Tsangpo collision zone in the Rikaze area

* Corresponding author. E-mail: erchie-wang@mail.iggcas.ac.cn