# A kilometre-scale low-angle detachment related to strike-slip faulting in Upper Cretaceous mudstones of the Table Mountains (Central Sudetes, SW Poland)

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Late Cretaceous to Cenozoic low-angle faults in the Sudetes have been sporadically described on the basis of map-scale outcrop patterns and interpreted as thrusts. A well-exposed subhorizontal detachment fault that occurs parallel to bedding in Upper Cretaceous marly mudstones near the Jawornica village in Góry Stołowe (Eng.: *Table Mountains*), is significant for the understanding of the style and geometry of Alpine tectonic deformations that took place from end-Cretaceous through Cenozoic times. The detachment is exposed in a continuous outcrop, exceeding 1 km in length, along a road cut slope between the Polskie Wrota Pass and the Lewin Kłodzki village and, most probably, is genetically related to the generally NW–SE-trending Mesozoic–Cenozoic **Southern Sudetic Fault System (SSFS)**, within which it occurs.

The detachment is exposed in the so-called Szczytna Mudstone Member that represents a lithological variety of the middle Turonian (*Inoceramus lamarcki* Zone) Batorów Formation. The rocks affected by deformation are mostly mudstone and calcareous claystones, but locally also limestones (calcilutites and calcarenites). The displacement occurred here either on a single fault (Fig. 1a) or on a system of interconnected, kinematically linked faults, generally north-westerly dipping at an angle of up to 20° and parallel or subparallel to the bedding planes of Cretaceous strata.

The detachment is usually localized within a 7 to 25 cm-thick shear zone defined by products of cataclastic flow, confined within two distinct boundaries of mostly intact rock (Fig. 1b). The shear zone is filled with fine-grained matrix of a composition analogóus to that of the host rock, which coexists with crush breccia and calcite veins. The matrix comprises clayey minerals, micrite and calcareous bioclasts, as well as quartz, glauconite (in traces) and opaques. The fault rock shows flaser bedding, defined by colour changes due to the variable content of Fe(?)-oxides and hydroxides and by preferred orientation of bioclasts and clay platelets. The calcite veins and lenses are up to several centimetres thick and up to a few tens of centimetres

