Zeitschrift: Schweizerische mineralogische und petrographische Mitteilungen = Bulletin suisse de minéralogie et pétrographie

Band: 59 (1979)

Heft: 1-2

Artikel: Research on metamorphism

Autor: Trommsdorff, V.

DOI: https://doi.org/10.5169/seals-46053

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Siehe Rechtliche Hinweise.

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. Voir Informations légales.

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. See Legal notice.

Download PDF: 26.04.2025

ETH-Bibliothek Zürich, E-Periodica, https://www.e-periodica.ch

Schweiz. mineral. petrogr. Mitt. 59, 161–163, 1979

Swiss National Committee for the International Geodynamics Project
Working Group 7: Metamorphism

Research on Metamorphism

Report by *V. Trommsdorff**)

Research on Metamorphism may be regarded as a marginal topic within the Geodynamics Project. However, considerable activity in this field has also contributed to an understanding of crustal movements in the Swiss Alps.

During the period 1971–1979 three Swiss colloquia on Metamorphism were held (1973 at University of Fribourg; 1976 at University/ETH at Zürich and 1979 at University of Lausanne). At the twenty-fifth anniversary of the Schweizerische Mineralogische und Petrographische Gesellschaft, a 600 page volume on Alpine metamorphism in the Alps was published (general review by FREY et al 1974).

In addition, the Swiss part of the metamorphic map of Europe (E. NIGGLI 1973) was finished during this period, and a map on Alpine Metamorphism in the Alps was published (FREY et al 1974).

Field and laboratory work on Alpine metamorphism was focused on three main topics:

1) *Mapping of isograds (other than already known) on a regional scale and in variable rock compositions:* marly and pelitic rock (FREY 1974; WENK, H.-R. et al 1974), mafic rocks(DIETRICH et al 1974), carbonate rocks (TROMMSDORFF 1972), ultramafic rocks (TROMMSDORFF and EVANS 1974). These new data helped to refine, but did not drastically change, the pattern that was recognized earlier.
2) *Mapping of isograds in relation to structure on a local scale* i.e. Simplon area (STRECKEISEN and WENK 1974), Misox area (P. THOMPSON 1976), Lukmanier (FOX 1975). These isogradic surfaces are subvertically (Simplon) to steeply north (Lukmanier, Misox) dipping and crosscut lithological and structural boundaries. P-T estimates of metamorphism along the Swiss Geotraverse (FREY et al 1976) are for geometric reasons in conflict with the above observations. This problem still remains to be solved.

*) Institut für Kristallographie und Petrographie, ETH-Zentrum, CH- 8092 Zürich (Switzerland)

In the Glarus Alps (FREY et al 1973) and in the northwestern Swiss Alps (MULLIS 1979), Alpine isograd patterns were recognized that predate nappe formation and are thus transported.

3) *Evaluation of polyphasic Alpine metamorphism in the Swiss Alps and relative location of metamorphic events in both space and time on the basis of combined petrographic and structural evidence* (AYRTON & RAMSAY 1974). In wide areas of the Pennine nappes, an early Alpine high-pressure metamorphism has been recognized (BEARTH 1974). In the Central Alps very high-pressure subduction zone metamorphism of unknown age has been analyzed (EVANS et al 1979). These high-pressure parageneses were in most places overprinted by mineral assemblages of lower pressures and often higher temperatures. In many areas these metamorphic phases were accompanied and then outlasted by Alpine vein- and fissure mineral formation. Studies of fluid inclusions in these veins and fissures revealed P-T data that are useful for the understanding of the Alpine uplift history (POTY et al 1974, MERCOLLI 1979).
In the Eastern Bergell area regional metamorphism is overprinted by contact metamorphic assemblages (TROMMSDORFF & EVANS 1972), both events being separated by intrusion of andesitic dykes (GAUTSCHI und MONTRASIO 1978). Early, rapid and later, moderate uplift then brought the Bergell Alps into their present position (MILLER et al 1978).

Literature

SMPM=Schweizerische Mineralogische und Petrographische Mitteilungen.

