

Comments on the authors' response to the comments on the manuscript SE-2017-119 (Dobrica et al).

If the authors have answered almost all concerns raised in the previous iterations, there still remain a few modifications needed, before their paper can be accepted for publication to Solid Earth :

1. It seems there is some ambiguity with the two first figures in the authors response. The authors mention a synthetic series with a -4 slope PSD... I guess the 1st figure in their response is for the time derivative of the series ? Which would be coherent with the approx. -2 slope PSD on the FFT (page 3 of their response). Am I correct ?
2. In the corrected version, it seems there is some confusion on the top of page 2. The authors say "the temporal spectra of the geomagnetic field at the Earth's surface and of the core field spherical harmonic coefficients could be approximated by a power law with a negative slope of about -4... and of about -2, respectively. The latter succeeded to reach periods down to 1 or 2 years."

But the -2 slope in Lesur et al (2017) is for the SV ! Which corresponds to -4 for main field series. So the two studies (by de Santis and by Lesur) are coherent ! The latter indeed extending this result down to shorter periods. The text should be corrected accordingly.

3. On the figures S2 (pages 4 and 5 of the response) : I do not understand how you can have a series dD/dt that gives a PSD with a slope about $s_1 = -1.8$, together with the corresponding series $D(t)$ giving a PSD with a slope about $s_0 = -1.9$... since one should have $s_0 = s_1 - 2$. Such a value would make your analysis consistent with that of de Santis et al (2003) (and see point 2 above).

I have the feeling your PSD for D is polluted by edge effects – see the many oscillations on the PSD for D ! These would disappear if removing the end-to-end line in the series (+ using tappers might help), the recipe used by de Santis et al. Note that this could also affect the PSD of dD/dt (to a lesser extent), and will make this analysis coherent with the result of de Santis et al (2003).

Furthermore, the three period ranges highlighted by the authors (60-90, 20-35 and 8-15 yrs) do not look obvious to me at all when looking at the log-log representation of the PSD for dD/dt . Before considering such periods, and given the suspected edge effects, I would need to see the PSD for dD/dt computed while removing the end-to-end line + using a taper.

These issues should really be considered before publication, with modifications to the corresponding text at the beginning of section 3.