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Paleogeography of the Upper Rhine Graben (URG) and the Swiss Molasse Basin (SMB) from Eocene to Pliocene

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Abstract Twenty paleogeographic maps are presented for Middle Eocene (Lutetian) to Late Pliocene times according to the stratigraphical data given in the companion paper by Berger et al. this volume. Following a first lacustrine-continental sedimentation during the Middle Eocene, two and locally three Rupelian transgressive events were identified with the first corresponding with the Early Rupelian Middle Pechelbronn beds and the second and third with the Late Rupelian « Serie Grise » (Fischschiefer and equivalents). During the Early Rupelian (*Middle Pechelbronn beds*), a connection between North Sea and URG is clearly demonstrated, but a general connection between North Sea, URG and Paratethys, via the Alpine sea, is proposed, but not proved, during the late Rupelian. Whereas in the southern URG, a major hiatus spans Early Aquitanian to Pliocene times, Early and Middle Miocene marine, brackish and freshwater facies occur in the northern URG and in the Molasse Basin (OMM, OSM); however, no marine connections between these basins could be demonstrated during this time. After the deposition of the molasse series, a very complex drainage pattern developed during the Late Miocene and

Pliocene, with a clear connection to the Bresse Graben during the Piacenzian (Sundgau gravels). During the Late Miocene, Pliocene and Quaternary sedimentation persisted in the northern URG with hardly any interruptions. The present drainage pattern of the Rhine river (from Alpine area to the lower Rhine Embayment) was not established before the Early Pleistocene.

Keywords Rhine Graben · Molasse · Paleogene · Neogene · Paleogeography

Introduction

Several paleogeographic reconstructions were published for the URG and the Molasse Basin during the last 10 years (Berger 1996; Kuhlemann and Kempf 2002; Schlunegger and Pfiffner 2001; Sissingh 1998, 2003). Here, we present the results of 4 years of research carried out in the frame of the EUCOR-URGENT project, giving a very detailed paleogeographic frame of the studied area for Middle Eocene to Late Pliocene times. These maps were prepared according to the stratigraphic data published by Berger et al. in this volume. To avoid repetition and redundancy between the two papers, references pertaining to stratigraphic and facies data are generally not repeated here but can be found in the companion paper by Berger et al. (2004).

Eocene (Maps 1–3)

Map 1 Lutetian

Lithostratigraphy (for details, see Berger et al. 2004, this volume)

Helvetic and Subalpine Molasse: Steinbach/Gallensis Formation, Bürgen Fm. and ?Klimsenhorn Fm., Siderolithic

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