Solid Earth Discuss., 3, C664–C673, 2012
www.solid-earth-discuss.net/3/C664/2012/
© Author(s) 2012. This work is distributed under
the Creative Commons Attribute 3.0 License.

Solid Earth
Discussions

Interactive comment on "Floating sandstones off El Hierro (Canary Islands, Spain): the peculiar case of the October 2011 eruption" *by* V. R. Troll et al.

V. R. Troll et al.

valentin.troll@geo.uu.se

Received and published: 27 February 2012

Dear Sir or Madam, Regarding the comments by reviewer #2 Francisco José Pérez Torrado we would like to provide the following responses: 1) Title: We have changed the title to " Floating stones off El Hierro, Canary Islands: xenoliths of pre-island sedimentary origin in the early products of the October 2011 eruption" to avoid the term "sandstones". This was also commented on by reviewer #1. 2) The variability in vesicularity of the restingolite samples and the xeno-pumice samples from other islands is likely a result of variable degrees of melting as a function of residence time, temperature contrasts and presumably the water content of the protolith, which may

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

vary at different localities. Quantification of some parameters, such as degree of partial melting, P and T values: As mentioned by the reviewer, this goes somewhat beyond the scope of this particular paper. However, we point out that this is planned for a follow-up publication that we are working on at the moment. 3) REE and isotope analysis: Additional analyses are in progress and will be published in the follow-up publication mentioned above. However, we agree entirely with the reviewer's comment and have now added results of oxygen isotope analyses of the restingolites. These values are significantly elevated relative to magmatic compositions and are thus consistent with a non-igneous protolith. The presence of clay minerals: We believe that the clay minerals are small remnants that were protected from melting, maybe by vapour insulation (cf. Leidenfrost effect) during very short magma residence. Such protolith remnants are in fact common in the restingolites, and, as pointed out above, are free from igneous crystals, implying they are not recent ocean floor sediment, which should include volcaniclastic components. Specific comments: 1) "absence of igneous minerals": we have clarified this point by giving examples and by stating that the focus is on igneous minerals typical for the Canary Islands, by stating that "igneous rocks on El Hierro do not contain any free (primary) quartz crystals (nor do igneous rocks on any of the other Canary Islands" (lines 222-223 revised manuscript). Moreover, we now give a list of typical igneous minerals absent, which are olivine, pyroxene, amphibole, and feldspar. 2) We have replaced "basaltic" with "basanitic" in the manuscript when we refer to the igneous eruption products of the El Hierro eruption and are grateful for this correction. 3) We have rephrased the sentence about the location of pre-eruptive seismicity to "Seismicity at El Hierro prior to and in the early phase of the eruption clustered primarily between 7 and 17 km depth, i.e. mainly within the igneous ocean crust (IGN, 2011)". 4) We changed "Holocene" to "Quarternary". 5) We checked all references to figures. Figures 2G and H show samples from Gran Canaria. 6) We have corrected the references. 7) We would like to keep Table 1 as it summarises in a very simple manner the results of XRD analysis. This will make the data more accessible to a wider audience. Quantitative information in form of two XRD

SED
3, C664–C673, 2012

plots is provided in the appendix. 8) Table 3, caption: We corrected the references. 9) Fig. 5 is too similar to Fig 8 in Hansteen and Troll (2003): Fig 8 in Hansteen and Troll shows magma-crust interaction beneath Gran Canaria including the Tejeda edifice and basaltic volcanism in the N of Gran Canaria. Our Fig. (now 6) adapts the general crustal structure of the Canary Islands (and Gran Canaria in specific) to the situation of El Hierro showing volcanism offshore on the apron of the island and focussing on magma-crust interaction within layer 1 of the oceanic crust. We have now clarified in the figure caption that this figure is modified after Hansteen and Troll (2003). 10) We have added a new Figure 1 showing the location of the Canary Islands and El Hierro, as well as that of the eruption site. We hope that all comments are now satisfactorily covered and look forward to your decision. With best regards, V.R. Troll on behalf of the author team

Please also note the supplement to this comment:
http://www.solid-earth-discuss.net/3/C664/2012/sed-3-C664-2012-supplement.pdf

---

Interactive comment on Solid Earth Discuss., 3, 975, 2011.

