



## **Is Late Cretaceous intraplate deformation in central Europe unrelated to the Alps?**

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Intraplate basin inversion and basement thrusting of Late Cretaceous age in central Europe is widely accepted to have resulted from the collision of the Alpine orogen with Europe's margin. Yet, a synthesis of data on shortening directions, relative paleogeographic location and timing suggests that this is unlikely to be true for Late Cretaceous time. Our conclusion is based on three key observations: (1) Kinematic data for the NW trending fault zones in central Europe show predominantly dip slip, N to NE directed contraction. Late Cretaceous shortening in the Alps was practically perpendicular, directed W to NW. (2) Cretaceous thrusting in the Alps was restricted to Austroalpine units on the leading edge of the Adria microplate which lay far southeast of its present-day position and was separated from the future European foreland by a strip of subducting oceanic lithosphere. (3) When intraplate thrusting and inversion began in Central Europe around 90 Ma, the Austroalpine nappe stack had already entered a phase of extension. By contrast, the onset of intraplate contraction coincides with the major change in Africa's motion relative to the European plate from a SSE-directed sinistral transform motion to NE-directed convergence. Coeval, N to NE directed contraction in southern France, Spain (especially the Pyrenees) and North Africa suggests that the Late Cretaceous pulse of contraction was caused by pinching west-central Europe's thin lithosphere between Baltica and Africa. Only since the onset of N-directed thrusting in the Alps in Paleocene or Eocene time are the kinematics of the Alps and their European foreland compatible, indicating that mechanical coupling between Africa-Europe and the Adria microplate had been achieved.