LOWER CALLOVIAN OF EAST CRIMEA: NEW DATA ON THE AMMONITE FAUNA AND BIOSTRATIGRAPHY

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Abstract: Hitherto the Lower Callovian of East Crimea was yet a little known. Studied succession include both Submediterranean and Subboreal ammonites and may be used as the link for the interprovincial correlation. Four ammonite assemblages (with the *Kepplerites*; *Macrocephalites-Choffatia*; *Hecticoceras umbilicatum*; *Chanasia michalskii*) are ascertained for the first time.

Key words: Lower Callovian, paleobiogeography, ammonites, correlation, Crimea

Recent progress in Jurassic stratigraphy result to appearance of the infrazonal stratigraphical schemes through the entire world. For the Lower Callovian deposits of the Mediterranean Realm, as well as of the Boreal one, was adapted from 8 to 18 biohorizons (Callomon et al., 1988; Sandoval et al., 1990; Thierry et al., 1997; Gulyaev, 1999; Mitta, 2000, et al.). The bulk of these horizons are restricted in their extension by the solitary provinces. The mixed Boreal/Tethyan ammonite assemblages, which permit to make approximate correlation of the different ammonite scales, characterize for the some stratigraphical levels of the Lower Callovian in Europe. In spite of "Tethyan" kind of the most Crimean ammonite assemblages, uncommon Subboreal ammonites occurs in the its Lower Callovian. Study of the Lower Callovian ammonites and stratigraphy of East Crimea goes back to Semenov (1885) and Voght (1897). Further, in the beginning of XX century, few ammonites, including *Macrocephalites*, were described and illustrated by Stremoukhoff (1915). Unfortunately, it was a sole illustration of the Lower Callovian Ammonitida from Crimea. After 2nd World War list of the Lower Callovian ammonites was enlargement (Muratov et al., 1960; Uspenskaya, 1969), but hitherto descriptions or illustrations of Lower Callovian ammonites from Crimea (exclude Phylloceratida and Lytoceratida) almost absence. Lower Callovian of Crimea now considered as sum of *Macrocephalus* Zone and *Calloviense* Zone, whereas the *Enodatum* Subzone belongs to Middle Callovian *Anceps* Zone (Permiakov, Sapunov, 1990). This framework due to lack of ammonite illustration and uncertain faunal assemblages (for example, *Macrocephalites macrocephalus* and *Sigaloceras calloviense* were noted from the both zones (Uspenskaya, 1969)), cannot be accepted as a whole and not comparable with the Submediterranean zonation. After

Uspenskaya (1969) the base of Lower Callovian marked by the first appearance of *Macrocephalites*, which are occurs with the Bathonian-like oppeliids. In the some areas nearby to the northern margin of Tethys first Macrocephalitids appears at the uppermost Bathonian (Dietl, 1981; Besnosov, Mitta, 2000, et al.). Thus, arise of *Macrocephalites* itself is not allow to define the base of Callovian, and level with the *Macrocephalites* and "Bathonian" oppeliids can be considered as uppermost Bathonian. Position of the top of Lower Callovian also cannot recognize precisely, because faunal list from the Lower-Middle Callovian transition beds included the Lower, Middle and Upper Callovian ammonite species (especially Hecticoceratins). This review based on the recent studies in the vicinity of Sudak town (fig.1). Voght (1897), who studied Lower Callovian of this area firstly, was mentioned representatives of *Macrocephalites* and *Hecticoceras hecticum*. Further his observations were confirm by Uspenskaya (Muratov et al., 1960; Uspenskaya, 1969). The most interesting and full-investigated section expose in the small valley, which dispose west of Perchem Mt (fig.1; locality 2.12). Lower Callovian in the studying area has a complex tectonic structure. Some of beds are split and crush, numerous faults are visible. These deposits have a subvertical position of beds. Only part of Lower Callovian beds about 10 m thick was investigated in detail. Among the monotonous intercalation of sandstones and alevrolites with rare lenses of black limestone dispose the following succession (see fig. 2). Ammonites are uncommon in most of beds, except bed 13, which contain numerous Hecticoceratins. Studied ammonite succession comprises mostly Submediterranean and Mediterranean ammonites. Subboreal ammonitids (*Kepplerites*) contains only at the lowermost assemblage. Due to lack of steady evidences of postmortal drift in ammonites (exclude oceanic Phylloceratida and Lytoceratida; see Westermann, 1990), we can make conclusion, that presence of *Kepplerites* mark the Subboreal enhancement. Through Lower Callovian ammonite succession of S France and S Germany only three distinct "Boreal spreads" (at the base of Callovian *keppleri* horizon; near to the bottom of Koenigi Zone; at the Enodatum/Patina Subzone) are observed. *Kepplerites* sp. indet. (fig.4.1), resembling to *K. torricelli*, which appears near to base of Koenigi (or Gracilis) zone. Therefore we can approximately correlate *Kepplerites assemblage* with the *toricelli* horizon (i.e. Submediterranean *Prahequence* Subzone) (fig. 3). *Macrocephalites/Choffatia* and *Hecticoceras umbilicatum* ammonite assemblages include only badly preserved specimens or endemic species. There are no strict evidences about the correlation of these faunal assemblages with the Submediterranean zonation. After Lominadze (1975, 1982), *Hecticoceras umbilicatum* (fig.4.2) in Geogria occurs at the condensed Lower/Middle Callovian beds with the Macrocephalitids, *Kosmoceras medea* Callomon and *Hecticoceras posterium* Zeiss. *C.michalskii assemblage* contain numerous and good preserved ammonites same of the michalskii horizon of France. Exact correlation of this assemblage

