

Mid-Miocene Climate-Driven Rapid Erosion of the Northern Tibetan Plateau

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The northeastern Tibetan Plateau is an area of active interaction between tectonics and the Asian monsoon. Both tectonic uplift and climatic change can cause intense erosion of the plateau and sedimentation in intermontane basins. High resolution paleomagnetism has been carried out to date 15 sections of Cenozoic stratigraphy in six basins in the Altyn Tagh and Qilian Shan. Detailed seismostratigraphic and tectonosedimentary investigations and balanced-section restoration were carried out to constrain deformation and uplift. The results show that the Cenozoic sediments in the northern Tibetan Plateau span about 54 Ma to present, and a permanent rapid stepwise increase of erosion and filling of basins was observed to occur at about 15-14 Ma. This increased erosion caused rapid change of the detritus composition in source areas, coarsening of sediments, increased sedimentation rate, and progradation of sediments unconformably upon former raised and eroded areas in basin margins and around the base of mountains. Since deformation at about 15-14 Ma was less strong than at earlier and later times, we suggest that this erosion event was driven by the global Mid-Miocene rapid cooling due to rapid expansion of Southeast Antarctic ice cap.