

## Reply on EC1

Carlos A. Góis-Marques et al.

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Author comment on "The bicentenary of Georg Hartung, a German pioneer geologist, explorer, and illustrator" by Carlos A. Góis-Marques et al., Hist. Geo Space. Sci. Discuss., <https://doi.org/10.5194/hgss-2021-15-AC3>, 2021

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I and my co-authors would like to thank the topical editor Kristian Schlegel for the review and suggestions to our tribute paper to Georg Hartung. We have read the provided recommendations and changed or added new text accordingly. In the following lines we present the reply to the comments and suggestions.

**EC1:** The authors should put some more emphasis on Hartung's illustrations. They should not lump the illustrations together into one single figure (as number 1), but separate them (in groups) with appropriate figure captions, and may perhaps include even some more.

*AC: We agree with the editor suggestions. We split our Figure 1 in separate figures and add some more, making a total of eight figures. Moreover, we provide a figure with the signature of Georg Hartung. The new order and figure labels are as follows:*

*Figure 1: Details of two illustrations depicting Georg Hartung performing fieldwork. (a), G. Hartung (left figure with a hat) taking notes from his guide in Fuerteventura Island, Canary archipelago, extracted from plate III in Hartung (1857b; <https://www.biodiversitylibrary.org/item/46730#page/320/mode/1up>: last access 26 September 2021); (b), Same person in São Miguel (Azores archipelago) talking with the locals, extracted from plate VII in Hartung (1860a: <https://www.e-rara.ch/zut/content/zoom/7111419>: last access 26 September 2021). Both images are public domain.*

*Figure 2: Signature of Georg Hartung found in a partial letter addressed to Lyell, within a Lyell's manuscript dealing with Madeira Island (see Lyell, 1854/1855). Image courtesy of the University of Edinburgh Library, under Creative Commons –attribution 4.0 International.*

*Figure 3: Panoramic views drawn by G. Hartung printed in the back side of Ziegler et al. (1856) physical map of Madeira Island. (a) Ribeira da janela stream and Rabaçal locality; (b) Lagoa locality in Porto Moniz; (c) Porto Moniz village; (d) Machico and Ponta de São Lourenço in the eastern part of the island; (e) View from the top Penha d'Águia (Porto da Cruz) showing the central part of the island. Notice that the depicted persons are probably Hartung wearing an umbrella while sketching, and his local guide waiting for him. Image public domain, digitalized by ETH-Bibliothek Zürich (<https://doi.org/10.3931/e-rara-38937>: last access 26 September 2021).*

Figure 4: Hartung (1857b), plate III, depicting a panoramic view of Fuerteventura Island (Canary Archipelago) from the locality of Água de Bueyes. Image public domain, digitalized by Biodiversity Heritage Library (<https://www.biodiversitylibrary.org/item/46730#page/320/mode/1up>: last access 26 September 2021).

Figure 5: Hartung (1860a), plate VII, depicting a panoramic view of Furnas in São Miguel Island. Image public domain, digitalized by ETH-Bibliothek Zürich (available <https://www.e-rara.ch/zut/content/zoom/7111419>: last access 26 September 2021).

Figure 6: Hartung (1860a), plate XI depicting geological sketches of Graciosa Island, Azores archipelago: (a) NW-SE cross-section of the island depicting four main volcanic formations proposed by Hartung; (b) SW-NE cross-section of the island; (c) SW-NE cross-section of the southern part of the island, crossing the Caldera of Graciosa; (d) panorama of Caldera of Graciosa; (e) NE-SW cross-section of Graciosa Caldera, signalling the Furnas do Enxofre ('hölhe' in the original). Image public domain, digitalized by ETH-Bibliothek Zürich (<https://www.e-rara.ch/zut/content/zoom/7111423>: last access 26 September 2021).

Figure 7: Hartung (1864), plate III, portraying geological sketches of Madeira Island, Madeira archipelago: (a), (b) and (c), sketches from the Eastern part of Madeira Island, the Ponta de São Lourenço: (a) section of the north cliff depicting the lithology; (b) N-S cross-section; (c) detail of the cross section in (b), including a stratigraphy and a reconstruction of the sea-eroded pyroclastic cone of Senhora da Piedade; (d), (e) and (f), drawings of the south coast of Madeira Island: (d) sea cliff from Cabo Girão to Câmara de Lobos; (e) stratigraphy the sea cliff portrayed in (f); (f) sea cliff from Forte de São Tiago (Funchal) to Ponta da Oliveira (Canico). Image public domain, digitalized by ETH-Bibliothek Zürich (<https://www.e-rara.ch/zut/content/zoom/7222170>: last access 26 September 2021).

Figure 8: A Hartung drawing in Fritsch (1867), plate VI, portraying a view from Las Canadas into the Teide stratovolcano in Tenerife Island, Canary archipelago. A similar drawing was published in Lyell (1855, pg. 514, fig. 651), where credit is given to G. Hartung. Image public domain, digitalized by ETH-Bibliothek Zürich (<https://www.e-rara.ch/zut/content/zoom/6096244>: last access 26 September 2021).

