Crosscutting versus Abutting Joints: A Reflection of Overburden-Induced Joint-Normal Stress in Devonian Black Shale, Western New York, Gary G. Lash, Department of Geosciences, State University of New York–College at Fredonia, Fredonia, NY 14063, lash@fredonia.edu; and Terry Engelder, Department of Geosciences, The Pennsylvania State University, University Park, PA 16802

The pervasive nature of joints in Middle and Upper Devonian black shale deposits exposed along the Lake Erie shoreline, western New York, has compelled some to suggest that jointing occurred principally as a consequence of glacial unloading. Studied black shale units of this area of the Catskill Delta host east–northeast-trending joints that either crosscut or abut cross-fold (CF) joints. These sets crosscut exclusively in the more proximal (Finger Lakes) region of the delta where slip on CF joints offsets east–northeast joints, indicating that the latter are older. However, in equivalent black shale in the shallower, distal delta (Lake Erie region), ~25 percent of the joint intersections are crosscutting whereas ~75 percent of the interactions are of east–northeast joints abutting CF joints. East–northeast joints in these deposits propagated first but were not as long or pervasive as in the deeper, proximal delta. Yet ~130 m deeper into the distal section, east–northeast joints are much better developed; all intersections are again crosscutting. CF joints propagated across east–northeast joints when both proximal and distal deposits had been buried deep enough (i.e., $\geq$ 3 km) such that a high joint-normal stress closed all east–northeast joints. Post-Middle Tertiary exhumation (i.e., burial depth $\leq$ 1 km) of the Catskill Delta caused reactivation of east–northeast joints by opening in the contemporary tectonic stress field. The reduction of joint-normal stress on CF joints in the distal black shale resulted in the reactivation of east–northeast joints into abutting intersections. In sum, post-glacial exhumation appears to have resulted only in reactivation of favorably oriented joints.