Zeitschrift: Eclogae Geologicae Helvetiae
Herausgeber: Schweizerische Geologische Gesellschaft
Band: 85 (1992)
Heft: 3: Symposium on Swiss Molasse Basin

Artikel: Mesozoic subsidence analysis from the Jura to the Helvetic realm
Autor: Funk, H. / Loup, B.
DOI: https://doi.org/10.5169/seals-167040

tion and the onset of the perialpine basin which, by further migration was subsequently becoming the Molasse basin. Origin, evolution and migration of this basin is mainly the effect of the overload caused by the arriving higher nappe units. During the late Eocene subsidence is enhanced by the formation of SW-NE striking normal faults which controlled the pattern of sedimentation during that period.

The two first transgressive events in the middle and at the end of the Paleocene are restricted to southeastern areas and the corresponding sediments in many areas underwent erosion during the following regressive phases, thus reflecting mainly eustatic sea level changes. The Einsiedeln Formation of Cuisian age covers wide areas in the highest nappes of Eastern to Central Switzerland and, after a phase of strong subsidence, is followed by the hemipelagic Globigerina marls of Middle Eocene age. The unconformity at the base of these Paleocene and Eocene formations shows virtually no effects of subaerial erosion. Further to the North and to the West the Middle Eocene Bürgen and Klimsenhorn Formations reflect two subsequent transgressive events, both induced by sea level rise, but followed by strong subsidence of the corresponding areas during the Late Eocene. In northwestern direction increasing traces of subaerial erosion are noted and, in the Helvetics of Western Switzerland and at the northern border of the Aar Massif in Central Switzerland, strong carstic erosion of the Mesozoic limestones occurred prior to the Late Eocene transgression. The arrival of the higher nappe units therefore not only produced a strong subsidence of the foreland but at the same time a corresponding forebulge uplift in the adjacent northwestern areas.

Special conditions are noted in the north-helvetic areas of Western Switzerland where the Basal Tertiary subcrop map shows some undulations, and the Aiguilles Rouges Massif was strongly uplifted, tilted and deeply eroded in its southern part during the Late Eocene.

Mesozoic subsidence analysis from the Jura to the Helvetic realm

By H. Funk [1]) and B. Loup [2])

[1]) Geological Institute, ETH-Zentrum, CH-8092 Zürich

[2]) Inst. de Géologie, 13 rue des maraîchers, CH-1211 Genève 4

Based on a palinspastic restoration of the Helvetic realm, the Swiss Plateau and the Jura, the Mesozoic subsidence history is reconstructed from outcrop and borehole data for more than 70 sections. The following parameters were taken into account for each lithological unit: age of sediments, compaction corrected sediment thickness (Sclater & Christie 1980), depositional depth estimations, erosion and eustatic sealevel corrections (long term curve of Haq et al. 1987). (See Funk 1985, Wildi et al. 1989 and Loup, this volume, for more technical details).

After removal of the sediment loading effect, tectonic subsidence curves can be constructed; they allow the investigation of the driving mechanisms of subsidence.

Here, an Airy model of basement compensation has been assumed throughout basin evolution. Comparison with three stretching models of the entire lithosphere (uniform [McKenzie 1978], crustal [Royden et al. 1983] and subcrustal streching [Royden & Keen 1980, Hellinger & Sclater 1983]) shows that the area can not be explained by one single model. Whereas subcrustal extension can generally account for the first order subsidence (whole Mesozoic and Cenozoic), the three stretching mechanisms are necessary to explain the "patchwork" pattern between domains as well as in the same area of the second order subsidence (50 to 60 my). This last point is especially evident for part of the Jura and the whole Plateau.

The Triassic movements mainly documented in the Jura and the northern part of the Swiss Plateau are rather linked to late Variscan events in the European lithosphere or to the reactivation of Variscan structures than a direct consequence of tethyan history.

These early movements show features of initial subsidence while thermal relaxation is generally the main driving mechanism in early and middle Jurassic times for most of the curves, even in the Helvetic realm. Here a high thermal anomaly, suggesting subcrustal stretching, can explain most of the subsidence. The high subsidence rates in late Jurassic times, mainly in the southern Plateau as well as in the northernmost part of the Helvetic realm are probably due to a second order rifting phase related to Tethyan tectonics.

The important early Cretaceous phase in the South-Helvetic area is somewhat problematic; it can be related to late rifting or to early stages of the inversion history of the basin.

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