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The ammonite genera *Gravesia* Salfeld and *Pseudogravesia* Hantzpergue in the Tithonian of S Germany and their correlation value with Western Europe

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ABSTRACT

The Subboreal ammonite genus *Pseudogravesia* and new finds of the genus *Gravesia* are reported from the Tithonian of Swabia. In S Germany *Gravesia* is widespread in the middle part of the Hybonotum Zone (*riedlingensis* to *laisackerensis* horizons), but does not occur in the end of the zone. The older level with *Gravesia gigas* (*riedlingensis* Horizon) can be identified in Franconia and SE France as well. This horizon corresponds to the lower part of the *gigas* Horizon (Gigas Zone) in W France. There, a higher level yielding both *G. gigas* and *G. gigas intermedia* corresponds with the beds between the *riedlingensis* and *laisackerensis* horizons in Swabia. In the still younger Gravesiana Subzone of Quercy (W France) there exist two levels with *Gravesia*. The lower one contains *Gravesia gigas intermedia* and *Gravesia gravesiana*. The upper one yields exclusively *G. gravesiana* and very rare *Pseudogravesia gravesiformis*. The lower level corresponds to the *laisackerensis* Horizon of S Germany (numerous *G. gigas intermedia*, few *G. gravesiana*). All records of *Pseudogravesia* from Swabia come from the *laisackerensis* Horizon and belong to a single taxon. In the lower parts of the Hangende–Bankkalke Formation of Swabia, both *Gravesia* and *Pseudogravesia* are apparently missing. Younger faunal horizons of the Hybonotum Zone occur in Franconia but not in Swabia due to post-Jurassic erosion. In the ammonite faunas of the latest Hybonotum Zone of Franconia, above the *laisackerensis* Horizon, Submediterranean taxa predominate. This explains the lack of *Gravesia* and *Pseudogravesia* both in the *rueppellianum* and *moernsheimensis* horizons.

1. Introduction

Since the first description of its type species (*Ammonites gigas* Zieten, 1830) several studies have dealt with the systematics and stratigraphic distribution of the ammonite genus *Gravesia* in the Hangende–Bankkalke Formation (Lower Tithonian, Hybonotum Zone) of SW Germany (e.g. Berckhemer and Hölder, 1959; Hahn, 1963; Ohmert and Zeiss, 1980; Schweigert, 1993a; Schweigert and Scherzinger, 1995; Schweigert, 1996a; Zeiss et al., 1996; Dimke and Zeiss, 1997; Scherzinger et al., 2006). Hantzpergue (1987, 1989) demonstrated for the first time the succession of different chronospecies of this genus in some parts of France during the Kimmeridgian/Tithonian transition. The Gigas Zone (including the Gigas and Gravesiana subzones) permits the potential for a correlation with the Hybonotum/Lithographicum Zone of the Submediterranean and Mediterranean provinces (Hantzpergue, 1989; Geyssant, 1996). The Hybonotum Zone was divided by Zeiss (1968, 2003) into three subzones in Franconia (Riedense, Rueppellianus and Moernsheimensis subzones). Other authors (e.g. Schweigert and Zeiss, 1998, 1999; Schweigert, 1996b, 1999, 2000, 2007, 2015; Zeiss and Schweigert, 1999; Scherzinger et al., 2015, paper herein) followed this proposal and completed the zonal scheme with numerous ammonite faunal horizons.

Because of the occurrence of *Gravesia* in S Germany, some authors used the Gigas and Gravesiana subzones for the division of the Hybonotum Zone in Swabia as well (e.g. Schweigert, 1996a; Schweigert and Scherzinger, 1995; Dimke and Zeiss, 1997). Schweigert and Scherzinger (1995) used the Submediterranean subdivision of the Hybonotum Zone (*sensu* Zeiss, 1968) for Franconia and the Gigas and Gravesiana subzones (*sensu* Hantzpergue, 1989) for Swabia due to the virtual lack of significant

