

Continuity of crustal fabric patterns observed in deep seismic reflection profiles across the northern Appalachian/Caledonide orogen

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Deep seismic reflection transects of the Newfoundland Appalachians show similar crustal fabrics. To the northwest, in Laurentian crust, reflectors dip variably but predominantly to the southeast. Moving towards the former Gondwanan plate, a zone of strong northwesterly dipping reflections cuts most of the crust and soles at the Moho. The top of the zone truncates the southeasterly dipping reflections. It is suggested that the southeasterly dipping fabric existed prior to the northwesterly dipping fabric, which either (i) was superimposed on, and mainly obliterated, the southeasterly dipping fabric; or (ii) removed the crust which contained the earlier fabric from the areas where the northwesterly dipping fabric now occurs. By correlation with surface structures, it is inferred that the southeasterly fabric is principally of Taconic (Ordovician) age, while the northwesterly fabric is inferred to be of Salinic (Silurian) age, corresponding to the collision

of Gondwana with Laurentia.

A very similar pattern is seen on most deep seismic profiles across the Caledonides, where the fabric 'confrontation' is interpreted to be associated with the Iapetus suture; and on profiles across the New England Appalachians, as far south as the Long Island platform. The pattern is not observed on deep seismic profiles across the southern Appalachians, in which a southeasterly dipping fabric with a strong and steep mid-crustal ramp is the common pattern.

The precise form of the 'confrontation' and its position relative to the surface tectonostratigraphic zones varies along the orogen. It is concluded that the structure is formed during the closure of Iapetus, and that its variable form and position relative to surface geology are related to differences in the timing and severity of collision along strike.