a multi-stage growth history of the mineral, or, more likely, as a mixed age (with no geological meaning) due to incomplete resetting of the Sm-Nd system at 340 Ma.

The Pb-Pb data for garnet samples from granulites of the Variscan foldbelt shed new light on the pre-Variscan metamorphic evolution, and an important finding is the evidence for multiple metamorphic events as has been emphasized by O'Brien and Vrána (1995). The pre-Variscan metamorphic history has been preserved in garnet probably due to the fact that the late Variscan HT metamorphism did not reach temperatures high enough to reset the U-Pb isotope system in garnet. In contrast, the Sm-Nd system was reset in many cases and therefore it provides little information on the early metamorphic evolution of the belt.

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Late orogenic collapse and the unroofing history of the Variscan basement of southern Sardinia (Italy)

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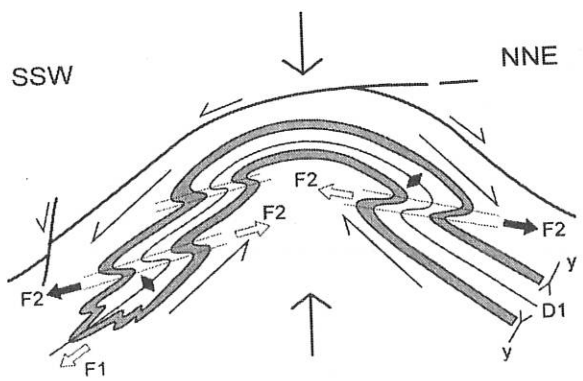
The Hercynian nappe stack of Sardinia originated from some stages of nappe imbrication during the Early Carboniferous phases of the Variscan orogeny. Crustal shortening caused regional SSW-directed thrusting, greenschist facies metamorphism and open to isoclinal SSW-facing polyphase folding.



CONTI et al., Fig.1

The deepest tectonic units in the Variscan basement of southern Sardinia crop out in the core of the largest upright antiformal structure (Flumendosa antiform). This WNW-ESE trending antiform, together with other km-scale structures (Barbagia synform, Gennargentu antiform), did not originate during late orogenic extension, but resulted from NNE-SSW shortening in the latest stage of crustal thickening.

During the beginning of late orogenic extension and exhumation, the limbs of the large-scale antiforms became preferred sites for normal faulting and recumbent folding. Most of faults are low angle normal faults. Below the normal faults and in shear zones in the limbs of upright antiforms are well developed asymmetric recumbent folds with WNW-ESE trending horizontal axes, which refold the main regional foliation and earlier collisional isoclinal folds. Asymmetric folds have flat lying axial planes and facing directions in the normal limb earlier isoclinal folds (black arrows in the Fig. 1) that point sideways, outward with respect to the hinge zone of the large scale antiform. These recumbent folds cannot be regarded as parasitic folds formed

during horizontal shortening and antiform development, but are interpreted to originate from vertical shortening of steeply inclined bedding and earlier foliation after antiform formation. Because we found normal faults with opposite dip and sense of movement in respect to the antiform crest, vertical shortening is hence partitioned into zones of non-coaxial deformation with opposite shear sense.

Exhumation of the Variscan basement of southern Sardinia is therefore accompanied by significant vertical shortening, documented by recumbent folds and low angle normal faults. This suggests gravitational collapse of the thickened orogen as a possible cause for extension in this sector of the Variscan orogen.

Paleozoic orogenesis in the Sudetes (NE part of the Bohemian Massif)

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The Sudetes (*sensu lato*) at the NE margin of the Bohemian Massif represent the principal exposure of the Variscan Orogenic Belt in Poland and Czech Republic with a relicts of a Neoproterozoic basement in the Lusatian and Brno Massifs. The Sudetes located between the NW-trending Odra Fault Zone and Elbe Fault Zone, are a very complex area. Crustal blocks showing contrasts in stratigraphy and metamorphic grade are mainly bounded by major ductile shear zones. The sharp oroclinal bend of the Variscan Orogenic Belt in this region further complicates geotectonic interpretations. The Sudetes mosaic-like structures still seem best explained as a complex of accreted terranes. These suspect terranes exhibit almost symmetrical distribution. A central terrane of magmatic arc rocks called as the Sowie Góry Terrane along with marginal/oceanic and ophiolitic rocks (the Central Sudetic Terrane) is bordered, respectively to the NW and SE, by the sialic Saxothuringian Terrane and Moldanubian Terrane. These are in turn bordered (again respectively to the NW and SE) by the Lusatian Terrane and Moravian Terrane, which are also sialic, but contain Cadomian granitoids and represent rifted and disrupted fragments of Gondwana affinities.

The Late Caledonian Orogeny, presumed to be present in the Sudetes by some geologists, is disproved by the stratigraphic record of Early Paleozoic to Early Carboniferous sequences. Deformation of Variscan age commenced in Late Devonian time, locally concurrent with a phase of blueschist facies metamorphism, and continued till Early Carboniferous time with crustal imbrication under greenschist to amphibolite facies conditions. Extensive HT-LP recrystallization associated with Late Variscan granitoid intrusions has almost obliterated the earlier blueschists. However, the principal stage of Variscan deformation in the Sudetes corresponds to the Sudetic phase (Late Visean).

New field and radiometric data from the Sudetes lead to new conclusions about the Variscan orogenic history of the NE part of the Bohemian Massif. Two major structural events characterize the Paleozoic (Variscan) tectonic evolution of the Sudetes: (1) Late Devonian-Early Carboniferous regional-scale ductile thrusting, and (2) Early Carboniferous-Early Permian regional extension.

The Late Devonian-Early Carboniferous regional-scale ductile thrusting is characterized by: (i) a general NNE-directed, dextral transpressional stacking of ductile nappes (sheets) due to oblique collision of the Moldanubian and Moravian microplates (terranes) in eastern part of the Sudetes, and (ii) SW- to NW-directed, sinistral transpressional stacking of ductile nappes due to westward lateral extrusion of continental crust (Saxothuringian Terrane) in central and western parts of the Sudetes as a result of oblique indentation of the oceanic lithosphere (Central Sudetian Terrane). New structural and kinematic data show the fact that the first part of the deformation in the Sudetes might reflect a purely convergent setting that evolved into a transpressive setting during oblique convergence.

In the Sudetes, the main structures resulted from a single kinematic event combining compressional and wrenching regime of strain (transpression). Domains of transpression in the Sudetes exhibit structures, such as stretching mineral lineations, folds, foliations, and shear zones, with orientations that vary within these areas. In general, these have been interpreted as recording partitioning of strain in order to accommodate contraction, extension, and transcurrent motion either sequentially or simultaneously. I report on the development of complex structures in transpressional shear zones in different part, of the Sudetes due to a heterogeneous distribution of strain across the transpression zones. A progression in the localization of strain partitioning is very common in the Sudetes. Strain localization may be the results of sequential or simultaneous uplift during transpressive deformation moving the metamorphic complexes into progressively less ductile levels.

As a regional example, the Rudawy Janowickie metamorphic complex (the eastern part of the Karkonosze-Izera Dome) is characterized by two stages: D_1 transpressional event and D_2 extensional deformation each exhibiting a different kinematic and metamorphic evolution. The older dextral transpression which caused an oblique emplacement of the Leszczyniec unit over the Niedamirów unit occurred before the Late Visean and was synmetamorphic (HP-MT).