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# ***Interactive comment on “Magnetic signature of large exhumed mantle domains of the Southwest Indian Ridge: results from a deep-tow geophysical survey over 0 to 11 Ma old seafloor” by A. Bronner et al.***

## **Anonymous Referee #1**

Received and published: 23 January 2014

### General comments

The authors present an interesting study on the magnetic signature of the different types of seafloor in the Southwest Indian Ridge. The paper addresses relevant questions about the magnetic properties of the serpentinized peridotites in the exhumed mantle domains and their capability to generate stable spreading magnetic anomalies. The paper is innovative (e.g. it uses an integrated dataset), and of broad interest (it will be of interest for marine geologists and geophysicists, geodynamic and paleomagnetism communities). This work has also implications for the interpretation of the

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magnetic anomalies over exhumed mantle domains at the OCT in the magma-poor passive margins. The main conclusions are corroborated by the interpretation of different kind of data (deep-tow magnetic data, magnetic properties of dredged samples) and by several and magnetic modelings. The paper is well written but it could, however, be improved specially in the figures that are not always clear.

### Specific comments

The figures and the captions could be substantially improved. The suggested changes to the captions (in bold) are attached as pdf file while the comments on the figure are reported below.

### Comments on Figure 1:

- the color scale adopted for the bathymetry makes difficult see the magnetic anomaly picks, the Magnetic Axis and the exhumed mantle areas. I suggest to modify it.
- the symbols of the Magnetic Axis are too small.
- Insert a meter-scale in the first image.
- I suggest to change in the upper figure the name of the two insets from “Box 1” e “Box 2” to “Western corridor” and “Eastern corridor”, respectively.

### Comments on Figure 2:

- Please indicate on top of the figure the geographic North and South. For a better clarity, please indicate “western corridor” and “eastern corridor” on top of the two group of profiles in place of names “Box 1” and “Box 2” that are not reported in the manuscript text.

### Comments on Figure 3:

- Change the color of the lines relative to the edges of the volcanic seafloor. The red color is mixed with the values of the NRM.

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- Please report the labels of the magnetic anomalies (1, 2A, 3A, etc.) in the figures a) and b).
- I don't know if the magnetic anomaly reported along the profiles are clear and useful here.
- Delete the label "Line" from the magnetic profiles; in the other figures the TOBI tracks are only labeled with the corresponding number.
- Please show in the Fig. 3b the NRM scale.
- In Fig. 3b the NRM values of the dredges # 21 and 33 are missing.
- In Fig. 3b the bigger green circle belonging to the dredge #30 to which NRM value in the Table 1 corresponds?

#### Comments on Figure 4:

- Please insert a meter-scale or the reference coordinates
- The bathymetric scale is missing
- Change the color-scale adopted for the bathymetry; identify the different type of seafloor (smooth, volcanic or corrugated) is very difficult.
- Change the labels "Box 1" e "Box 2" to "Western corridor" and "Eastern corridor", respectively
- Don't show in the box1 the edges of the TOBI side-scan swath for the E-W profiles that are not reported in the figure. It is misleading because the black lines seem the ridge axis extension
- Insert the magnetization scale also in the box1

#### Comments on Figure 5:

- In Fig. 5a write the label axes as "Susceptibility (SI)" and "NRM (Am-1)"

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- In the legend of Fig. 5a “basalts” instead of “basaltes”

Comments on Figure 6:

- Increase the font size of the profile name (profiles 2-2 and 2-5)
- Move the vertical and horizontal scale on top of the figure
- Please insert a geographic reference N-S for the profiles

Comments on Table 1:

- Dredge #22 is not reported in the figure

Technical corrections:

- Line 11: suggest “11 Myr” instead of “11 Myrs”
- Line 65: suggest “volcanic rocks” rather than “volcanic”
- Lines 16, 47, 69, 83, 384, 390, etc.: suggest ultra-slow rather than ultra slow or ultraslow. Anyhow write it always in the same manner
- Lines 70, 473, 498: suggest “magma-poor” rather than “magma poor”
- lines 72 and 116: suggest “between 62°E and 65°E” or “between 62°-65° E” rather than “between 62 and 65°E”
- lines 73, 107, 114, 157, 207, 208: suggest “side-scan” instead of “sidescan” or “side scan”
- line 89: missing Sauter et al., 2011 in the References
- line 179: insert the reference to Fig.3a
- lines 203-204: suggest Profile in the brackets with the P lowercase
- line 220: missing a space at the start of the phrase

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- line 226: “east” and not “East”
- line 228: write “2” in letters
- lines 228, 242, 406: anomaly “C5” and not “5”
- line 231: delete the comma after “small”
- line 245: probably you intend “similar pattern to those from the WESTERN corridor” and not from the eastern
- line 252: missing a space in the bracket between “profile” and “1-7”
- line 253: missing a space in the bracket between “profile” and “1-6”
- line 259: magnetization instead magnetizations
- line 264: missing space between “Figure” and “3”
- line 267: suggest “along the profiles” rather than “from profile”
- line 271: “Properties” instead of “Proporties”
- line 259: double points at the end of the phrase
- line 284: suggest to invert “induced vs remanent magnetizazion”
- line 287: “basalts” instead of “basalt”
- line 289: delete the words “for these samples” is already specified
- line 305: “Koenigsberger ratio” instead of “Koenigsberger ratios”
- lines 314, 362, 407: change “line 2-5” with “profile 2-5” or always use the same name
- line 324: add “ the anomalies” before of “C3A and C”
- line 341: “profiles” instead of “profile”
- line 342: delete the bracket at the start of the line

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- line 345: add “along the” before “profile 2-5”
- lines 356-359: suggest to delete this phrase because the concept have been already defined six lines before
- line 360: missing space between “i.e.” and “the”
- line 386: “1 Myr” instead of “one million years”
- line 389: “serpentinized” instead of “serpentinised”
- line 390: suggest “volcanic extrusion or mantle exhumation” rather than “from volcanic extrusion to mantle exhumation”
- line 392 : “0,5 Myr” instead of “0,5 My”
- line 425: suggest “and they are strictly inferior to. . .”
- line 462: “rather than by peridotites” instead of “rather than peridotites”
- line 479: “are” instead of “is”
- line 512: “homogeneous” instead of “homogenous”

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/5/C934/2014/sed-5-C934-2014-supplement.pdf>

Interactive comment on Solid Earth Discuss., 5, 2449, 2013.

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