

New Data on the Kimmeridgian Ammonite Biostratigraphy of Spitsbergen

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Recent progress in the Kimmeridgian ammonite-based biostratigraphy and discussions concerning the Kimmeridgian GSSP leads to the more detailed studying of the Kimmeridgian ammonites over the world. Among the other questions it is applicability of the proposed criteria of the Kimmeridgian GSSP level for wide correlations. Here new information about the basal portion of the Kimmeridgian of Svalbard is presented, along the revision of the ammonite succession for the whole stage based upon recent field works and, partially, on the re-interpretation of ammonite collections collected before.

The bulk of the data is based on the results of the field works (years 2006 and 2007) held at the famous Festningen and Myclegardfjellet sections, which were studied previously by many scientists (Frebald, 1928; Sokolov and Bodylevski, 1931; Birkenmajer et al., 1982; Erschova, 1983, among the others). As has been shown recently, Kimmeridgian ammonite succession permits to recognize some widely ranged faunal horizons (Wierzbowski, 1989), but its basal portion was little-studied.

Ammonite succession with preliminary zonal scheme could be summarized below (Table 1). Rarity of aulacostephanid ammonites and abundance of cardioceratids allows using cardioceratid-based zonal and infrazonal scales (Wierzbowski and Smelror, 1993):

Lower Kimmeridgian

Bauhini Zone: recognized at the Festningen section by appearance of *Plasmatites* (*P. cf. bauhini*, *P. cf. lineatum*)

Kitchini Zone

Bayi horizon: *Amoebites bayi* has been recognized at Festningen from level slightly above the Plasmatites.

Subkitchini horizon: well-revealed at Janusfjellet section (Wierzbowski, 1989) as well as at Myclegardfjellet; at Festningen *Amoebites cf. subkitchini* are uncommon.

Mesezhnikovi horizon: recognized at Janusfjellet by Wierzbowski (1989), characterized by *Amoebites mesezhnikovi*.

***Amoebites pingueforme* horizon:** firstly recognized at Janusfjellet (Wierzbowski, 1989) as *Rasenia cymodoce*–*Amoebites pingueforme* horizon it also could be traced at Festningen by presence of its characteristic taxa as well as microconchate aulacostephanids *Prorasenia*. Birkenmajer et al. (1982) also figured *Rasenia cymodoce* from the Myclegardfjellet section, but not *Amoebites pingueforme* nor *Rasenia*

were found during the studies of the same section undertaken by the author.

***Amoebites cf. beaugrandi* horizon** perhaps could be fixed at Myclegardfjellet, where single specimen of *A. cf. beaugrandi* occurs few beds above the level with numerous *A. subkitchini*, but its preservation is far from good. Precise position of *Xenostephanus* (= *Zenostephanus*, corrected) horizon proposed by Wierzbowski (1989) is still unrecognized, because albeit *Zenostephanus* (including species *Z. sachsi*, which is widely ranged in Arctic) are known from Spitsbergen, and these ammonites were collected by our precursors during the geological survey and lacking data about precise level of their records within the succession.

Kochi Zone

***Norvegicum* horizon:** *Amoebites norvegicum* has been chosen as marker of the separate faunal horizon of the Barents Sea Kimmeridgian (Wierzbowski and Smelror, 1993). This remarkable species is characterized by weakly ribbed inner whorls which became strongly ribbed later. Presence of this horizon at Spitsbergen could be proposed at the base of record of *A. norvegicum* at the Myclegardfjellet section.

***Sokolovi* horizon:** *Amoebites sokolovi*, which is could be senior synonym of the *A. kochi* (see Birkelund and Callomon, 1985), is a very characteristic ammonite for the Spitsbergen. Few specimens of this species have been collected at the Festningen section.

Elegans Zone

Previously Wierzbowski (1989) based on his observations at Janusfjellet and suggested that in Spitsbergen *decipiens* and *elegans* horizons, which are recognized in East Greenland, cannot be separated. Upper part of the Kimmeridgian of the Festningen is very poor in ammonites, only one small nucleus resembling *Amoebites elegans* or *A. kochi* has been found. But at the Myclegardfjellet section late *A. elegans* (= *A. bodylevskii* Shulgina) occurs at the uppermost fossiliferous horizon within the Kimmeridgian ammonite succession and clearly separated from band with *Amoebites decipiens* which is located some 3.5 m below.

Taimyrensis Zone (?)

***Suboxydiscites taimyrensis*,** the Boreal oppeliid ammonite, is restricted at the Arctic by uppermost zone of the Kimmeridgian. But genus *Suboxydiscites*, as has been shown recently (Rogov and Wierzbowski, 2009), ranged through the whole Kimmeridgian Stage and its successive species are very poorly studied. Studying of

the collection by Erschova revealed presence of few *Suboxydiscites* cf. *taimyrensis*, but their precise position within the succession remains unclear.

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Table 1 Kimmeridgian ammonite zonation of Spitsbergen (preliminary) and East Greenland

Subboreal zonation	East Greenland horizons <small>(cardioceratid horizons were chosen when possible; succession after Birkelund, Callomon, 1985)</small>	Spitsbergen horizons <small>(letters indicates sections: M - Myklegardfjellet, F - Festningen, J - Janusfjellet (Wierzbowski, 1989))</small>	Boreal zonation
Aulacostephanus autissiodorensis	Aulacostephanus autissiodorensis	?	Suboxydiscites taimyrensis
Aulacostephanus eudoxus	Amoebites elegans	Amoebites elegans M	Amoebites elegans
	Amoebites decipiens	Amoebites decipiens M	
Aulacostephanoides mutabilis	Amoebites kochi	Amoebites sokolovi F,J	Amoebites sokolovi
		Amoebites norvegicum M	
	Aulacostephanoides mutabilis	Zenostephanus ?	Amoebites kitchini
	Amoebites cf. beaugrandi	Amoebites cf. beaugrandi M	
Rasenia cymodoce	Amoebites aff. rasense		Amoebites kitchini
	Amoebites aff. subkitchini	Amoebites pingueforme F,J	
	"Pachypictonia"	Amoebites mesezhnikovi J	
Pictonia baylei	Amoebites subkitchini	Amoebites subkitchini F,M,J	Plasmatites bauhini
	Amoebites bayi	Amoebites bayi F	

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