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Interactive comment on "Shallow water carbonate platforms (Late Aptian, Southern Apennines) in the context of supraregional to global changes" *by* A. Raspini

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I thank Di Lucia for his interest in my manuscript. Anyway, I have to admit that I was rather surprised by his comments, as I briefly report hereinafter. First of all, the manuscript that I have submitted reworks and reappraises just few data from the available literature on the stratigraphy of the Orbitolina level in the southern Apennines (which is adequately cited, obviously including my former papers on related topics) and is grounded on many original informations deriving from cm-scale field and laboratory observations; in addition, the bulk of the data is discussed and interpreted following an original, integrated approach. The very few words which are reported in

the brief abstract by Di Lucia et al. (2007), dealing with the paleoecological meaning of the Orbitolina level, are not original and do not provide relevant informations about the topic addressed in my manuscript. By contrast, the following comment by Di Lucia: the author "fails to cite previous Authors that published earlier some of the ideas that he presents as new", is simply unrealistic and incorrect. Furthermore, I believe that the unspecific and general argumentations that typically characterize very brief abstracts, devoid of any detailed description and original data (as in the case of Di Lucia et al., 2007, and Parente & Di Lucia, 2007, 2009; the latter is not even cited by Di Lucia in his comment to my manuscript), cannot be claimed as landmarks of the scientific literature.

The high shelliness of the (different) Orbitolina levels in the Aptian-Albian platform/ramp carbonates is a well known feature across the Tethyan realm that has been addressed in detail by several authors both in a biostratigraphic (e.g.: Schroeder, 1975; Cherchi et al., 1978; Arnaud et al., 1998; Husinec, 2001; Schroeder et al., 2010) and taphonomic/paleoecologic (e.g.: Vilas et al., 1995; Pittet et al., 2002; Embry et al., 2010) perspective. In addition, the different role of sedimentation rates and hardpart-input rates (i.e., dead-shell production and shell destruction rates) has been also addressed by TomašovÃ¡ch et al. (2006), who state that: (i) "....high shelliness can reflect either high population density of shell producers or lack of sediment" (p. 278); and (ii) a positive correlation between alteration and shelliness is expected under decreasing burial rates. I have obviously relied on these papers as part of the robust background for my discussion; nonetheless, I acknowledge the invitation to cite Di Lucia (2009) on the paleoecology of the Orbitolina bearing level. However, after the reading of Di Lucia et al. (2007), I noted that the authors wrote (lines 3-5): "The first bed" (forming the Orbitolina level) "consists of green marls to marly limestones overlying a subaerial exposure surface and filling a network of cavities penetrating for 100-150 cm down into the substrate". Raspini (1998, p. 206, lines 3-5; see also Raspini, 1996, p.121), after demonstrating that the settlement of the Orbitolina level followed a platform emersion induced by high frequency sea-level changes (e.g., p. 205, but see his Fig. 6), expressed the same concept with remarkably similar words: "Orbitolina floatstone with

a clayey matrix penetrates downward to about 150 cm into the carbonate strata, filling the underlying network of cavities".

I must also observe that the overall stratigraphic frame provided by Di Lucia (2009) for the Orbitolina level of the Apennine carbonate platform is strikingly in contrast with the points that I report in my manuscript. In fact: 1) I basically ground my stratigraphic, geochemical and paleoecologic discussion on the solid assumption that the Orbitolina level of the Apennine carbonate platform is Late Aptian in age (early-middle Gargasian; see Cherchi et al., 1978; Bravi & De Castro, 1995; Schroeder et al., 2010, among many others); 2) my paleoenvironmental and paleoecologic interpretations are rooted in a stratigraphic model which includes relative sea level oscillations and paleoclimatic controls on the evolving trophic levels as the main governors for the sedimentation of the Orbitolina level. As consequence, the main features of the Gargasian hydrosphere-biosphere system, as deduced by local carbon isotopic curves coupled to secular fluctuations of Ca/Mg ratio and pCO2 (among others), have been taken into consideration and discussed consistently. Nonetheless, I acknowledge the invitation to cite Di Lucia (2009) on the possible role played by the seawater's chemical composition on the diffusion of skeletal carbonates, including calcareous algae. By contrast, Di Lucia (2009) has reported what I consider an odd dating of the Orbitolina level that has been ascribed to the mid Bedulian, and equated to the base of the Selli level (hence linked to the sharp fluctuations of oceanic pCO2), based on chemostratigraphic correlations among some discontinuous and isotopically bad preserved shallow-water records and "continuous" pelagic reference sections. As consequence, a simple comparison of the stratigraphic, chemostratigraphic and paleoceanographic outlines of the Orbitolina level in the Apennine carbonate platform, as reported and discussed by Di Lucia (2009) and in my manuscript, makes it evident that both the general and specific data, backgrounds assumptions and conclusions are completely different. It is worth noting that the overall stratigraphic conclusions on the Orbitolina level, considered as the base of the basinal Selli OAE by Di Lucia (2009), has been proposed again in the paper that Di Lucia et al. have submitted to the Special Volume of Solid Earth edited by Trabucho

Alexandre et al. (Di Lucia M., Mutti M. & Parente M. (submitted) Bio-chemostratigraphy of the Barremian-Aptian shallow-water carbonates of the southern Apennines (Italy): pinpointing the OAE1a in a Tethyan carbonate platform. Solid Earth Discuss., 3, 789-838; ". . ..the Selli level . . ...corresponds in the southern Apenninic carbonate platform to the interval between the "Orbitolina level" and the second acme of Salpingoporella dinarica."; p.814, lines 19-21; see also p.790, lines 7-11 and p.809, lines 25-28).

As such, the stratigraphic, paleoecologic, chemostratigraphic and paleoceanographic assumptions by Di Lucia (2009) and Di Lucia et al. (submitted) on the Orbitolina level cannot be considered as similar, equivalent, comparable or even pre-existing to those discussed in my manuscript. In addition, as far as I know, the earliest, though very preliminar, investigations on the Orbitolina levels of the central-southern Italy as component of the evolving Aptian biosphere-geosphere interactions have been reported by Graziano (1999; 2000).

Summing up, the quite simple and evident observations presented above undo and invalidate both the comments and the surprising conclusions reported by Di Lucia according to whom: "...we believe (we ??) that the hypotheses proposed by Raspini on the paleoenvironmental significance of the Orbitolina level and of the Salpingoporella dinarica acme are very interesting. However, since these ideas were published before in documents that are fully available to the scientific community (Di Lucia et al. (2007) is the second or third item retrieved by googling "Orbitolina level"), we claim that it is not appropriate to present these ideas as new. Previous works should be adequately cited."

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