

## **Objections to the report and to the Olazagutia section**

In this document I am trying to give a systematic review of all objections both to the report by Prof. M. Lamolda and to the Olazagutia section, clearly favored by the report. The objections are arranged here according to the points of the Prof. Lamolda's report. Most of them are actually to be found dispersed in the main text of the letter by Prof. Lamolda and in e-mail messages attached to his letter. They are listed herein to show you how many of the objections were raised by the members of the group and how serious they are. Having this complete view I hope you will find the suggestion of postponing the voting (expressed in one of the letter to Prof. Lamolda) justifiable.

### **Objectives to the report** [*from a letter of I. Premoli Silva to M. Lamolda*]:

The GSSP proposal must be a self contained document, with all the details of the argument set out, from the opinion of the Copenhagen and Brussels Meetings, up to the present. In the case of the circulated document the reader is referred to published articles, some of them available as online documents. However, there are also a series of 4 figures used in support of the Olazagutia section that are marked 'confidential', as is a section entitled 'bioevents'. This is not correct. What is needed is an objective discussion of freely available information. If some informations are not all available it may be expected that the members of the Santonian WG will accept conclusions without having access to the observations on which those conclusions are based?

### **Objections to the Olazagutia section** (*bolded points 1-12 are after report of Prof. Lamolda*):

**1. Outcrop nature and characteristics:** Both sections expose the Coniacian/Santonian boundary and range below and above the boundary level. The Olazagutia section is clearly much more expanded succession, however, 'its preserved candidate east face, with its metal markers, is not available for the bed-by-bed collection of macrofossils other than echinoids. There is undoubtedly a good foraminiferal and nannofloral record, but it is difficult to relate the sample horizons in the published skeletal logs to the detailed log with the stable isotope ample horizons published by Lamolda and Paul, fig. 2, in *Cretaceous Research* 28/1. Incidentally, this graphic log implies that the lithostratigraphy is readily recognisable in the face, which is not the case as I remember it. Some idea of the relatively poorly exposed nature of this face can be seen in the photograph fig. 4B in Gallemi et al. (2007). In fact, the quarry road visible in the photograph interrupts the Upper Coniacian part of the succession at about the level which has yielded the only horizoned *Magadiceramus*.' [*from the message of C.J. Wood to M. Lamolda*].

The Ten Mile Creek section possesses an excellent macrofossil (and foraminiferal

and nannofloral) record and good exposure. The boundary itself, with the succession ranging 18 metres below and about 5 metres above it, is well exposed in a single section, i.e. in the WallMart section on Ten Mile Creek. The succession may be further expanded in two others easily correlatable section. The other advantage of the Ten Mile Creek section is its conspicuous cyclostratigraphy that readily enables location within the section.

**2. Structural complication:** The criticism in this point addressed to the Ten Mile Creek is unjustifiable. The WalMart section area is structurally very simple (almost horizontal bedding); the single fault in one of the section is conspicuous and its displacement is readily interpretable.

**3. Continuity of sedimentation:** The remark in the report may suggest that the Ten Mile Creek section contains numerous gaps; although the channels are present they are readily recognizable and occur distinctly below the boundary.

**4. Thickness of the *Platyceramus undulatoplicatus* Zone:** Nothing addressed to.

**5. Palaeoenvironment:** Not addressed.

**6. Fossils:** The statement in the report that both sections contain diverse and abundant macrofossils is not adequate [it is OK in case of microfossils, but this is inoceramid, which is a primary marker]. The Ten Mile Creek section contains a continuous inoceramid record, with a well documented change from the *Magadiceramus* dominated to the *Cladoceramus undulatoplicatus*- dominated assemblages, marking the Coniacian – Santonian boundary. The first *Cl. undulatoplicatus* appears only 0.4 m above the last *Magadiceramus*. Additionally this section also contains good ammonite record. Nothing like that is observed in the Olazagutia section, where the first *Cl. undulatoplicatus* appears 30 metres above the single specimen of *Magadiceramus* found in the section.

*To this point refers a very detailed analysis by C.J. Wood, e-mailed to M. Lamolda:*

In the WallMart section of Ten Mile Creek (see Gale et al. 2007, *Acta Geologica Polonica* 57/2) there is a *Magadiceramus* record (involving several taxa) over 17.5 m, with the highest occurrence only 0.4 m below the entry of *Cladoceramus*. Some additional Upper Coniacian inoceramid taxa appear just below this datum, and several specifically Santonian taxa, including *Platyceramus cycloides*, appear only 3 to 4 m above the datum. This locality is south of the geographical range of *Sphenoceramus* and therefore the key *Sphenoceramus* Teilzone is not represented. The FO of the ammonite *Texanites gallicus* in this section is located 2.4 m below the entry of *Cladoceramus*; this taxon ranges across the boundary, with its LO 3.7 m above. At Olazagutia, the only really abundant fossils across the boundary interval are echinoids of no international biostratigraphical significance. There are some lower Lower Coniacian inoceramid records, including what appear to be *Cremnoceramus deformis erectus* [the primary marker for the base of the Coniacian] and *C. waltersdorfensis hannovrensis* near the base of the section, c. 94 m below the entry of *Cladoceramus*. The only horizoned *Magadiceramus* records

(incomplete, poorly preserved and specifically unidentifiable specimens) are c. 30 m below the entry of *Cladoceramus*. There is, admittedly, a good inoceramid record in the Santonian part of the section, including several biostratigraphically significant taxa in addition to *Cladoceramus*. However, with the exception of a record of *Platyceramus cycloides* c. 5 m above the boundary and within the range of *Cladoceramus*, these latter taxa do not appear until some 25 m above the highest *Cladoceramus* record. There are no horizoned Coniacian ammonite records whatsoever, and the lowest, very limited and biostratigraphically not particularly significant, Santonian ammonite record starts 33 m above the datum. In fact, it is worth considering the following comments from one of the most recently published papers on Olazagutia (Gallemí et al., 2007, *Cretaceous Research* 28/1, pp. 6, 7): ...with fresh outcrops, conditions for extensive macrofossil sampling are not ideal [my italics], but they are good for microfossil and stable-isotope sampling. .. Inoceramids are rare below the boundary and abundant above it, while echinoids are abundant throughout the section to such an extent that they contribute to the lithological characteristics of the rocks." ..."Ammonites are very rare; moreover, the few specimens collected come from far above the boundary." Finally, it should be emphasized that much of the earlier detailed biostratigraphical work, including the identification of several fossiliferous horizons within the Santonian part of the succession, was on a section on the west side of the quarry, which is no longer available as a result of quarrying activity. There are significant differences in the *Cladoceramus* records from both sections, in that neither a higher *Cladoceramus* event horizon identified in the west face nor the level of the reported LO of the genus in this face has subsequently been recognized in the candidate east face section (see Kuechler 2002, in *Aspects of Cretaceous Stratigraphy and Palaeobiogeography*, fig. 2, pp. 318-321 for details and relevant references).

**7. Biogeography:** One remark from me: the Ten Mile Creek is not a part of the Western Interior Seaway.

**8. Geochronometry:** Not addressed.

**9. Stable isotope studies:** Including confidential data in the report is unacceptable; see objections to the report.

**10. Bioevents:** Including confidential data in the report is unacceptable; see objections to the report.

**11. Access:** The information in the report is not quite adequate. The WalMart section and other sections of the area are within creeks, which belong to the state and consequently, a free access to all of them is secured.

**12. Preservation of site:** Again the same; the information in the report is not quite adequate. The WalMart section and other sections of the area are within creeks, which belong to the state what secures a free access to all of them.