SED
3, C664–C673, 2012

Interactive Comment

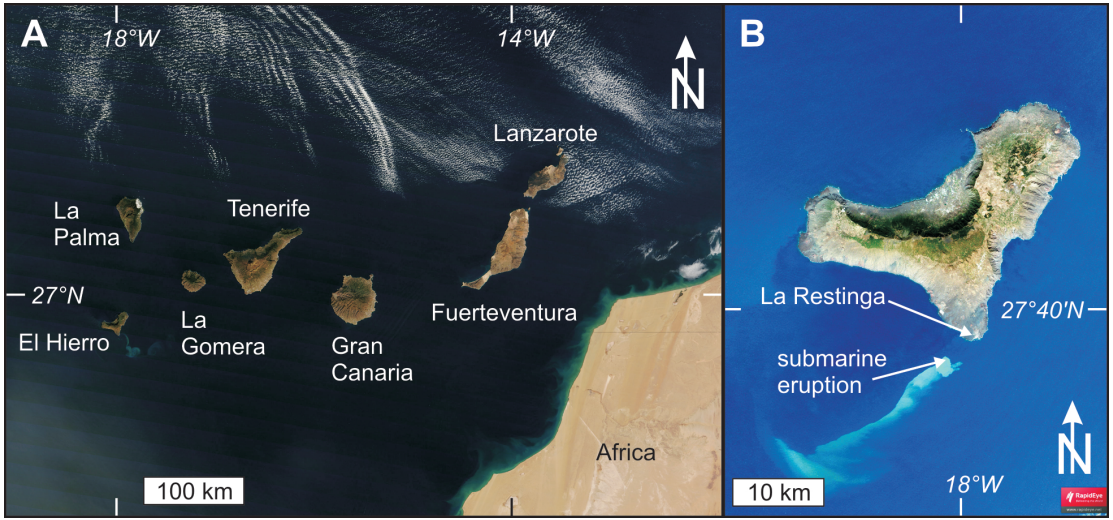

Fig. 1.

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

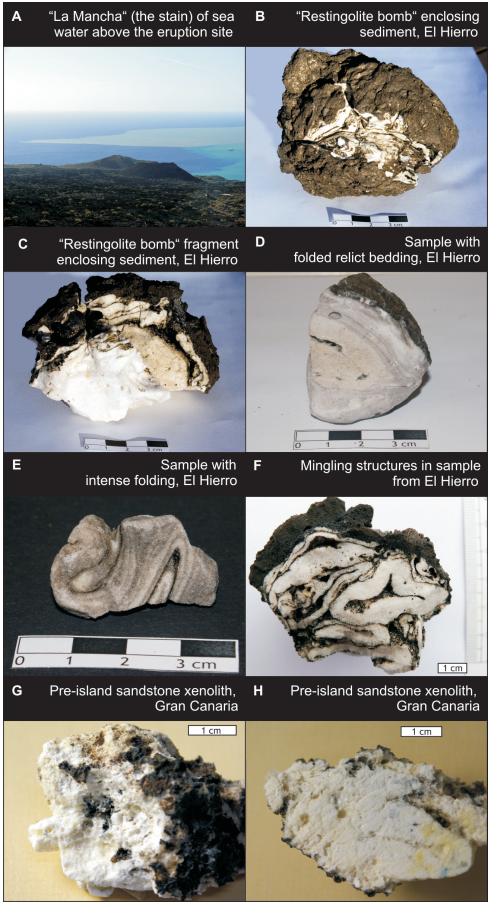

Fig. 2.

SED
3, C664–C673, 2012

CC BY

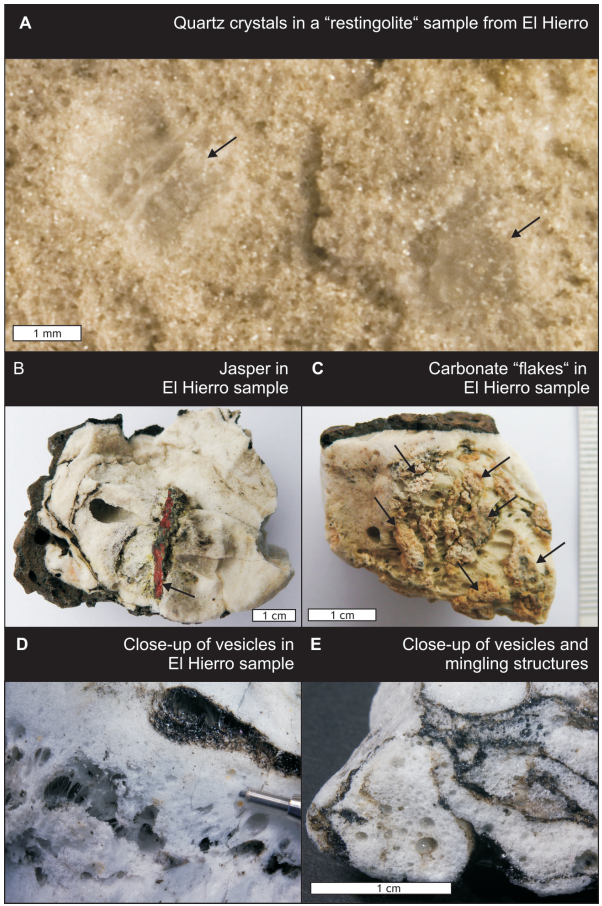

Fig. 3.

