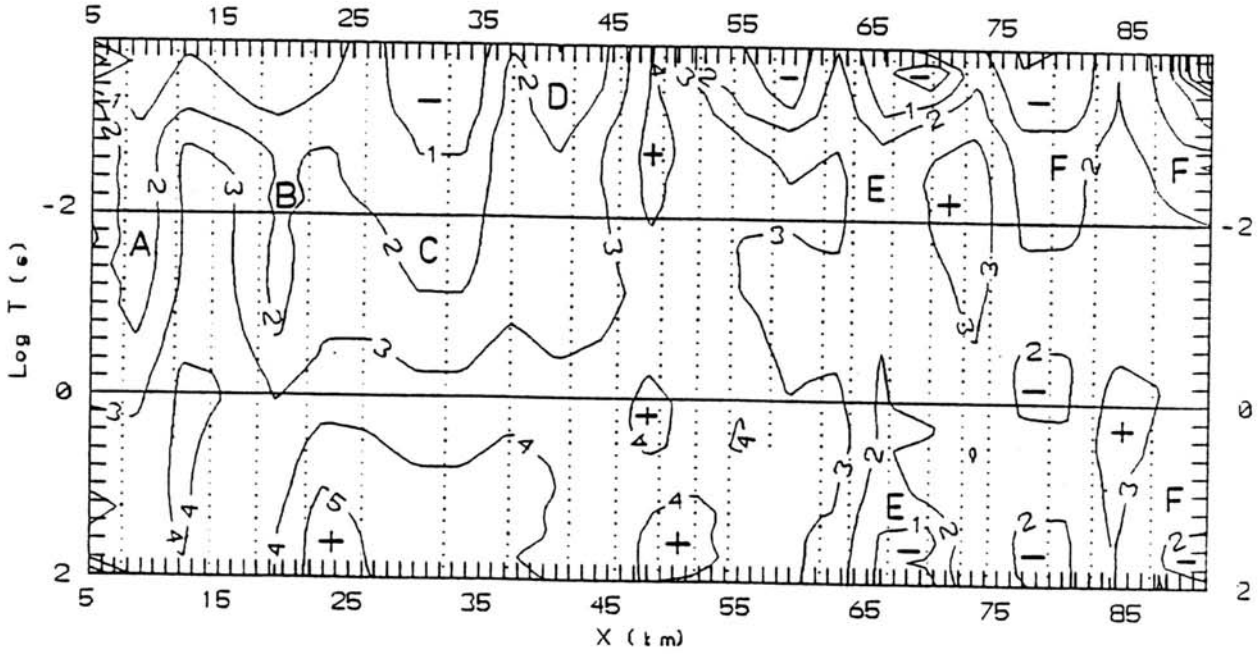

Fig. 2. Pseudosection log Rux (ohmm)

ANALYSIS OF KILOMETRE–SCALE SHEARING IN DEEPLY ERODED OROGENS

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Archean cratons such as the Superior Province of the Canadian Shield are rimmed by Proterozoic orogens exposed at mid–crustal levels. Typical orogens are aggregates of allochthonous masses (suspect terranes, tectonic domains, etc.) that are bounded by prominent shear zones. Centimetre–size features such as rotated porphyroblasts and fibrous veinlets have been used in unravelling the structural history of kilometre–scale shear zones, but the difference in scale poses a problem unless the macro–deformation is perfectly continuous. We employ kilometre–scale structures such as attenuated plutons, tight monoclinic folds and deflection patterns of mineral lineations in attempts at constraining the path of distributed shear at domain boundaries. Some boundary zones host several generations of attenuated granitoid plutons in which the principal–strain axes subtend different angles with the normal to the boundary surface. Using the geometric properties of the strain ellipsoid, one may determine several finite shears (Ψf), together with their sense and direction. Large shear increments (Ψi) may be obtained by combining different Ψf, and this information constrains the shear path at the boundary. By contrast, the monoclinicity of large folds and the deflection pattern of inherited lineations generally pertain to single large increments of boundary shear. The use of folds as shear–sense indicators is fraught with difficulty because the enveloping plane, axial plane and profile section are non–material surfaces that do not qualify as shear planes. Fold–enveloping surfaces or attenuated fold limbs will be nearly parallel to domain boundaries but the sense of boundary–parallel shear may differ from that of limb–parallel shear, even where the obliquity angle is $< 2°$.

