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Structural similarities and differences north and south of the Periadriatic fault with examples of the Drau Range and Friauli

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The Periadriatic fault, a major strike-slip fault of the Alpine orogeny, separates the northern Austroalpine and the South Alpine units. The stratigraphies north and south differ widely, but knowledge is poor about structural differences. Our studies focused on an approximately 70 km long N-S profile along the maximum shortening from Oberdrauburg [Austria] to Spilimbergo [Italy]. Fault-slip data were analyzed from nearly 100 outcrops north and south of the Periadriatic fault. Inhomogeneous data is separated into homogeneous subsets by kinematic compatibility and evaluated field observations.

Four main groups and three minor ones can be distinguished. The main stress tensor groups are found north and south of the Periadriatic fault and have been ordered chronologically from old to young: (1) N-S thrust; (2) NW-SE strike-slip compression; (3) NE-SW compression, sigma 3 ranges gradually from subvertical to subhorizontal NW-SE; (4) N-S strike-slip compression. Geological evidence indicates (2) NW-SE strike-slip compression as youngest main stress field again. The chronological order is uncertain for minor paleostress tensor groups, the tensors of these groups are rare in the south and hardly present in the north. (5) E-W extension; (6) N-S extension; (7) NW-SE extension.

The comparison of the northern and southern areas shows that the deformation stages on either sides of the Periadriatic fault are quite similar. Significant differences are not visible in fault-slip data. It seems as if the mode of deformation has been unaffected by the Periadriatic fault and its lateral E-W displacement. The absolute amount of the displacement during various deformation stages differs. The Periadriatic fault is presumably associated with NW-SE compression. At least two NW-SE compressional events are recognizable, the second oldest and the youngest main deformation stage described here. For these stages, a partly contemporaneous lateral displacement of the Periadriatic fault is assumed.

We suggest constant stress fields over large-scale areas. The evolution of the northern and southern part must have been similar.

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