SED
3, C664–C673, 2012

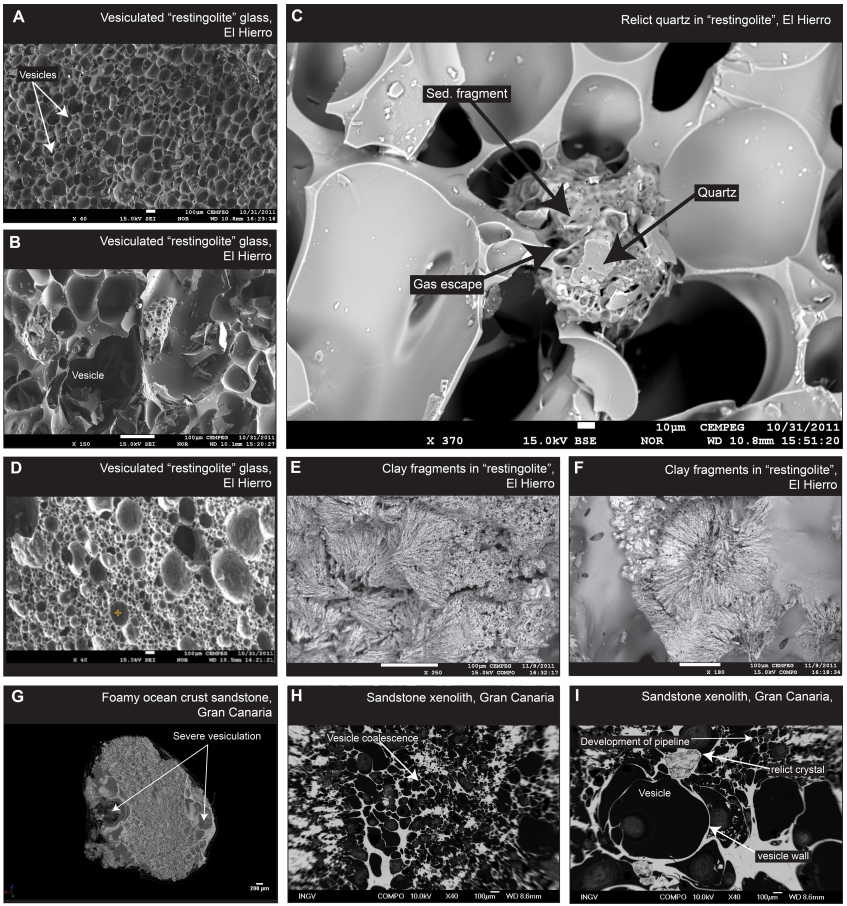

Fig. 4.

