

Interactive comment on “Assessment of hydrothermal alteration on micro- and nanostructures of biocarbonates: quantitative statistical grain-area analysis of diagenetic overprint” by Laura A. Casella et al.

Anonymous Referee #2

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The authors present an interesting study of the process of alteration of six selected microstructures when submitted to the action of hydrothermal fluids. They assess the process of transformation of either biogenic aragonite or calcite into inorganic calcite with time. Although the simulated diagenetic alteration conditions are probably a small portion of the whole range existing in ambient conditions, the study is highly meritorious. Particularly, the application of EBSD analysis provides a wealth of information. Although I am not expert on diagenesis, I would be surprised if such a picture of the progression of a simulated diagenetic alteration ever existed.

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The study is significant in its field, and the conclusions are backed by data. It is technically very sound. The statistics is consistent. The Ms is well written and profusely illustrated. The selected microstructures are representative of the range present in molluscs.

I am only concerned about the dissonance between the references in text and in the reference list. Many in-text references are not found at the end and the other way round (see at the end). This has to be amended before publication.

Minor comments: Abstract.- I do not know if the journal allows for the presence of references within the abstract. Please check. Page 2, line 8.- “Despite ongoing and extensive research”, do you mean ‘previous’ extensive research. Page 3, line 2.- delete “s” after “M.” Page 3, line 8.- ‘were carried out’ should not be italicized; “tissue” should be plural. Page 5, line 13.- Correct spelling is Carvajal. Page 5, lines 25-26.- “consists”, “consisting”; avoid redundancy. Page 5, line 28.- “When sectioned in 2D”, section, by definition, provides a 2D view; ‘in 2D’ can be deleted. Page 7, line 7.- “sp.”, here and elsewhere, should not be italicized. Page 7. line 31.- “compare Fig. 4A with right hand part, framed in green with Fig. 4D”, I would suggest ‘compare Fig. 4A with Fig. 4D, right hand part, framed in green’. Page 9, line 8.- Comma after “shows”. Page 10, line 4.- Comma after “sediments”. Page 10, line 20.- Correct spelling is ‘Etschmann’. Jonas et al. 2015 appears as 2017 in References. Page 11, lines 13-14.- The sentence contained there is either incomplete or the initial “In” needs to be removed. Page 13, line 21.- Correct spelling is “Fernández-Díaz”. Page 14, lines 22-23.- “as well as the increased prevalence of the nacreous shell layer of *M. edulis* relative to calcitic shell layers in seashore sediments.” Do the experimental conditions really simulate the diagenetic conditions in nearshore sediments? If so, please provide additional data and/or references. Page 15, line 3.- Replace “the nacreous tablets are” by ‘nacre is’; the microstructure is nacre. Page 15, line 20.- Delete “of”. Page 15, line 31.- “Biogenic aragonite was dissolved for the reprecipitation of low-Mg calcite”, this is odd; please rewrite. Page 16, line 9.- Sorauf (1980) appears as 1981 in References. Page 16, line

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28.- Comma after “immediately”. Page 17, line 11.- ‘replacement’ instead of “replaced”. Page 18, line 14.- “Their” should be lower case. Page 19, line 33.- “tuberculate” should be ‘tuberculata’. Page 21, line 13.- “cabonates”, ‘carbonates’.

THE following in-text references have not been found in the References list (per order of appearance): - Patterson and Walter, 1994 - Ku et al. 1999 - Brad et al. 2004 - Zazzo et al. 2004 - Immerhauser et al. 2015 - Ridgway and Richardson 2011 - Krause-Nehring et al. 2012 - Rodgway et al. 2012 - Crippa and Raineri 2015 - Blanchon et al. 2009 - Hahn et al. 2012 - Nidiyasari et al. 2015 - Brown et al. 1962 - Cardew and Davey 1985 - Regenberg et al. 2007 - Hover et al. 2001 - Cherns et al. 2008 - Wright et al. 2003 - James et al. 2005 - Harper 1998 - Harper 2000 - Kidwell 2005 - Land 1967 THE following references in the References list have not been found in the main text: - Addadi et al. 2006 - Allison et al. 2007 - Altree-Williams et al. 2017 - Barthelat and Spinoso 2007 - Bathurst 1975 - Böhm et al. 2006 - Brahmi et al. 2012 - Brocas et al. 2013 - Butler et al. 2009 - Cartwright and Checa 2007 - Checa et al. 2006 - Checa et al. 2009 - Checa et al. 2011 - Cohen et al. 2001 - Currey et al. 2001 - Dauphin et al. 1989 - Elliot et al. 2003 - Gries et al. 2009 - Grossman et al. 1993 - Heiss 1994 - Hipler et al. 2009 - Hubbard et al. 1990 - Jackson et al. 1988 - Korte et al. 2005 - Levi-Kalisman et al. 2001 - Li et al. 2006 - Marchitto et al. 2000 - Marin and Luquet 2004 - Mayer 2005 - McGregor and Gagan 2002 - Metzler et al. 2007 - Morton 2011 - Nudelman et al. 2006 - Nudelman et al. 2008 - Oeschger and Storey 1993 - Parkinson et al. 2005 - Putnis et al. 2005 - Raffi 1986 - Richardson 2001 - Rüggeberg et al. 2008 - Sanchez et al. 2005 - Schöne et al. 2004 - Schöne et al. 2005a - Schöne et al. 2005b - Schöne and Surge 2012 - Taylor 1976 - Wanamaker et al. 2008 - Wang and Gupta 2011 - Wang et al. 2011 Figure A16.- Panel A is simply the sum of B and C. It can be simplified.

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