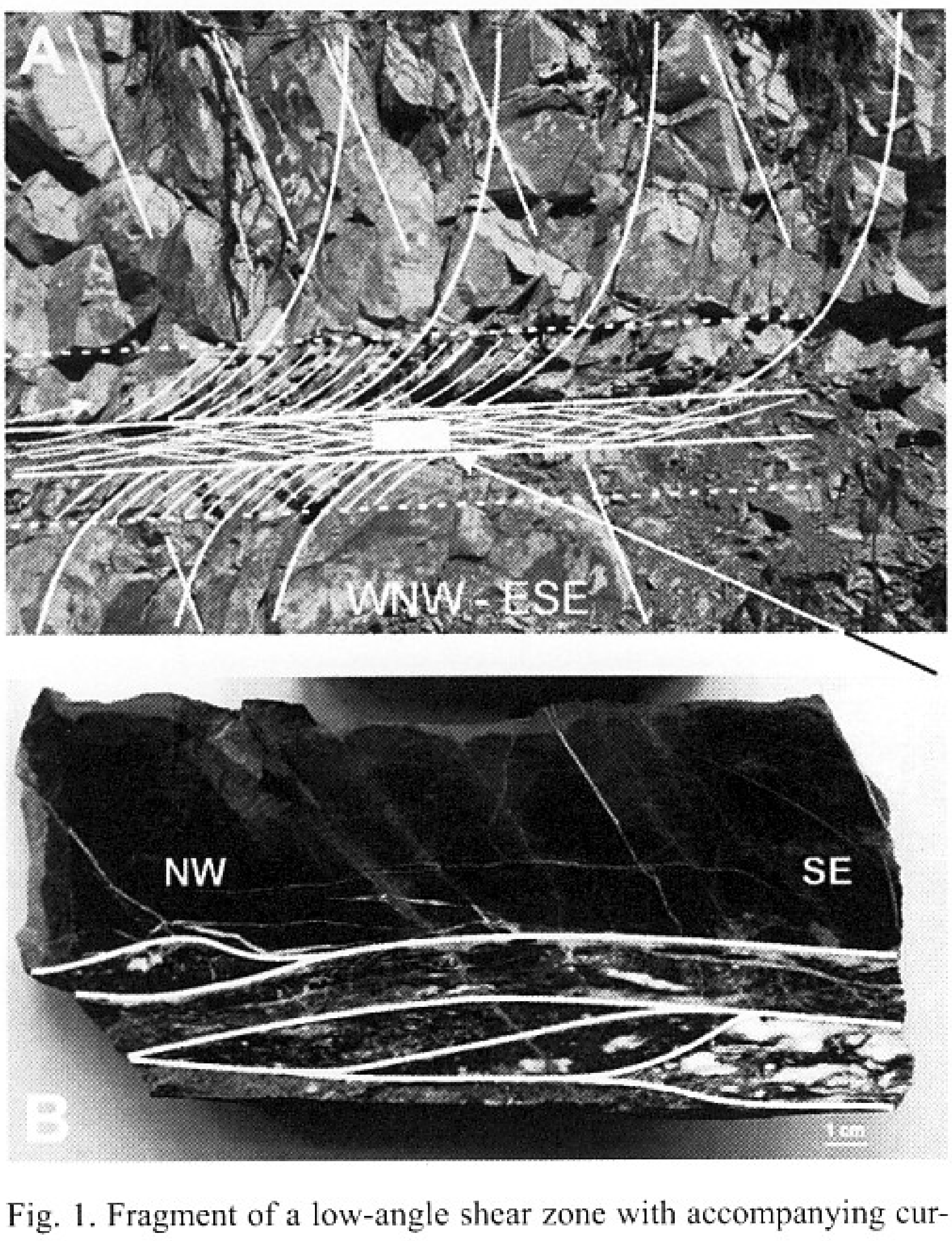

Fig. 1. Fragment of a low-angle shear zone with accompanying curviplanar joints (A) and shear zone detail (B)