SED
3, C664–C673, 2012

CC BY

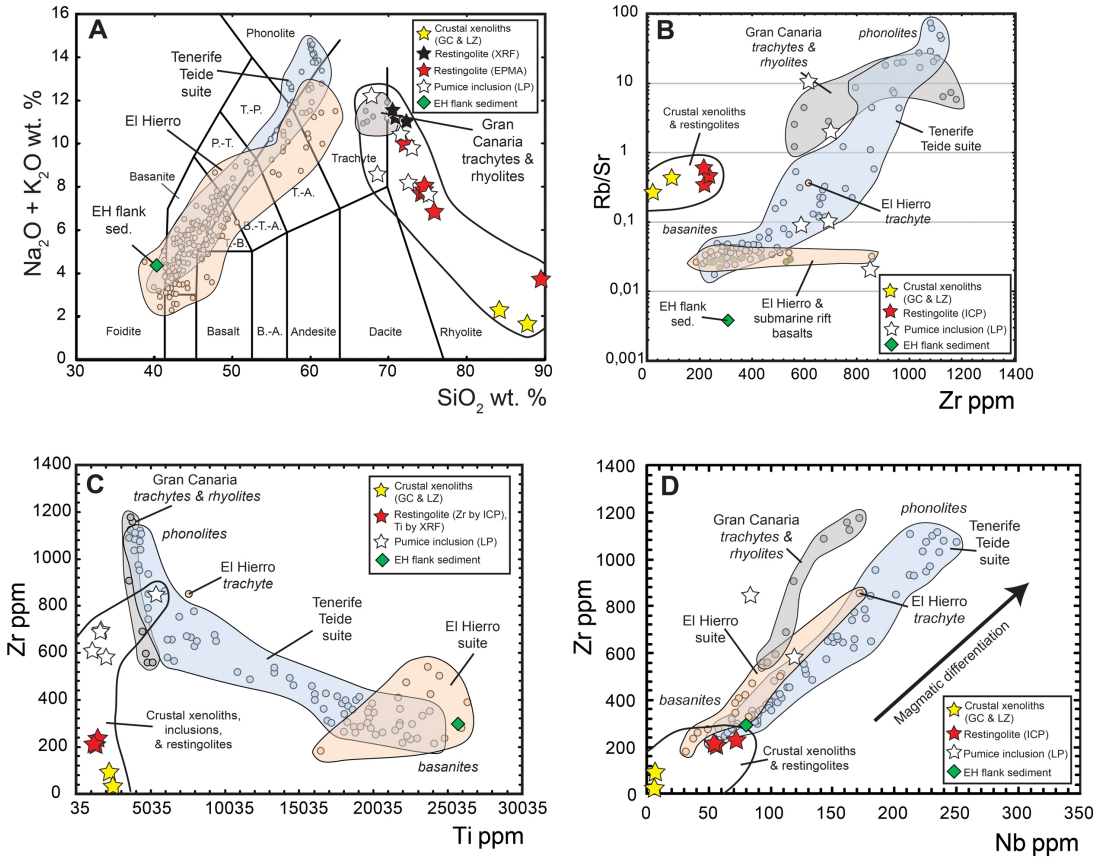

Fig. 5.

SED
3, C664–C673, 2012

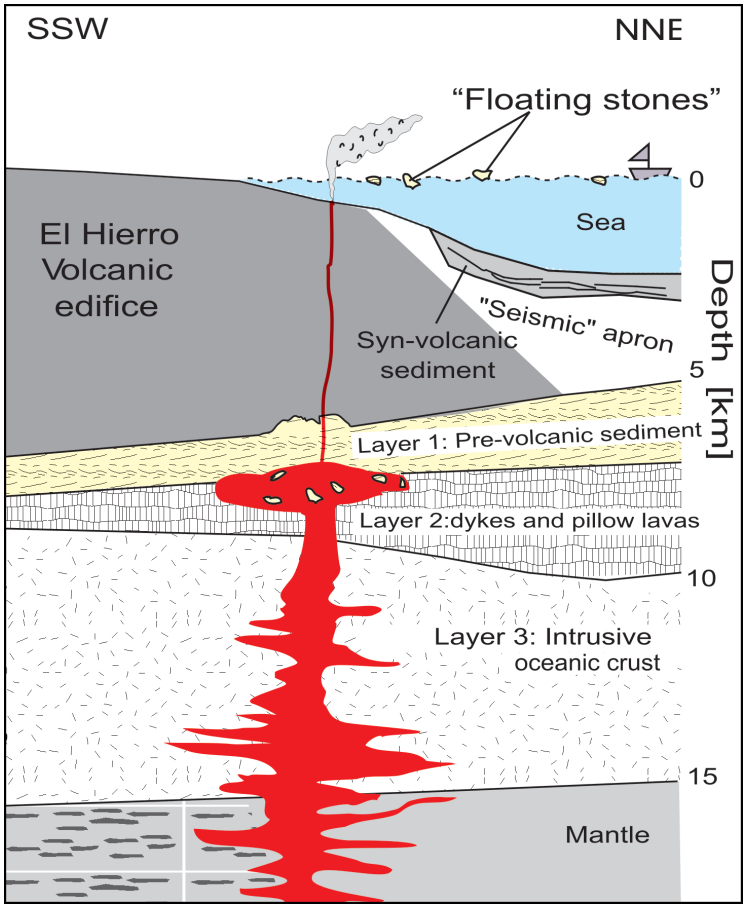

Fig. 6.

SED
3, C664–C673, 2012

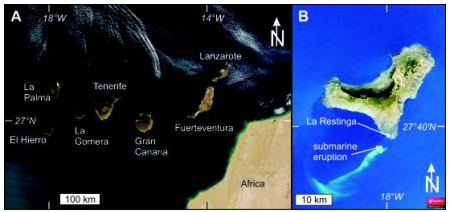

Fig 1. new after revision

Fig. 2, formerly Fig. 1, slight changes in the figure headers

Fig. 7. overview of all figs with changes outlined

SED
3, C664–C673, 2012

CC BY