

Kontinentales Tiefbohrprogramm der Bundesrepublik Deutschland K-Ar Geochronology of the East-Bavarian Basement

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Systematic K-Ar dating on hornblendes, muscovites and biotites from different units of the NE-Bavarian basement were performed to date the last metamorphic event within these units. The results are of interest for the reconstruction of the paleotectonic development of this region and may be helpful for the identification of rocks from the KTB drill cores.

AUTOCHTHONOUS UNITS

The Saxothuringian Fichtelgebirge crystalline complex, the Moldanubian s.str., and the Zone Tirschenreuth-Mähring as a transitional zone between both yielded almost exclusively mid- to late Carboniferous dates. The oldest of these dates (330 to 320 Ma) testify to a regional metamorphic event in the early Carboniferous, immediately followed by the intrusion of the first post-kinematic Variscan granites. Numerous radiometric dates of the Moldanubian s. str. from literature indicate, too, that the latest regional event, a low-pressure metamorphism, ceased around 320 to 320 Ma ago. In the Fichtelgebirge and in the northern part of the Moldanubian s.str. the first post-kinematic granites intruded around 320 Ma. Scattered dates down to 295 Ma are frequent in the metamorphic series and reveal thermal influences of later granite pulses of the Late Carboniferous to earliest Permian.

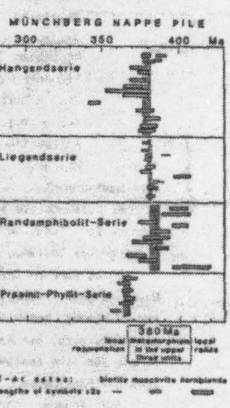
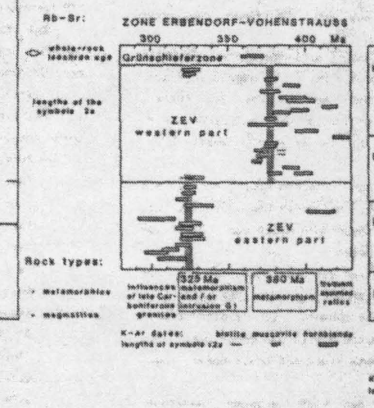
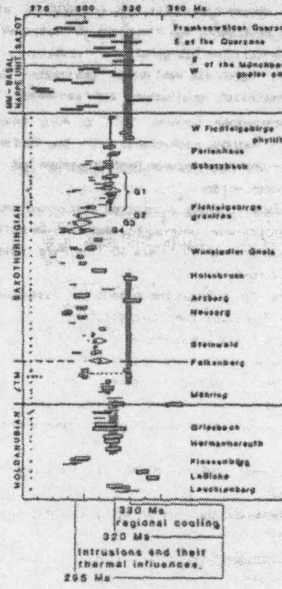
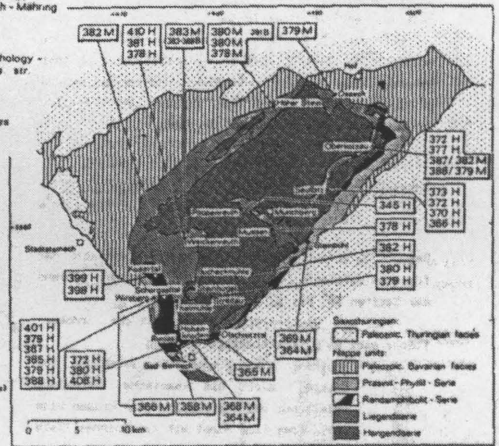
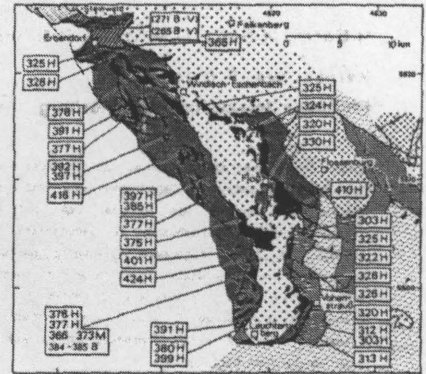
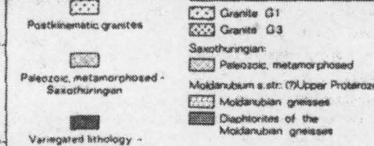
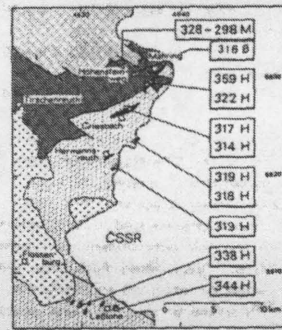
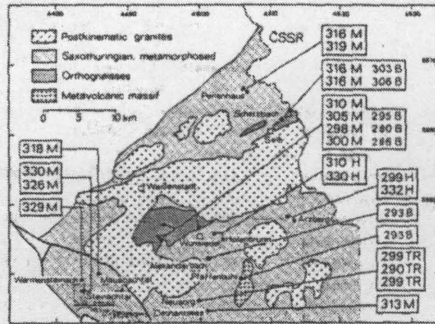
ALLOCHTHONOUS UNITS

Higher metamorphic rocks from the Hangend-, the Liegend-, and from the Randamphibolit-Serie of the Münchberg nappe pile document an early Devonian event. K-Ar dates around 380 Ma probably indicate the end of a regional metamorphism under medium-pressure, amphibolite facies conditions. The slightly discordant muscovite dates from the Prasinit-Phyllit-Serie between 368 and 358 Ma as well as a slight increase in the biotite dates of the Liegendserie and a decrease in some hornblende dates of the Hangendserie point to a partial reset which may be correlated to nappe thrusting.

Mid-Carboniferous to early Permian K-Ar dates from illites of the lowermost nappe unit (Bavarian lithofacies) as well as the adjacent autochthonous Saxothuringian (Thüringian lithofacies) correlate to K-Ar dates from the Fichtelgebirge and the Moldanubian s.str. (see Arendt et al., 1986).

In the western part of the Zone Erbdorf-Vohenstrauß muscovite dates around 373 Ma and slightly older hornblende dates around 380 Ma point to an early Devonian regional metamorphic event, similar to the Münchberg complex. A considerable scatter of hornblende dates to higher values can be explained either by excess Ar or by inherited Ar.

In the eastern part of the Zone Erbdorf-Vohenstrauß, hornblende dates are distinctly younger with the majority of values around 324 Ma. These younger dates are due to either a regional metamorphic overprint contemporaneous with the low-pressure metamorphism in the neighbouring Moldanubian s.str., and/or thermal influence of the Leuchtenberg granite intrusion which took place about 324 Ma ago (Köhler & Müller-Sohnius, 1976; Harre et al., 1985). Since this granite forms a sheet dipping to the south and east, a thermal influence would mainly have affected the country rocks at the southern and eastern contact.



New K-Ar investigations of our working-group on minerals from the Zone Tepla-Donaslice are under progress. This zone is presumed to be a continuation of the E-Bavarian nappe units. Furthermore, current ³⁹Ar/⁴⁰Ar measurements on those samples which gave diverging high or low values from the Münchberg complex and the western part of the Zone Erbdorf-Vohenstrauß may give the reason for the deviation.

Literature:
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