

LETTER TO THE EDITORS

Definition of vergence

Mr. R. Weijermars writes:

In a recent paper published in the *Journal of Structural Geology*, Bell (1981) discussed the concepts of cleavage vergence and minor fold vergence. The paper is very instructive, stresses the advantage of the vergence concept over descriptions of fold asymmetry such as S- or Z-shaped or sinistral or dextral, but contains two minor errors related to the definitions of fold vergence and cleavage vergence.

Bell states (p.197) that: "Originally, vergence was introduced as a direction relating to fold asymmetry". This is not correct. Stille's (1924, 1930) original definition of 'vergenz' relates to fold orientation and not to fold asymmetry; in some situations these are not the same (Fig.1). The difference between Stille's term 'vergenz' and the presently used term 'fold vergence' complicates geological communication. For example, in the German literature the term 'vergenz' has been more recently used in the sense corresponding to Stille's original definition (e.g. Hoepfener 1960, Stets 1962). Summarizing, it can be stated that vergence ('vergenz') was a term originally used to describe fold orientation but in the English literature of the last two decades (e.g. Sturt 1961, Grindley 1963, Wood 1963, Means 1963, 1966, Thomas & Treagus 1968, Roberts 1974, Roberts & Treagus 1977) its meaning has evolved into a term to describe the asymmetry of minor folds and cleavage relationships (Bell 1981).

The definition of cleavage vergence (Bell 1981, p.198) should be slightly modified in order to exclude the possibility of two 180° diverging vergences. Cleavage vergence is the horizontal direction, within the plane normal to the fabric intersection lineation, towards which the younger fabric needs to be rotated through the upper acute angle, so that it becomes parallel to the older fabric (Fig.2).

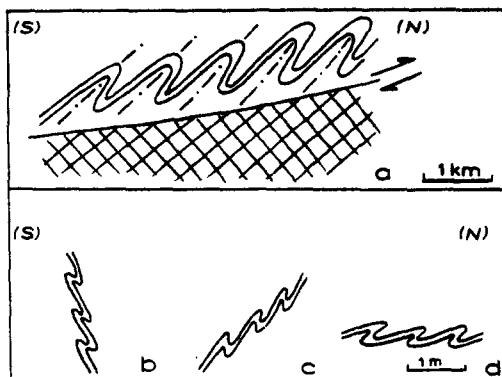


Fig. 1. Vergence (vergenz) was originally used by Stille (1924) to indicate the direction of overturning of folds, that is a direction opposite to that of the dip of the axial plane. The term was used with genetic connotations and implied a sense of movement. (a) N-verging folds according to Stille (1924). (b), (c) and (d) N-verging folds according to the present usage of fold vergence (Bell 1981). Note that the N-verging folds in (b) are S-verging according to Stille's definition.

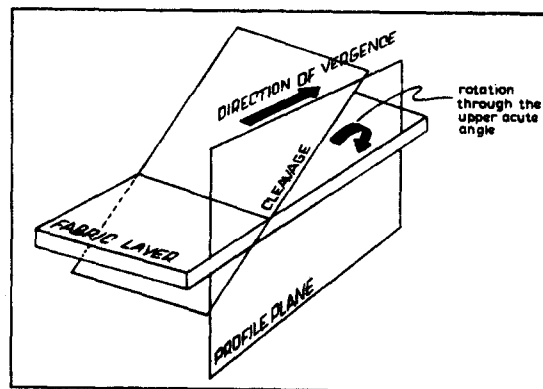


Fig. 2. The direction of cleavage vergence is determined by rotating the younger fabric through the upper acute angle towards the older fabric.

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