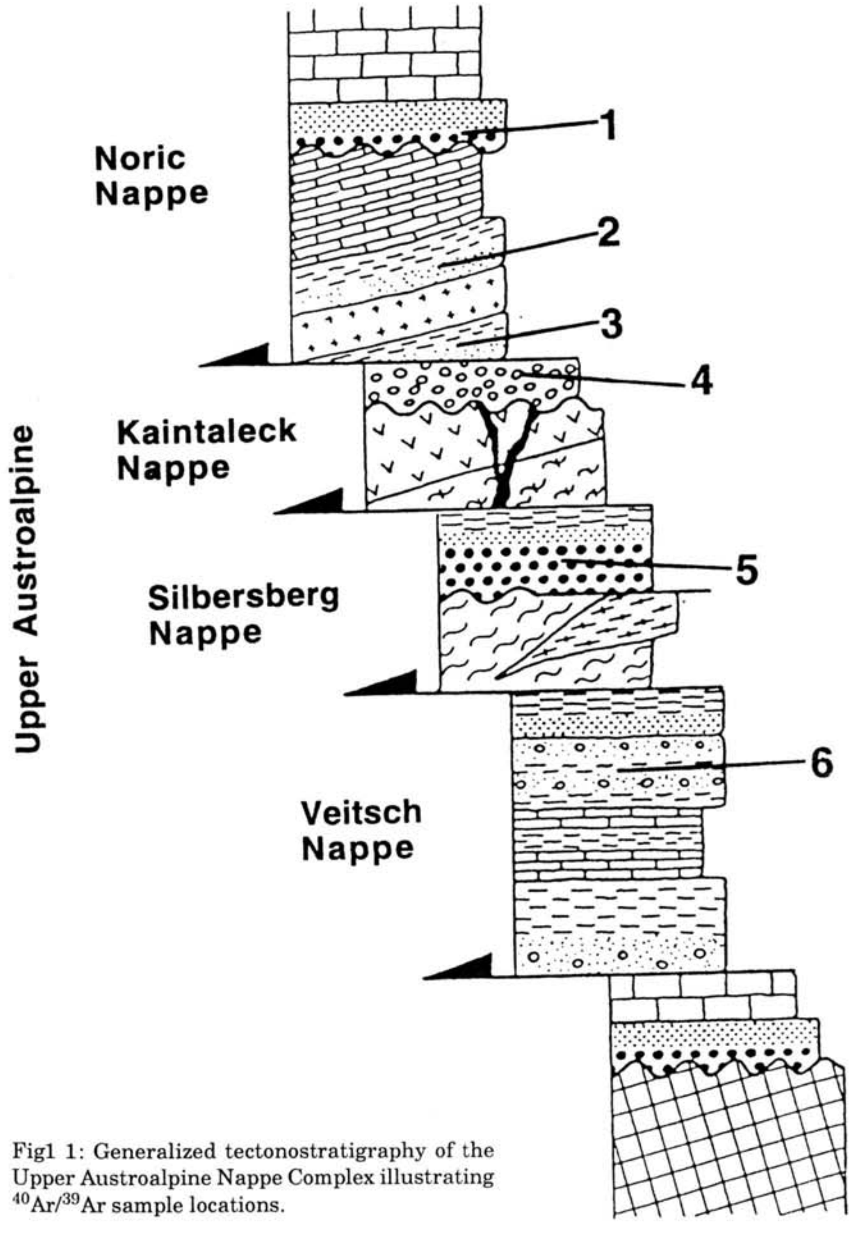

Figl 1: Generalized tectonostratigraphy of the Upper Austroalpine Nappe Complex illustrating $^{40}Ar/^{39}Ar$ sample locations.

the Noric Nappe cover have not been derived from the presently-exposed, immediately underlying basement rocks (which record only a low-grade Variscan metamorphic overprint). They must have originated within a source area which suffered a completely different tectonometamorphic evolution. The very short time interval suggested between uplift, erosion and sedimentation of detrital white micas within the Veitsch Nappe is consistent with the molassic character of the host sediments; 2) an Early Variscan (Caledonian?) source area for the orthogneiss boulder of the Kaintaleck Nappe, and for detrital white micas within Permian cover of the Silbersberg Nappe. A possible source area may be exposed within basement units of the Kaintaleck Nappe (for which a late Silurian - Devonian amphibolite facies metamorphism has been suggested); and 3) a Cadomian source area for sediments of the Noric Nappe basement. A similar source has previously been suggested for detrital white micas of similar age from Ordovician sandstones of the Carnic Alps and from the Gurktal Thrust System.

