

Floating sandstones off El Hierro (Canary Islands, Spain): The peculiar case of the October 2011 eruption.

V. Troll et al. 2011. Solid Earth Discussion 3, 975-999

General comments:

The work is very interesting and model proposed (sedimentary origin for the “restingolitas”) is according to the data presented and with the evolution of the eruption (not finished yet) without any signal of high explosivity (expected for magma mingling of basic and salic magmas)..

However, in my opinion, there are some points in the paper the authors should be considered.

1 - Delete “floating sandstones” in the title. Regardless of the proposed origin (sedimentary) of “restingolitas”, textures observed in those materials are typical of volcanic rocks, very different of detritic sediments. Maybe “xeno-pumice” (as described in line 175) might be more appropriate.

2 - Origin of high vesicularity and mingling textures of the “restingolitas”. The examples provided by authors of similar rocks in the islands of Lanzarote and Gran Canaria (Aparicio et al., 2006, 2010, Hansteen & Troll, 2003) do not show so high percentage of vesicularity and mingling textures are limited to pervasive penetration of basic magmas into the sedimentary xenoliths with inner texture still remainder its origin. On the other hand, xenoliths from the Teneguia eruption at La Palma island (1971) with similar high vesicularity are interpreted by Araña & Ibarrola (1973) as rhyolitic pumice. So, authors must explain the reasons for these striking differences.

3 – Quantification of some parameters: degree of partial melting of the sediments and P and T values estimates.

4 – REE and isotope (U-Th-Pb, Rb-Sr and Sm-Nd systems) analysis. Spider and isotope diagrams can support better evidence fort sedimentary origin that presented in this paper. If authors have some of these data, should be presented and discussed. Also, should be very interesting if the authors gave the same analytical data for the black material (basanite) enveloping the white cores.

Perhaps considerations 3 and 4 exceed the limits of this work in the present format for this journal. But it is obvious (even with the data presented here and dynamics of the eruption point to the model proposed for these authors) that any of these data and considerations established ensure other proposed origin for “restingolitas” are impossible. For example, presence of clay minerals in the “restingolitas” it is very strange. How can preserve clay mineral in a sediment with a high degree of partial melting?. It is possible that clay minerals can be incorporate in the apron sedimentary layer?.

Specific comments:

1 - The authors write several times (lines 70, 128, 182, 199, 202, 205) "... absence of igneous minerals". They must clarify "... absence of common igneous minerals from Canary Islands". Quartz and biotite are primary igneous minerals in many volcanic context.

2 - Authors refer to the black magmatic enveloping as basalt (lines 59, 62, 113, 119) but they do not show geochemical analysis for this material. According to Gimeno (2011) the black enveloping is basanite in composition, so in absence of their own analysis, the authors should be named this material as basanite.

3 – Lines 238 to 240. 95% of the seismicity of El Hierro, prior and during the eruption, clustered between 10 and 20 km, i.e., close to the limit Mantle-oceanic crust and in the lower layer of the oceanic crust. Seismicity around 5 to 10 km (closed to layer 1) is less than 5%. So, this argument is not valid for the model proposed and authors should change this paragraph.

4 - Line 163. Holocene eruptions in Gran Canaria refer to Quaternary eruption. Samples studied by Hansteen & Troll (2003) are older than holocene.

5 - Line 173. Authors refer Fig. 2D & E as Gran Canaria are samples from El Hierro, no Gran Canaria. Line 173.

6 - References. Lines 324, 333. The title of both references is the same.

7 – Table 1. Better to transform in a quantitative table. In the present format this table is not necessary.

8 - Table 3 caption. Lines 373, 374. Number 8 repeat 3 times. The last two times should be numbers 9, 10.

9 - Figure 5 is too similar to Figure 8 of Hanstel & Troll (2003). In fact, the orientation of this figure for El Hierro is wrong and should be NNE - SSW (from left to right in the figure). Also the subaerial relief of the island should be with more slopes.

10 – It is very convenient to make a new figure with the location of the studied area (map).

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