Moreover, we changed the title from 'The bicentenary of Georg Hartung, a German pioneer geologist and explorer' to 'The bicentenary of Georg Hartung, a German pioneer geologist, explorer and illustrator' to focus the title on his illustrations.

Other small additions pertaining the focus on his illustrations:

Line 50: we added the following line: 'The first known published illustrations by Hartung are found in Madeira Island map by Ziegler et al. (1856) depicting several panoramas of the island (see Fig. 3).'

Line 63-65: Hartung further publishes his observations on Madeira and Porto Santo Islands (Hartung and Mayer, 1864; Fig. 6), and is co-author of a book with geological drawings of Tenerife (Fritsch et al., 1867; Fig. 8), being the last known drawings publishes. However, in 1870 he stills draws as he sends drawings to Heer depicting the Niagara Falls, and the village of Matt in Switzerland (see Bouheiry, 2013).

**EC1:** In addition, on page 3, line 65 the authors should name the subjects in the list of Hartungs publications and not just the years of publication.

AC: We agree with the author. We changed our text to include the subjects that Hartung wrote about, and when appropriate we provide the bibliography of the papers Hartung was discussing. We added the following text:

'Last known writings appear mainly in the journal *'Zeitschrift der Gesellschaft für Erdkunde zu Berlin'*, where he publishes a review on the formation of lakes and valleys (Hartung, 1878a), a summary in German of the 'ninth annual report of the U. S. Geological and Geographical Survey of the territories' by Hayden (1875) (Hartung, 1879a), a translation to German of a paper about the geography of Norway by Kjerulf (1876) (Hartung, 1879b), a description and discussion about the formation of the Jutulhogget Canyon in Norway (Hartung, 1880a), two summaries in German of the tenth (Hayden, 1878) and eleventh (Hayden, 1879) 'annual report of the U. S. Geological and Geographical Survey of the territories' (Hartung, 1881a, b), a discussion about the landslide in Flims, Switzerland (Hartung, 1884), and finally a summary in German of the 'third annual report of the United States geological survey' by Powell (1883) (Hartung, 1885). Further contributions were published in other journals such as a commentary of the book 'scientific results of the United States arctic expedition' by Bessels (1876) (see Hartung, 1880b), and a discussion about the book 'The Great Ice Age: And Its Relation to the Antiquity of Man' by Geikie (1874) dealing with the glaciations (Hartung, 1878b).'

Added bibliography:

Bessels, E.: *Scientific results of the United States Arctic Expedition. Vol. I. Physical Observations*, Government Printing office, Washington, <https://archive.org/details/cu31924029881095>, 1876.

Geikie, J.: *The Great Ice Age: And Its Relation to the Antiquity of Man*, D. Appleton and Company, New York, 545 pp. 1874, <https://books.google.pt/books?id=zxcBAAAAYAAJ>

Hayden, F. V.: *Ninth annual report of the United States Geological and Geographical Survey of the Territories: embracing Colorado and parts of adjacent territories; being a report of progress of the exploration for the year 1875*, Govt. Print. Off., Washington, <https://www.biodiversitylibrary.org/item/124508>, 1877.

Hayden, F. V.: *Tenth Annual Report of the United States Geological and Geographical Survey of the Territories, embracing Colorado and parts of adjacent Territories, being a report of progress of the exploration for the year 1876*, Govt. Print. Off., Washington D.C., <https://doi.org/10.3133/70038934>, 1878.

Hayden, F. V.: *Eleventh Annual Report of United States Geological and Geographical Survey of the Territories embracing Idaho and Wyoming, being a report of progress of the exploration for the year 1877*, Govt. Print. Off., Washington D.C., <https://doi.org/10.3133/70038936>, 1879.

Kjerulf, T.: *Et Stykke Geografi i Norge, Forhandlinger i Videnskabs-selskabet i Christiania.*, 1-18, <https://www.biodiversitylibrary.org/item/149466#page/105/mode/1up>, 1876.

Powell, J. W.: *Third Annual report of the United States Geological Survey to the Secretary of the Interior, 1881-1882, Report 3*, 718, <https://doi.org/10.3133/ar3>, 1883.

AC: We also made the following small changes:

Line 89-90: added the following references: Góis-Marques, 2013; Góis-Marques et al. 2014:

Góis-Marques, C. A.: *Paleobotânica da Ilha da Madeira: Inventário e Revisão da Macroflora*

*Fóssil de São Jorge e Porto da Cruz, Dissertação de Mestrado Departamento de Geologia, Faculdade de Ciências da Universidade de Lisboa, Lisboa, 144 pp., 2013.*

*Góis-Marques, C. A., Menezes de Sequeira, M., and Madeira, J.: Palaeobotany of Madeira Island: historical perspective of the leaf-beds and collections of S. Jorge and Porto da Cruz, Silva Lusitana, nº Especial, 87-108, 2014.*

*Line 105: we added the following text: 'to Gillian McCay (Cockburn Geological Museum, University of Edinburgh), for the access to Lyell manuscript; to the reviewers Adriano Pimentel (University of Azores) and Karl-Heinz Glassmeier (Technische Universität Braunschweig) and to the editor Kristian Schlegel for their review and suggestions that improved the initial manuscript.'*