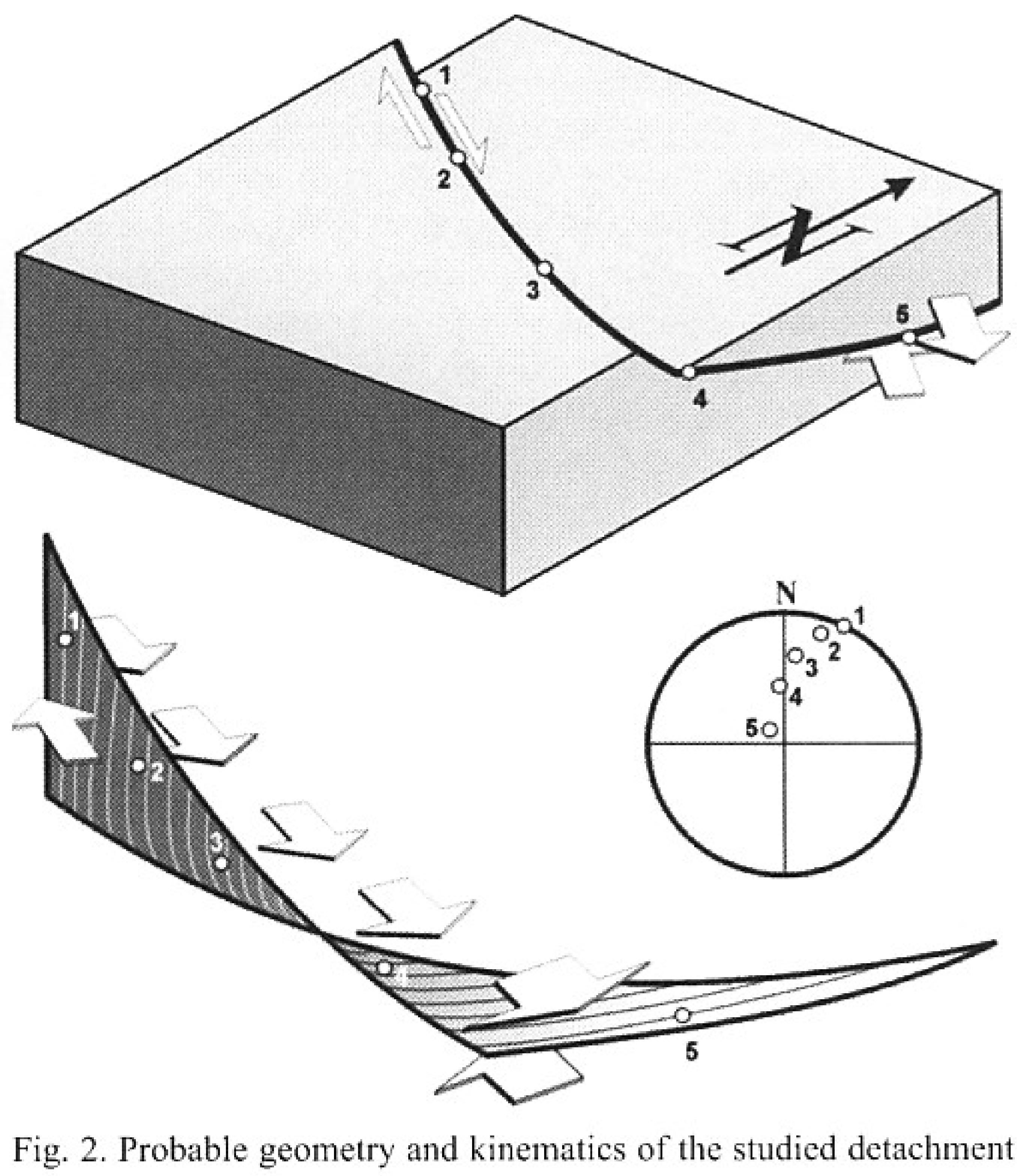

Fig. 2. Probable geometry and kinematics of the studied detachment

long and extend parallel to the shear zone boundaries. They are light grey to white, in contrast to the darker matrix. The veins and lenses are composed of coarse-grained calcite with grains up to several millimetres in size. They are intensely fractured, defining mortar or brick-wall structures. Locally, the fractures enclose lensoidal, partly grounded, lithic fragments, up to 2 mm in thickness. Most calcite grains are intensely strained and brittly-fractured, with translated and rotated fragments. Twin striations and cleat planes are distorted or displaced. Near to microfaults, recrystallization phenomena can be observed, such as amoebic grains and healing features.

The shear zone is both at its top and bottom accompanied by several cm-thick breccia layers of whitish grey colour. The breccia is composed of white calcareous lenses and light grey lithic matrix. It contains numerous microfaults and fractures.

Directly below and above the brittle shear zone, up to c. 25 cm apart from its boundaries, occur highly fractured host rocks with frequent curviplanar (listric-shaped) joints of attitudes at 290–315/50–75 (dip direction/dip), possibly representing shear zone-related tension fractures T. Some of these continue for a longer distance into the surrounding rock as fractures of attitude at c. 330/55–90. Together with the systematic fracture set of attitudes 160 –190/63–85 and 210–220/80–90, they define the penetrative joint network. The 210–220/80–90 joint set is the most common one in the study area and it occurs also far away from the faults and the zone of detachment in question. The joints of this set are often filled with calcite, whose fibrous aspect points to syntectonic growth in a dextral strike-slip regime.

The tectonic setting of the studied outcrops as well as the orientation of the joint sets and the internal structural features of the detachment shear zone seem to support a conjecture that the detachment originated due to thrusting in a local transpressional regime related to the nearby NW–SE-trending regional-size strike-slip fault system, SSFS, that was active probably in the Latest Cretaceous and during the Cenozoic times (Fig. 2).

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