is doubtless. There is only one significant difference between *michalskii assemblage* and *michalskii* horizon of France, Spain and Algeria: at the *michalskii assemblage* Macrocephalitidae are uncommon and Reineckiidae are absence. Same ammonite assemblages are characterized only epioceanic areas of France (Thierry, 1988). There is easternmost find of the ammonite assemblage with the numerous *Chanasia* and *Jeanneticeras*. Hitherto abundant Lower Callovian hecticoceratins indicated only from France, Algeria, S Germany and, partially, from Poland. Nevertheless, hecticoceratins along North Tethys margin were lived constantly during Early Callovian. So, *Hecticoceras*, *Jeanneticeras* and *Chanasia* are recorded from Romania and Hungary (Loczy, 1915; Raileanu et al., 1964; Géczy, 1982), and *Hecticoceras* – from Serbia (Antonijević, 1962). *Jeanneticeras ex gr. gelini* was figured from Moldavia (Romanov, Danich, 1971: *Hecticoceras haugi*, pl.IX, fig.4). *J. penninicum* (fig. 4.4,5) was described for the first time also from the Carpathians (Uhlig, 1878).

Eastward from Crimea, in the Northern Caucasus, Lower Callovian hecticoceratins are infrequent. In addition to *Hecticoceras*, only *Jeanneticeras anomalum* Elmi occurs in the Georgia (Topchishvili et al., 1998). Probably, Boreal influence during Early Callovian was quite clear at the Caucasus.

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Fig. 1. Topographic map of the outcrop area west of the town of Sudak (see point 2.12)

Fig. 2. Ammonite distribution and lithology of the Lower Callovian deposits at the locality 2.12 (see fig.1) Explications for the ammonite taxa in the diagram:

Fig. 3. Approximate correlation of the Crimean ammonite assemblages with the Submediterranean succession of the Center-West France

Fig. 4. Some Lower Callovian ammonites of the East Crimea.

All figured in natural size. Locality 2.12. (44,85° N; 34,93° E), west to Perchem Mt near Sudak town. All specimens stored in the author's collection (Geological Institute of RAS, Moscow)

Kepplerites sp. assemblage, bed 3: 1. *Kepplerites sp. indet.*, CR-6

C. michalskii assemblage, bed 13: 2. *Jeanneticeras cf. girodi* (Bonarelli), CRH-47; 3. *C. michalskii* (Lewinski), CRH-41; 8. *C. michalskii* (Lewinski), CRH-8; 5. *C. michalskii* (Lewinski), CRH-38; 6. *Chanasia cf. pseudochanasiense* (Lemoine), CRH-40; 7. *C. pseudochanasiense* (Lemoine), CRH-4; 8. ?*Paralcidia calloviensis* (Parona&Bonarelli) – *Lissoceras* sp., CRH-39; 9. *Choffatia* sp., CR-2; 10. *C. recuperoi* (Gemmellaro) , CR-1.

