geologic evidence derived from field and map relationships. With the geometry corrected as suggested here, this model will be useful for studying similar tectonic settings.

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Reply

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We thank Helmut Mayer for endorsing the main conclusions of our 1991 paper and for pointing out two minor problems with it. Our expression for relating the enveloping surface (i.e., the regional slope) of a foredeep to fault displacement and spacing was indeed wrong; the expression given by Mayer,

$$\alpha = \sin^{-1}\left(\frac{d}{w}\sin\delta\right),$$

is correct. Nothing that follows in our 1991 paper suffers for this mistake, however, and the main points of our Figures 13A–13C remain unchanged. If the normal faults in an ancient, rebounded foredeep display the toppled-domino geometry illustrated in Figure 13C, the original regional dip is equal to the present-day dip of the tops of fault blocks, but in the opposite dip direction. This suggests a novel way, which we haven't yet fully explored, of deducing the paleobathymetry of ancient normal-faulted foredeeps. Mayer also correctly points out that the expression for extension, $h = s/\tan\delta$, is an *exact* (not approximate) solution for the situation after rebound. In any case, because postflexure rebound is typically 1° to 2°, it makes no practical difference.

The Alpine foredeep of Austria should, indeed, be added to the roster of good examples of flexural extension. Nachtmann and Wagner (1987) documented an Eocene to early Oligocene phase of extensional faulting in the foreland, related to advance of the Alpine orogenic load. As in the Taconic foredeep and Arkoma Basin, most of the Austrian normal faults parallel the orogenic front (Fig. 9 of Nachtmann and Wagner, 1987), and they are buried by younger strata of the foredeep succession (Upper Puchkirchen Formation). All of the major Eocene oil and gas fields in the region studied by Nachtmann and Wagner (1987) are bounded by flexure-induced normal faults.

This Reply gives us the opportunity to cite two other recent works. Geochemically based correlations of ash beds require some modifications to the stratigraphy of the Taconic foredeep of New York (Mitchell et al., 1994). Even with these changes, however, the diachronous pattern of foredeep facies and normal faulting (our original Fig. 4) still holds true. Finally, Bradley (1993) followed up on the link between Mississippi Valley–type zinc mineralization throughout the Appalachians and flexural tectonics in the Taconic foredeep, which we mentioned only in passing in our 1991 paper. Flexure-induced normal faults can play an important role in focusing the flow of hydrocarbons and mineralizing fluids in foreland basins.

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