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## Introduction

This study is a summary and a critical review of what the author has published since 1966 about sedimentary geology in an epicontinental (shelf) sea during the Late Jurassic in northern Switzerland. Most of the results that are presented in this study were previously documented in numerous papers and in four books published in Switzerland and abroad. A synopsis of the interplay of varying paleoclimate, sea level variations, varying water depth, sea floor topography, vertical and lateral facies changes, processes of sedimentation such as aggradation and progradation, compaction, the great regional differences in rates of sedimentation and in isostatic equilibration of the lithosphere under load, and concomitant synsedimentary tectonics is presented here. Regional variation in isostatic adjustment of the lithosphere to the increasing load of sediments is analyzed by means of time correlations based on a detailed biochronology of ammonites in combination with mineral stratigraphy using the comparatively stable clay mineral kaolinite, and with sequence stratigraphy.

Differential vertical displacement of the basement can be the effect either of processes deep in the earth interior (endogenic), or of lateral variation in rates of sedimentation and thereby of regional differences in loading and in isostatic equilibration of the lithosphere (exogenic). An epicontinental basin can accommodate partially compacted sediments with a thickness that is about three times the initial depth of the basin, until the basin is filled up to close below sea level. Cauliflower pellets of glauconite were formed in deeper water, and iron ooids were accreted in shallower water. Both kinds of particles evolved during nondeposition at the surface of mud-grade sediments, or somewhat below the sediment surface in times of a minimal rate of deposition. The bathymetrically controlled, vertical and lateral boundaries between facies where cauliflower pellets of glauconite or iron ooids were formed are clear-cut. The pertinent facies boundaries were at a paleodepth of approximately 100 meters *in the basin investigated*. Rapid relative sea level rises which could be documented to have occurred in Oxfordian and in Kimmeridgian time were essentially eustatic. They were of small scale. Ammonites collected from *in situ* in sections measured bed by bed have a great potential in the investigation of sedimentary geology, provided that they are well preserved and numerous enough, and that they are used in combination with detailed lithostratigraphy, sedimentology, mineral stratigraphy, and sequence stratigraphy.

The entire material which was collected by the author since 1962 and that is cited in this study is stored in the Museum of Natural History at Basel, Switzerland, together with the originals of the fieldbooks which are occasionally cited in this study. Copies of the fieldbooks are in the Landesgeologie at Wabern near Bern. The exact location with coordinates of all of the cited sections with the suffix RG can be read from Table 1 in GYGI (2000a). Names of localities are preceded in the text by the name of the township the locality belongs to. The names of all of the townships cited in the text of the present study can be found in the “Road map of Switzerland” 1:200,000 by swisstopo (Swiss Federal Office of Topography). An alphabetic list of townships including all of the sections measured and all of the localities studied by the author is kept at the Museum of Natural History at Basel and in the section “Landesgeologie” of swisstopo at 3084 Wabern.

The names of all of the lithostratigraphic units in the Upper Jurassic Series in northern Switzerland mentioned in this study are quoted in the stratigraphic dictionary by GYGI (2000b).

Each entry in this annotated dictionary includes the name(s) of the author(s) of the unit, the reference of publication, and, where possible, the type locality with coordinates and reference of the type section. The following text in the dictionary specifies the name and the sheet number of the topographic map, Landeskarte der Schweiz 1:25,000, in which the type locality of a unit can be found. Then the lithology, the macrofossil assemblage, and the age of a unit is described. Description of the lithostratigraphic units in the Central Jura Mts. by GYGI (2000a) is preceded by a synonymy list of older names for each unit.

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