

NATURWISSENSCHAFTEN

DIE GEOMORPHOLOGISCHE ENTWICKLUNG DER OSTALPEN

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mit 15 Abb. im Text

INHALT

| | |
|---|-----|
| <i>Summary</i> | 123 |
| <i>Zusammenfassung</i> | 124 |
| 1 Einführung | 125 |
| 2 Geomorphologische Charakteristika der Ostalpen | 127 |
| 3 Methoden zur Rekonstruktion der geomorphologischen Geschichte der Ostalpen | 134 |
| 4 Die geomorphologische Entwicklung der Ostalpen | 140 |
| 5 Schlussfolgerungen | 157 |
| 6 Literaturverzeichnis | 159 |

Summary

The geomorphologic evolution of the Eastern Alps

The Eastern Alps are characterized by rugged topography with high relief and great maximum and average elevations in their western part, and by lower relief and elevations in their eastern part. In the eastern part, remnants of two paleosurface systems are preserved: the Late Eocene to Early Oligocene Dachstein paleosurface in

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the Northern Calcareous Alps and the Early Miocene Nock paleosurface in the central part of the orogen east of the Hohe Tauern. The present-day diversity of landforms has its roots in the geologic-tectonic evolution since the Eocene orogeny. In Early to Middle Miocene times occurred a fundamental reorganization of particularly the eastern part of the Eastern Alps: "lateral tectonic extrusion" led to the disintegration into tectonic blocks along fault zones, to the formation of fault-bounded longitudinal valleys, and to considerable west-east stretching of the orogen; the elongated shape of the Eastern Alps is therefore a geologically young phenomenon.

The western part of the Eastern Alps, characterized by large crustal thickness, already raised to a high mountain-chain in Early Oligocene times and did not fundamentally change since then. The large river system of the Paleo-Inn was established. The river follows the large Inntal fault until present and therefore largely maintained its course over the whole period, although its exit into the Molasse zone repeatedly changed its position. In the eastern part of the Eastern Alps the karstified, hilly lowlands in the Calcareous Alps (the Dachstein paleosurface) became sealed by the sediments of the Augenstein Formation in Oligocene to Early Miocene times, and again denuded by erosion later in the Miocene. During the following uplift the paleosurface was largely protected from erosion in those areas, which were dominated by thick Triassic limestone sequences, because erosion mainly acted in the subsurface domain by the formation of huge cave systems. For this reason, significant remnants of the paleosurface are today preserved as elevated plateaus. The Augenstein Formation received its sediment material from the south, where the Nock paleosurface formed as a planation surface in Early Miocene time, towards the end of sedimentation in the Augenstein depositional area. The Nock paleosurface was probably not uplifted before Pliocene times. For this reason, erosion remained moderate ("modified paleosurface"). Both paleosurface systems became dissected by the Miocene fault system, the single tectonic blocks experienced different uplift in the following period. For this reason the paleosurface remnants are found at different elevations today.

Zusammenfassung

Die Ostalpen zeichnen sich durch einen topographisch rauhen Westteil mit hohem Relief und großen maximalen und mittleren Höhen und einen Ostteil mit geringerem Relief und geringeren Höhen aus. Im Ostteil sind Reste von zwei großen Altflächensystemen erhalten: der obereozän-unteroligozänen Dachstein-Altfläche in den Nördlichen Kalkalpen und der untermiozänen Nock-Altfläche in den Zentralalpen östlich der Hohen Tauern. Die heutige Formenvielfalt der Ostalpen hat ihre Ursache in der geologisch-tektonischen Entwicklung seit der eozänen Gebirgsbildung. Im Unter- bis Mittelmiozän erfolgte eine grundlegende Umgestaltung vor allem der östlichen Ostalpen: „laterale tektonische Extrusion“ führte zur Zerlegung in tektonische Blöcke entlang von Störungen, zur Bildung der störungsgebundenen Längsfurchen und zu einer erheblichen West-Ost-Streckung des Gebirges, dessen lang gestreckte Gestalt somit ein geologisch junges Phänomen darstellt.