AYRTON, ST. N. and RAMSAY, J. (1974): Tectonic and metamorphic events in the Alps. SMPM 54, 609-639.

BEARTH, P. (1974): Zur Gliederung und Metamorphose der Ophiolite der Westalpen. SMPM 54, 385-397.

DIETRICH, V., VUAGNAT, M. and BERTRAND, J. (1974): Alpine metamorphism of mafic Rocks. SMPM 54, 292-332.

EVANS, B.W., TROMMSDORFF, V. and RICHTER, W. (1979): Petrology of an eclogite-metarodingite suite at Cima di Gagnone, Ticino, Switzerland. American Mineralogist, 64, 15-31.

FOX, J. S. (1975): Three dimensional isograds from the Lukmanier Pass, Switzerland and their tectonic significance. Geol. Mag.112, 547-564.

FREY, M. (1974): Alpine Metamorphism of Marly and Pelitic Rocks in the Central Alps. SMPM 54, 489-506.

FREY, M., HUNZIKER, J. C., ROGGWILER, P. und SCHINDLER, C. (1973): Progressive niedriggradige Metamorphose glaukonitführender Horizonte in den helvetischen Alpen der Ostschweiz. Contrib. Mineral. Petrol. 39, 185-218.

FREY, M., HUNZIKER, J. C., FRANK, W., BOQUET, J., DAL PIAZ, G. V., JÄGER, E. and NIGGLI, E. (1974): Alpine metamorphism of the Alps. A Review. SMPM 54, 248-290.

FREY, M. JÄGER, E. and NIGGLI, E. (1976): Gesteinsmetamorphose im Bereich der Geotraverse Basel-Chiasso. SMPM 56, 649-659.

GAUTSCHI, A. und MONTRASIO, A. (1978): Die andesitisch-basaltischen Gänge des Bergeller Ostrandes und ihre Beziehung zur Regional- und Kontaktmetamorphose. SMPM 58, in press.

MERCOLLI, I. (1979): Le inclusioni fluide nei noduli di quarzo dei marmi dolomitici della regione del Campolungo (Ticino). Dissertation ETH Zürich.

MILLER, D. S., WAGNER, G. A. and JÄGER, E. (1978): Fission track ages on apatites, sphenes and zircons of Bergell rocks from the Central Alps and of Bergell boulders in oligocene sediments. Short papers of the 4th international Conference on Geochronology, Cosmochronology and Isotope Geology, U.S. Geol. Survey, Open file report 78, 701.

MULLIS, J. (1979): Fluideinschlüsse in den Nördlichen Schweizeralpen: Hinweise auf transportierte Metamorphose. Colloque Suisse sur le Metamorphisme, Vortrag Lausanne.

NIGGLI, E.(1973): Metamorphic map of Europe 1:1000000 Sheet 17, Metamorphic map of the Alps.

POTY, B. P., STALDER, H. A. and WEISBROD, A. M. (1974): Fluid Inclusions studies in Quartz from fissures of Western and Central Alps. SMPM 54, 717-752.

STRECKEISEN, A. and WENK, E. (1974): On steep isogradic surfaces in the Simplon area. Contrib. Mineral. Petrol. 47, 81-95.

THOMPSON, P. H. (1976): Isograd Patterns and Pressure-Temperature Distributions during Regional Metamorphism. Contrib. Mineral. Petrol. 57, 277- 295.

TROMMSDORFF, V. (1972): Change in T-X during metamorphism of siliceous dolomite rocks of the Central Alps. SMPM 52, 567-571.

TROMMSDORFF, V. and EVANS, B. W. (1972): Progressive metamorphism of antigorite schist in the Bergell tonalite aureole (Italy) Amer. Journ. Sci. 272, 423-437.

TROMMSDORFF, V. and EVANS, B. W. (1974): Alpine metamorphism of peridotitic rocks. SMPM 54, 334-352.

WENK, H.-R., WENK, E. and WALLACE, J. H. (1974): Metamorphic mineral assemblages in pelitic rocks of the Bergell Alps. SMPM 54, 507-554.

Manuscript received July 23, 1979