The detrital white mica ages confirm an Alpine age of nappe assembly within the UAANC because sediments containing older (Cadomian) detrital white micas have been thrust over sediments continaing much younger (Variscan) detrital white micas. Therefore assembling of present tectonic geometry could not have occurred during Variscan tectonic activity. It must reflect Alpine nappe assembly. However, the $^{40}Ar/^{39}Ar$ results record only a very low influence of Alpine deformation/metamorphism.

THE APPALACHIAN OROGEN - PRODUCT OF ARC, TERRANE, & CONTINENT-CONTINENT COLLISION

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The Appalachian orogen is the product of closing of several Paleozoic oceans following Late Proterozoic rifting, and a Paleozoic history that may record several Wilson cycles. Major throughgoing units include the North America basement, Late Proterozoic rifted margin and slope-rise assemblages and lower Paleozoic cover, and the Avalon–Carolina exotic terrane. The history along the Laurentian margin was consistent throughout the orogen to Early Silurian time, with formation of a Late Proterozoic rifted margin, an early Paleozoic passive margin, and then destruction during the Penobscottian and Taconian (Ordovician) events with ophiolite obduction, arc accretion, emplacement of thrust and fold nappes, metamorphism, and plutonism. The Taconian event was diachronous – older (or a different event) to the south and north; younger in the central. Taconic allochthons derived from the outer margin are confined to the northern half of the orogen. Tectonic history of the internides is remarkably dissimilar along the length of the Appalachians throughout the remainder of the Paleozoic. Accretion of the Avalon/Carolina volcanic arc terrane probably occurred during the Taconian. In the northern Appalachians, one or more seaways remained open receiving turbidites until the Middle Devonian, and deformation of the internides was Acadian producing early fold–thrusts, metamorphism, possible underthrusts, backfolding, and gneiss domes; no known parallels exist in the southern or central Appalachians. Devonian plutons dominate in NE; fewer occur in the south where Ordovician and Carboniferous–Permian plutons dominate. Devonian metamorphism dominates throughout the north; its extent in the south is not clear, but may prove equally important because the internides may be dominated by a crustal-scale Acadian shear zone that decoupled the Blue Ridge from the Piedmont. The tectonic style in the south is dominated by Alleghanian (Permian) cratonward-directed thrusts in both the internides and foreland, and early Alleghanian dextral faults in the internides. Ordovician and Carboniferous–Permian plutons dominate in the south; Devonian plutons to the north. Foreland clastic wedges indicate the extend of uplift during all three events: Taconian wedges are diachronous and extend along the entire orogen; a single Acadian wedge extends from New York to northern Virginia, and diachronous Alleghanian wedges extend from Pennsylvania to Alabama, and westward into the Ouachitas. Alleghanian collision with Africa was probably rotational-oblique -zippered- involving promontories along an irregular continental margin. Oblique collision in the north produced only early Alleghanian (Carboniferous) dextral faulting and internal pull-apart basins, but in the south produced both early (Carboniferous) dextral faults and later (Permian) megathrusts by head-on collision. Basements generated during earlier orogenies served to consolidate the orogen, but were transported westward in the south aboard the megathrust sheet.Several buried terranes are present beneath the Coastal Plain in Florida, Alabama, and Georgia that, together with geophysical data, reveal a major suture that truncates Appalachian structure, south of which is African cratonic basement and Paleozoic cover. Alleghanian foreland deformation was driven ahead of the megathrust sheet and overlaps Ouachita deformation beneath the Gulf Coastal Plain. The orogen was extended during the Triassic and Jurassic during opening of the Atlantic.

The Appalachian orogen is similar to the Scandinavian Caledonides and Urals, although several important differences also exist, and is markedly dissimilar to the British Caledonides and the Variscan orogen. The Scandinavian Caledonides formed by collision during the Silurian and underwent extensional collapse during the Devonian. Compressional events affected the Urals at times similar to the Appalachians, but did not undergo extensional collapse precursor to another spreading event.

THERMAL MODELING OF LATE–OROGENIC EXHUMATION AT A VARISCAN SUTURE ZONE (SOUTHERN RHENOHERCYNIAN ZONE AND WESTERN MID–GERMAN CRYSTALLINE RISE)

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Thermal modeling techniques constrained by published petrologic and thermochronometric data were applied to examine the late–orogenic exhumation of southern Rhenohercynian zone and western Mid-German Crystalline Rise. These crustal units are separated by a prominent suture zone which traces the site of a small oceanic basin. Closure of this basin during Variscan subduction and subsequent collision of continental units were responsible for the different tectonometamorphic histories in the southern Rhenohercynian and northern Saxothuringian zones. Thermal modeling suggests that initial exhumation of the western Mid–German Crystalline Rise was characterized by a brief stage with rapid uplift at rates of more than three mm/a. Comparison with data from other orogenes suggests that such high uplift velocities were largely the result of extensional strain rather than erosion. Similarly rapid uplift of the southern Rhenohercynian zone immediately after thrusting was followed by a