Active flexural folding and faulting in the NE margin of Tibetan Plateau

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In regions of active continental shortening, the topography can be generated and re-transformed rapidly compared with rates of erosion and deposition as tectonically-produced result due to the continued growth of active structures (Stein and Yeats, 1984; Jackson et al., 1996; Keller et al., 1999; Hubert-Ferrari et al., 2007). The landscape topography geometry and pattern thus have the potential to preserve and indicate the information about the active flexural folding and faulting (Walker, 2006; Lin et al., 2015). The NE Tibetan Plateau is an ideal place as the growth and expansion front where active tectonism has been persistent for considering the coupling and interaction of active tectonics and corresponding tectonic geomorphology (e.g., Tapponnier et al., 1990; Hubert-Ferrari et al., 2007). Therefore, study of the topography response to active flexural folding and faulting can provide important constraints on the active tectonic process of the NE Tibetan Plateau. Recent studies about active tectonics in NE Tibetan Plateau are mainly focus on topics such as slip rate, recurrence interval of large earthquake of given single active fault, such as Haiyuan fault triggering the 1920 Ms 8.5 Haiyuan earthquake (Zhang et al., 2005); Kunlun fault triggering the 2001 Ms 8.1 central Kunlun earthquake (Lin et al., 2002); as well as the emerging GPS technology (Zhang et al., 2004). However, little attention has been paid to the roles that active flexural folding and faulting play in modifying the regional-scale topography and dissecting the most recent active tectonics in NE Tibetan Plateau.

In this presentation, we focus on the Active flexural folding and faulting in the NE margin of Tibetan Plateau. Analyses of active structures and tectonic topography related to late Quaternary activity in the NE margin of Tibetan Plateau reveal that: (1) four en echelon fold structures (followed by Qinghainanshan anticline; Laijishan anticline; Maxianshan anticline and Huajialing syncline eastward, respectively) divided the different drainage systems; (2) geological profiles across these divides revealed that the late Quaternary formations have involved the folding and the axis were exactly parallel with the topographic divides; (3) the axis of these folds show a left-stepping staircase geometry, suggesting a regional shear characteristic; (4) the regional stress regimes inferred from the fold axis show a NE-trending compression, consistent with the Global Positioning System and focal mechanism resolutions data. The active flexural folding and faulting maybe represent the most recent tectonic process in the NE margin of Tibetan Plateau, and the case provides an excellent example to study and display the coupling relationship between the active tectonic process including active flexural folding and faulting and geomorphology evolution.

Keywords: Active flexural folding , Active faulting, NE margin of Tibetan Plateau