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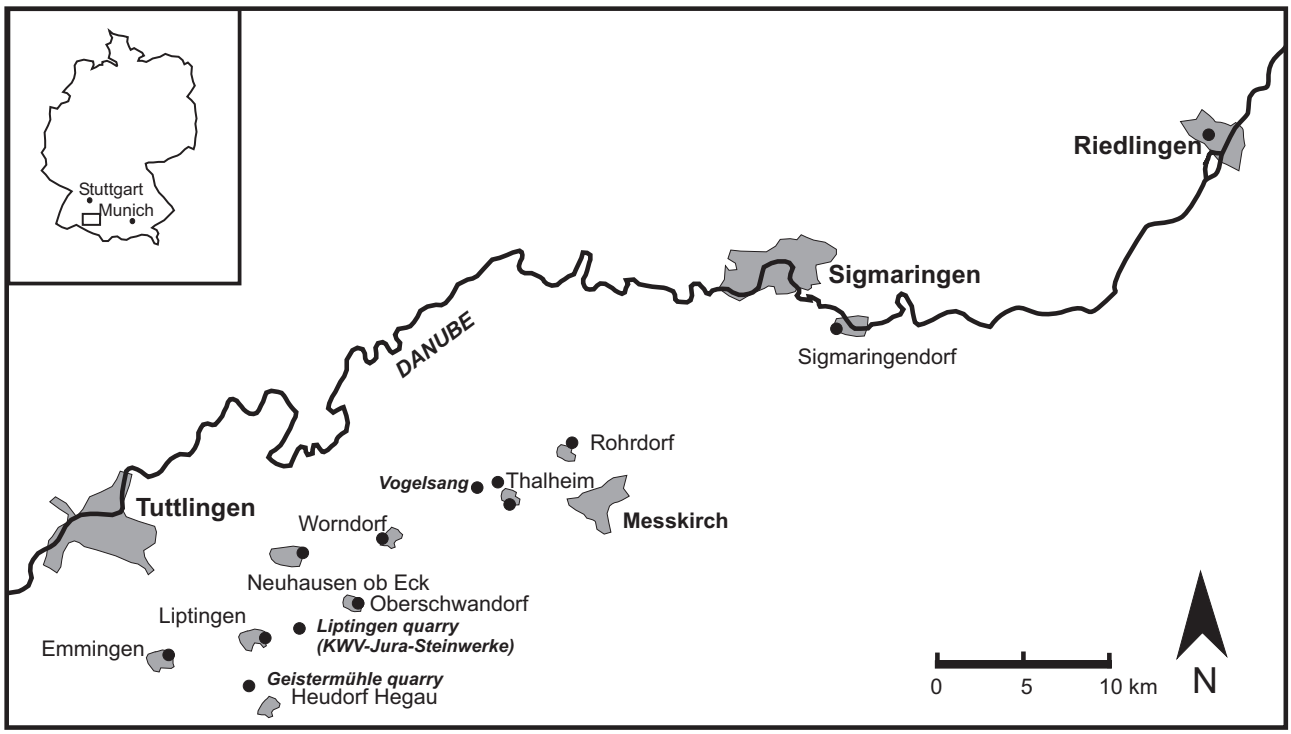

Fig. 1. Location of some localities in SW Germany mentioned in the text.

Fig. 2. Former wall of Liptingen quarry (exposed to SE direction), date of photograph: 2004, A. Scherzinger. The wall shows the higher part of the limestone beds of the *laisackerensis* Horizon, between large olistholiths, which stem from the nearby autochthonous reef. Most of the material comes from this part of the quarry.

ammonite species in Swabia which are abundant in Franconia. Instead of the Hybonotum Zone sometimes the Lithographicum Zone was alternatively used in the Submediterranean Province (Crussol), e.g. by Hölder and Ziegler (1959) or by Geyssant (1996).

Zeiss (2003, p. 93) gave a very good summary of the zones and subzones of the Lower Tithonian Stage in Europe. Therein (p. 92, Fig. 5) he restricted the Lithographicum Zone of E Austria and Moravia to the younger parts of the Hybonotum Zone.

Extensive bed-by-bed collections in sections of the Hangende–Bankkalke Formation of SW Swabia during the past 15 years yielded about 200 specimens of *Gravesia gigas*, *Gravesia gigas intermedia* and *Gravesia gravesiana*. We compare this new material with previously published data from W France (Hantzpergue, 1987, 1989), N Germany (Schweigert, 1996b, 1999), S England (Cope, 1967; Gallois and Etches, 2010), and more recent data from Franconia (Schweigert, 2007).

The genus *Pseudogravesia* was introduced by Hantzpergue (1987, 1989) as a subgenus of his genus *Tolvericeras* from the Lower Tithonian (Gigas Zone) of W France. The author had only four specimens from Saint-Jean d'Angely, Charente, and Saint-Chamarad, Lot, for which he differentiated two taxa (*Pseudogravesia hahni*, *Pseudogravesia gravesiformis*). Enay et al. (2014) regarded *Pseudogravesia* as a separate genus and in this paper we follow the taxonomic concept of Enay.