

## Inherited basement controls on the development of Neogene thrust faults in the Northeast Tibetan Plateau

Rowan Vernon<sup>1</sup>, Dickson Cunningham<sup>1,2</sup>, Zhang Jin<sup>3</sup>, Richard England<sup>1</sup>

<sup>1</sup> Department of Geology, University of Leicester, rv52@le.ac.uk

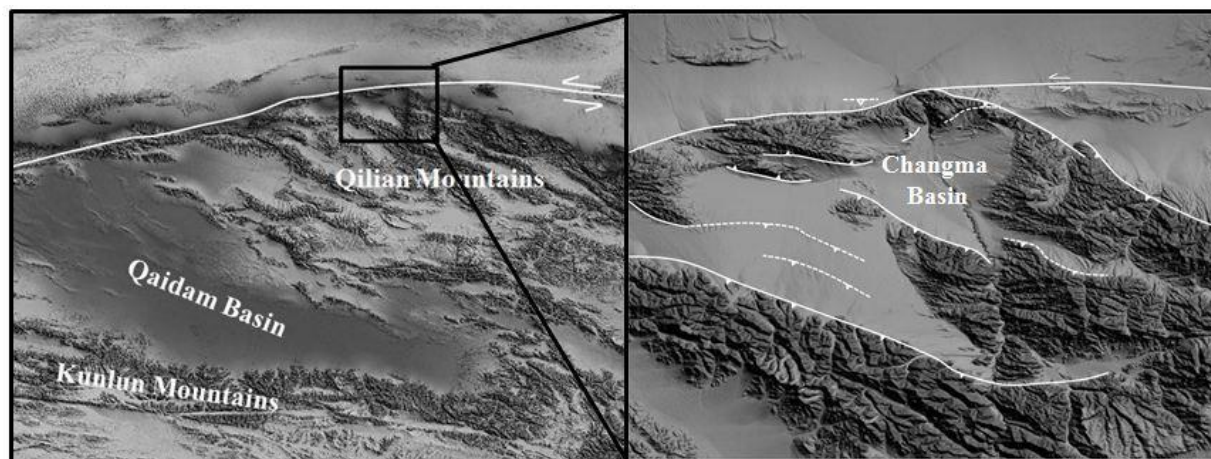
<sup>2</sup> Department of Environmental Earth Science, Eastern Connecticut State University

<sup>3</sup> Institute of Geology, Chinese Academy of Geological Sciences, Beijing

The Qilian Mountains of the northeast Tibetan Plateau represent one of the most actively deforming regions of the Plateau, and may provide an analogue for the formation and evolution of its older regions. The crust of the Qilian Mountains is an orogenic collage of island arc derived meta- volcanic and sedimentary rocks, accreted to the North China Craton during the Palaeozoic. Northeast-directed compression related to the Indo-Asia collision began here in the early Miocene. The resulting northwards-propagating deformation is characterised by uplift of fold-thrust mountain ranges which splay south-eastwards from the sinistral northeast-trending Altyn Tagh Fault (ATF).

In this project, we investigate the extent of inherited structural and lithological controls on the post-Oligocene tectonics around the Changma Basin at the very northeast corner of the Plateau, where the ATF forms a triple junction with the Qilian Nan Shan. Our research involves synthesis of previous geological and geophysical data, remote sensing analysis and structural mapping along key transects.

The Changma Basin (Fig. 1) is being uplifted through thrusting at the front of the Qilian Nan Shan and inverted due to back-thrusting of the Yumen Shan, related to transpression against the ATF. It is not possible to trace major structures from the basin into the surrounding ranges to demonstrate unequivocal evidence of basement reactivation. Field data and previous geological mapping show that some of the main range-building thrusts are approximately strike-parallel to basement structures within the ranges, while some are strongly discordant to these structures. Pre-existing foliations are exploited by some range-bounding faults, but intra-range reactivation of older fabrics has not been observed. In ranges containing thick limestone units intra-range uplift is accommodated by thrust faults both within and below the limestones, however in ranges lacking these units uplift is focused on the range-front. These observations suggest that inherited basement structures and specific lithologies exert varying degrees of control on the development of thrust faults and the post-Oligocene uplift of mountain ranges in the northeast Tibetan Plateau.



**Figure 1-** DTM showing the location of the field area and the major Neogene faults surrounding the Changma Basin, NE Tibet.