The La Ronge/Rottenstone domain boundary, situated in the western Trans–Hudson orogen, northern Saskatchewan (Fig.1) furnishes a practical example of shear–path analysis. The domains were assembled by southward thrusting and associated ductile deformation, which probably resulted in an E–W orogen. The subsequent path of strike shear, including a reversal in shear sense at the Birch Rapids Straight Belt (BRSB, Fig. 1), is constrained by attenuated plutons, large Z folds and the deflection pattern of mineral lineations (see next page).

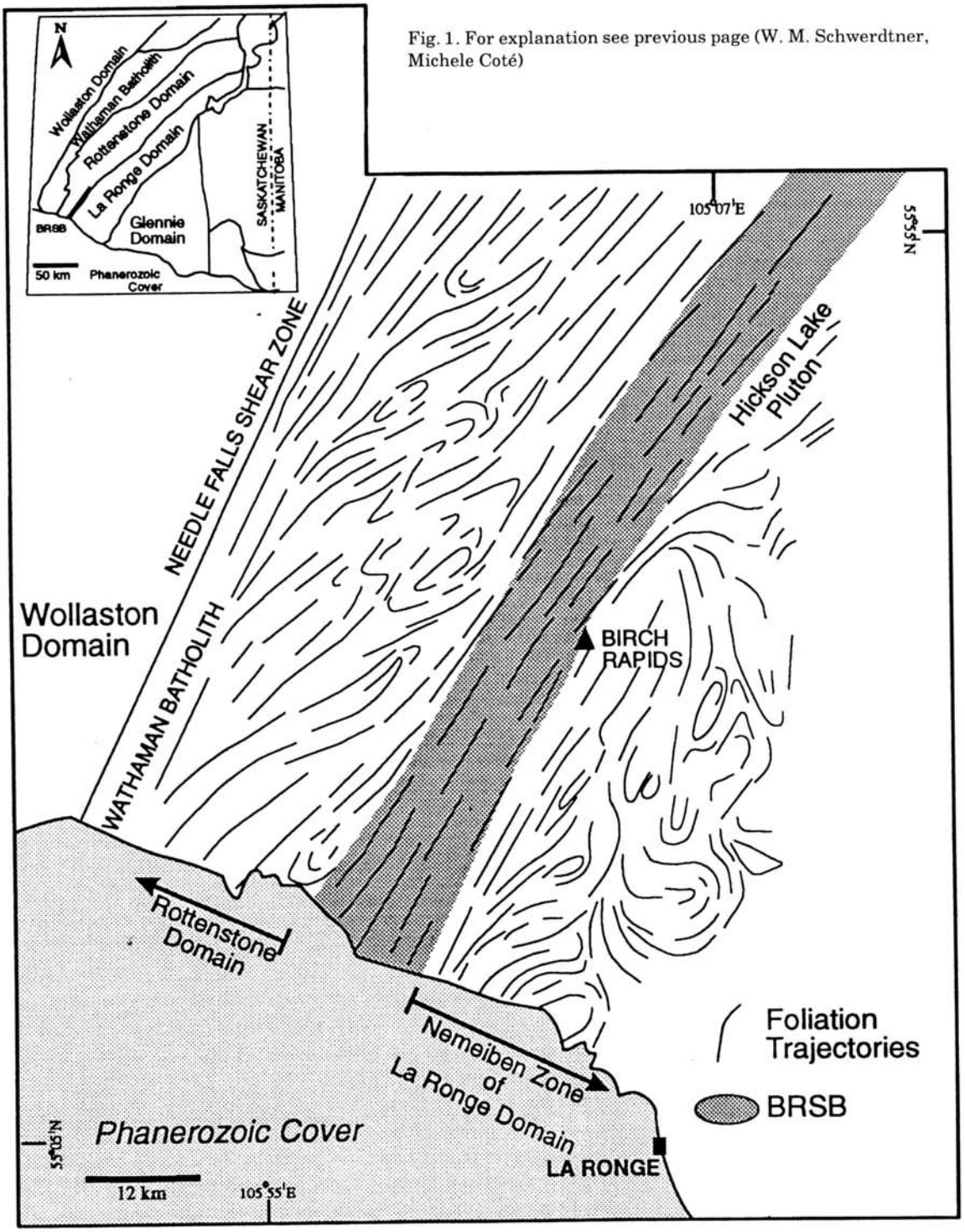

Fig. 1. For explanation see previous page (W. M. Schwerdtner, Michele Coté)