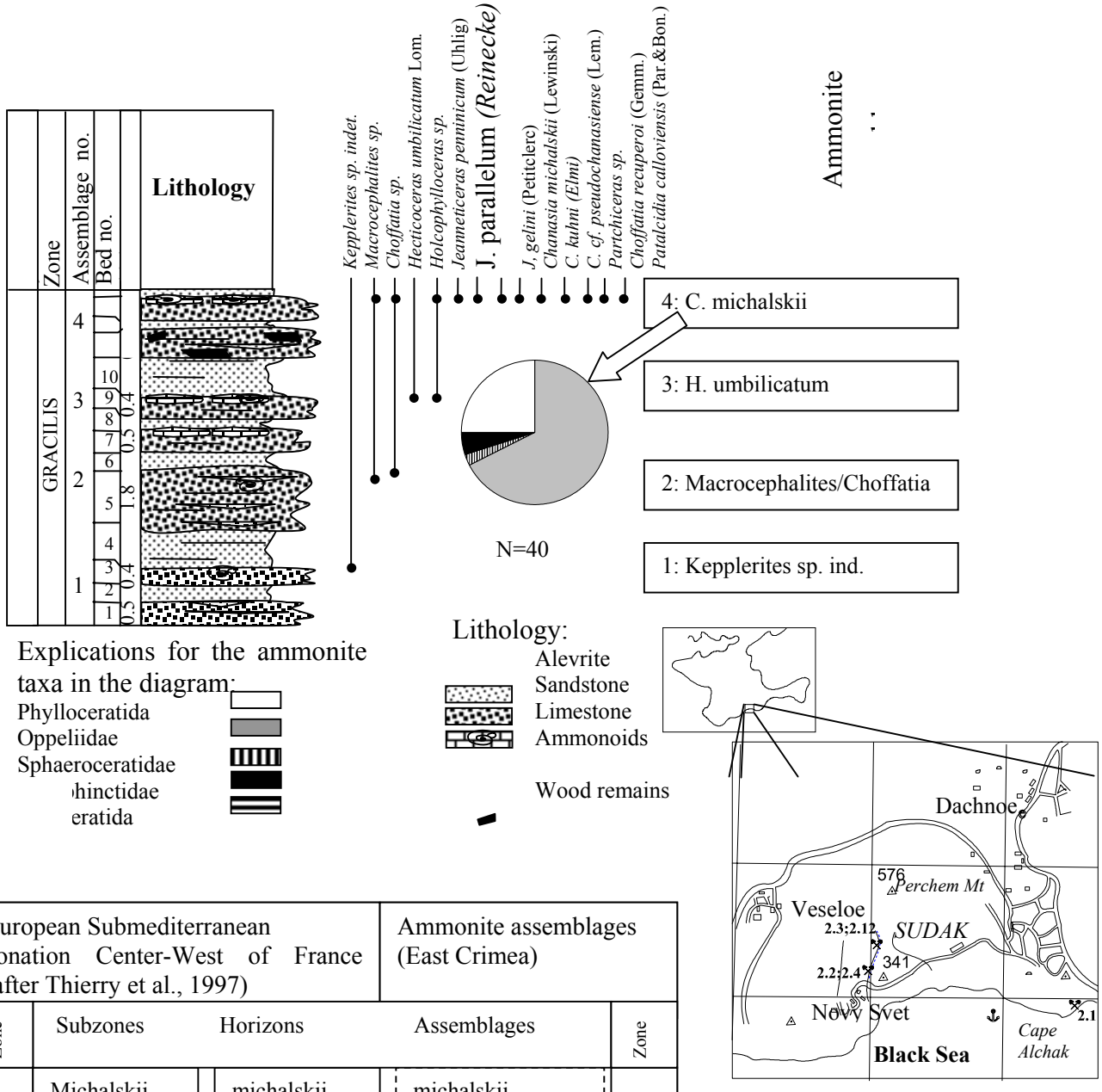

Fig. 1.

European Submediterranean zonation Center-West of France (after Thierry et al., 1997)			Ammonite assemblages (East Crimea)	
Zone	Subzones	Horizons	Assemblages	Zone
GRACILIS	Michalskii	michalskii	michalskii	GRACILIS
	Voultensis	laugieri	umbilicatum	
		pictava	Macrocephalites-Choffatia	
	Grossouvrei	grossouvrei		
	Prahequense	prahequense	Kepplerites sp.ind.	

Fig. 3.

Fig. 4.