International Geological Correlation Programme, project 105 : continental margins in the Alps

Autor(en): **Bernoulli, Daniel**

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International Geological Correlation Programme, project 105: Continental Margins in the Alps

By DANIEL BERNOULLI

From seafloor spreading and continental drift, it follows that Alpine-type mountain ranges are the result of deformation and elimination of former ocean basins and continental margins. Such a view was implicit in the mobilistic concepts of Alpine geology since the times when classical nappe theory was developed. However, only the opening histories of the Mesozoic–Cenozoic oceans and a related understanding of sedimentary facies in the frame of continental margin evolution provide some of the prerequisites for a reconstruction of the paleotectonic and sedimentary evolution of the Tethyan ocean and its margins. Within this general context, IGCP-project 105 aimed at a better understanding of the early development of the paleotectonic elements now assembled in the Alps.

Our project was a small project with limited financial support. We therefore chose activities which were complementary to large international projects, and we organized field symposia for younger scientists working actively on problems of paleotectonics in the Alps and in neighbouring areas. Between 1976 and 1979 four workshops were realized and a final symposium, summarizing some of the project's results, was held, within the frame of the 160th Annual Assembly of the Swiss Academy of Natural Sciences, on 17–18 October 1980 in Winterthur. Organization of the workshops and of the final symposium and publication of the symposium proceedings in this issue of Eclogae geologicae Helvetiae was made possible by financial contributions from the International Geological Correlation Programme (International Union of Geological Sciences/Unesco), the Swiss Academy of Natural Sciences and the Swiss Committee for Unesco. All these contributions are gratefully acknowledged.

The main topics the project dealt with concerned Early Jurassic rifting in the future continental margins; the subsequent sedimentary, bathymetric and paleoenvironmental evolution of the margins during drifting and accretion of oceanic crust; and finally the turn from subsiding margins of Atlantic-type to margins governed by subduction and orogeny in the "mid-Cretaceous". Early rifting movements which were discordant to the earlier, Triassic, evolution (CASTELLARIN & ROSSI, this volume) are well documented by rapid changes of facies and formational thickness of synrift sediments across Liassic faults and by the existence of pronounced fault scarps which became the source areas for marine breccia formations (workshop 1976). Along passive Atlantic-type margins, synsedimentary faulting decreased with the onset of formation of ocean crust in the Liguria–Piemont zone and subsidence

was more evenly distributed over the margins, apparently following a curve of exponential decay (WINTERER & BOSELLINI 1981). Sedimentary facies during subsidence of passive margins during the Middle/Late Jurassic to Early Cretaceous was determined mainly by persisting Bahamian-type carbonate platforms with adjacent belts of turbiditic carbonate sedimentation (BOSELLINI et al. 1981), and by pelagic sediments in the starved distal continental margins whose facies was mainly determined by the inherited submarine morphology and some ongoing synsedimentary faulting (WEISSERT, this volume), increasing water depth reflected in the carbonate solution facies (BERNOULLI et al. 1979), and basin-wide oceanographic events: the traces of the "mid-Cretaceous" anoxic events are recorded over a wide range of sedimentary environments and paleotectonic settings (GRACIANSKY et al., this volume).

Along the northern margin of the Liguria-Piemont ocean, north and south of the Briançonnais platform, local uplifted blocks and long-lived fault scarps associated with marine breccia formations point to the interference of transverse movements along a transform margin. Comparison with sedimentation and magmatic activity in the young Gulf of California suggests oblique rifting, eventually combined with the emplacement of serpentinites and the intrusion of mafic rocks in the north-Pennine Valais Trough (KELTS, this volume). Whereas Cretaceous flysch sediments in this north-Pennine trough are probably still related to transcurrent movements, Cretaceous flysch sequences in the south-Pennine (workshop 1979, CARON et al., HESSE, both this volume) and Austro-Alpine realm are certainly related to incipient subduction and orogeny: the associated structures, however, are largely unknown, particularly for the South-Alpine Lombardian Flysch (BICHSEL & HÄRING, this volume). It is hoped that these fundamental problems of early Alpine tectonic evolution will be approached in future projects.

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