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## ***Interactive comment on “Geophysical characterisation of two segments of the Møre-Trøndelag Fault Complex, Mid-Norway” by A. Nasuti et al.***

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### General comment

The manuscript deals with the geophysical characterization of one of the main fault systems in Central Norway, comprising gravity, magnetic, electric, and seismic surveys. With this new data it contributes to an ongoing discussion about the geological evolution of the investigated area. Some of the interpretation remains speculative, because either the original data is not fully presented or some forward models are missing. However, in the sense of a discussion paper, the content of the manuscript is worth to be published after some improvements.

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## Specific comments

### A) Geology

The authors give a short introduction into the geology of the study area. For me it would have been helpful having a figure available, which images the geological interpretation of the apatite fission track data after Redfield et al. (2004, 2006) and Redfield and Osmundson (2009).

Name the faults that are plotted in Fig. 2.

### B) Gravimetry

Because the observed gravity anomalies are rather small, e.g. only about 1 mGal along profile PP', some more information about the error budget of the anomaly data might be required. The authors write (page 163, line 25) that the measuring accuracy was in the order of 0.01 to 0.02 mGal. But with respect to the small anomalies it would be interesting to read also something about the accuracy and values of the terrain reduction. How did the authors handle the bathymetric data? The reference to some (internal?) reports is not helpful.

I suggest shifting the information from chapter 3.3 'Petrophysical data and Bouguer corrections' to chapters 3.1 and 3.2. When discussing the densities, the authors should refer to Table 1 and the sample locations in Fig. 5.

On page 168, line 15, the authors write, that the observed gravity anomaly along profile PP' displays a steep gradient that cannot be explained by the relief only. What is meant? The relief in the sense of the topography should be corrected in the gravity data, because the authors discuss Bouguer anomalies.

The density of the Quaternary overburden is rather high (2590 kg/m<sup>3</sup>). Does any evidence exist for this assumption? If the density can be even lower, than the gradient in the Bouguer anomalies along profile PP' (Fig. 7) might be simply explained by the density contrast between the Quaternary and the hard rocks, i.e. between density

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contrasts above sea level.

### C) Magnetism

Regarding the location of the magnetic surveys the authors should refer also to Fig. 2 (page 164, line 4). Furthermore, I miss some information about the data quality - again, only an internal report is given as reference. Also the work of Biedermann (2010) is unpublished. Therefore, some more information about the variations in the petrophysical data and its interpretation should be given in this paper. Is any information available about remanent magnetization of the rocks? Or is there any evidence that no remanent magnetization must be considered in the forward models also?

Are the magnetic anomalies pole reduced; I guess they are not? The authors describe the shape of the magnetic anomalies along profile QQ' (Fig. 6) with "up and downs" (better: alternating positive and negative anomalies) which are expected to image contacts between different rocks. I am not really aware of the typical shape of only induced magnetic anomalies at these latitudes. For a better correlation between the magnetic signature and the discussed structures a forward model is required. The proposed correlation of the magnetic anomaly M3 with the seismic anomaly S3 and the resistivity anomaly R3 is - with respect to their locations along the profile – not convincing.

Also regarding the discussion of the spatial correlation between the resistivity anomalies A1 (and A2?) along profile ZZ' and the magnetic anomaly U a forward model is required. Are the positive and negative parts of the anomaly U related to one source body, or do they origin from two different rock types? Another magnetic survey was performed about one kilometer west of profile ZZ'. Does this profile also image the anomaly U like along profile ZZ'?

### D) Seismic profiling

The interpretation of the seismic surveys suffers from a lack of information regarding the "field data". I expect the reader wants to see at least a representative seismogram

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/ graph of traveltimes that was used to estimate the velocities.

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Interactive comment on Solid Earth Discuss., 3, 159, 2011.

**SED**

3, C53–C56, 2011

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