Alleghanian dextral transtension along a portion of the Carolina slate belt-Milton belt boundary, North Carolina

(postier)

J.K. Wilkins, J.P. Hibbard and G.S. Shell, Jr.

Department of Marine, Earth and Atmospheric Sciences, Box 8208, North Carolina State University,
Raleigh, North Carolina 27695, USA

Alleghanian shortening in the southern Appalachian foreland has been recognized for many decades, but recently, many workers have documented the local, if not regional, importance of extensional tectonics in the hinterland during this event. Recent field studies along the boundary between two first-order elements of the southern Appalachian orogen, the Carolina slate belt (CSB) and the Milton belt (MB), has revealed that extension in conjunction with dextral shear has played a crucial role in the interaction between these belts.
It appears that motion along this boundary, the Hyco shear zone (HSZ), was partitioned into some regions where dextral motion was predominant and others where extensional motion was primarily active. Dextral shear sense can be recognized in these rocks by S-C fabrics, shear bands, winged porphyroclasts and asymmetric folds. The extensional component of deformation can be recognized by S-C fabrics, and tight to isoclinal recumbent folds with a CSB down to the south asymmetry.

This portion of the HSZ is oriented at approximately N70°E, whereas other shear zones related to the Eastern Piedmont fault system are generally oriented at N30°E. It is likely that this portion of the HSZ represents an extensional jog along this fault system. An extensional component to the relative motion between the CSB and MB provides a plausible explanation for the present juxtaposition of high grade MB gneisses against low grade metaigneous rocks of the CSB. A lower age constraint for this motion is provided by the pre- to syn-kinematic Yanceyville metagranite that is dated at 340 Ma.