

Interactive comment on “The enigmatic Zerelia twin-lakes (Thessaly, Central Greece): two potential meteorite impact Craters” by V. J. Dietrich et al.

E. Buchner (Referee)

Elmar.Buchner@hs-neu-ulm.de

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The manuscript by Dietrich et al.: “The enigmatic Zerelia twin-lakes (Thessaly, Central Greece): two potential meteorite impact craters” comprises an extensive geophysical, structural, petrological, and geochemical description of two roundish lakes and connected lithologies in Central Greek. Furthermore, a discussion of the possible origin of these two lakes is presented by the authors. According to their discussion, these lakes are probably of impact origin. This interpretation is mainly based on four arguments: 1. gravity and magnetic anomalies connected with the two depressions; 2. The occurrence of polymict impact breccias surrounding the lakes; 3. weakly shocked quartz

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grains in these breccias; 4. “calcite globules in quartz” that are interpreted as the result of immiscibility between carbonate and silicate melts.

The gravity and magnetic anomalies are not convincing, but I don't want to comment on this problem and want to focus on the petrological/mineralogical arguments of Dietrich et al. The authors describe soil horizons as “loose packed polymict breccia”. Furthermore, consolidated “polymict breccias” strongly resemble caliche typical for the environmental conditions of Central Creek. The quartz grains presented in Fig. 5 do not show any evidence for (even mild) shock-metamorphism and are over- or even misinterpreted. According to Dietrich et al., minuscule calcite globules are present in quartz grains (!?) that might represent recrystallized immiscible melts between SiO₂ and CaCO₃ melts. Mixture of melts and immiscibility between two melt phases, respectively, requires liquid CaCO₃ and SiO₂ melts. These SiO₂ melts should occur in the form of lechatelierite, silicate glass, or recrystallized silicate melt. The authors, however, do not depict any evidence for silicate melt but describe the occurrence of former recrystallized immiscible carbonate melts in solid quartz grains. This reduces the argumentation to absurdity. Likewise, the authors detected Fe and Ni in solid quartz grains and interpreted the occurrence of these elements as possible remains of an (iron) meteorite. Maybe silicate melt and not solid quartz is meant by Dietrich et al., however, the authors should write this and give arguments for the primary existence of lechatelierite and/or silicate melt. The discussion is lengthy and unbalanced. Accordingly, I have to recommend “rejection”. I have some more objections and comments all of which are depicted in the annotated pdf file.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/5/C590/2013/sed-5-C590-2013-supplement.pdf>

Interactive comment on Solid Earth Discuss., 5, 1511, 2013.

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