SHEAR ZONES AND SHEAR ZONES: DIFFERENT TYPES AND MEANINGS

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Collisional and accretional orogens are characterized by the presence of major shear zones, often separating terranes, nappes or tectonic domains. Analysis of the mylonites in these zones permits a subdivision into shear zones that predate the main metamorphism (type 1), contemporaneous shear zones (type 2) and shear zones that postdate the metamorphic peak (type 3). Combinations are, of course, possible and indeed common because of reactivation. Type 1 shear zones usually reflect initial collisional movements; they may represent sutures or major nappe contacts and tend to be subhorizontal to moderately dipping with down dip stretching lineations. Although they often show large displacements they rarely contain mylonites, because subsequent heating tends to mascarade mylonitic fabrics by static recrystallisation. Type 2 shear zones contain high temperature mylonites; they tend to be steeper and may dislocate segments of orogens. Often their mylonites are also mascaraded by static recrystallisation. Type 3 shear zones are the most spectacular ones in terms of well developed mylonites. They are usually steep with subhorizontal stretching lineations, as a consequence of late horizontal adjustments and/or escape tectonics in orogens. The mylonites are formed under retrograde metamorphic conditions and therefore well preserved; they may reflect low to high temperature deformation. These shear zones appear clearly on remote sensing images and may be overestimated in importance because of their marked presence in the final architecture of orogens. In SE Brazil, in the southern part of the N-S trending collisional Neoproterozoic Brasília Belt, shear zones of all three types were mapped and studied in detail. Type 1 shear zones separate major nappes with top to the east displacements in the order of a hundred kilometers; they rarely contain mylonites. The metamorphic grade increases gradually from bottom to top in this flat lying nappe stack, with few abrupt changes, marked by mylonites that testify movements, syn to post metamorphic peak (type 2). Steep standing shear zones of type 3 cut through the nappe stack. They can be grouped in two generations. One is approximately N-S and shows sinistral transcurrent movement, of up to several kilometers, reflecting NW-SE contraction. The second generation is NE-SW with up to 10th of kilometers of dextral movement, resulting from E-W compression probably related to the final adjustments of Gondwana formation in the age range 540-500 Ma.