Comments on the revised version of the manuscript "Multiscale monsoon variability during the last two climatic cycles inferred from Chinese loess and speleothem records" by Li et al.

In the following, my major comments on the first version, the Replies of the Authors and my present comments.

1. *The authors should confirm the results shown in Fig. 3, by applying at least another spectral technique not based on Fourier method. I suggest to use the Singular Spectrum Analysis (SSA, toolkit available online), which is well suited also for series affected by a high-noise level. SSA required equally-spaced data and therefore an interpolation is required.*
   Reply*:* In lines 2-5 and 19-21, page 7, we performed both Redfit and MTM (implemented in the SSA toolkit) methods on the loess grain size records, and found that the spectrum by these two approaches are highly comparable, confirming the reliability of Redfit spectral results.

   In order to verify and support the results, I suggested to use a method not related to the Fourier approach, but the Authors applied MTM (although implemented in the same toolkit together with SSA and MEM, it is substantially based on the Fourier transform). Moreover, the Monte Carlo test I suggested (more specific in respect to that used by the Authors also in the revised version) was not applied.

2. *Regarding the reconstruction of the variability components (Fig. 4, 5 and 6), the choice of the boundaries of the frequency bands C1, C2, ..., C5 is somewhat arbitrary and the shape of the components reconstructed in Fig. 4 can depend on this choice. The arbitrariness in the choice of frequency bands can be overcome by extracting the components using SSA. A Monte Carlo test (more specific in respect to that corresponding to the red curves of Fig.3) is associated with SSA. By applying it, discrimination among the many components identified as significant in the C4 and C5 bands, should be possible.*
   Reply: In lines 14-20, page 6, we adopted Empirical Mode Decomposition (EMD) in the revised manuscript to extract the "intrinsic mode functions" (IMF) of Gulang MGS data and to further demonstrate the multi-scale features of East Asian monsoon variability. Since the EMD method is based on the local characteristic time scale of the data, can avoid the arbitrariness in the choice of frequency band.

   Regarding the components extracted from the series, the authors used EMD to avoid the arbitrariness in the choice of frequency bands. However, IMF1 to 6 in Fig. 4(A) and 5(A) clearly show that each component contains a broad range of oscillations of different frequency. E.g., in IMF3 of Fig.4 the 'dominant' period of 16 ky present in the spectrum on the right is due to the single event at about 100 ky BP. Therefore it is not correct to associate the variance of 6% to an oscillation component of 16 ky. Also IMF5 in Fig. 4(A) contains only one 'event' lasting about 40 ky and many oscillations of period of about 23 ky. So the variance associated to 23 ky is actually contained partly in IMF4 and partly in IMF5. Therefore different variability modes are not well separated in different components.

3. *80% of c. l. is a low value. It would be interesting to specify which components remain significant at a higher c.l., e.g. 90 or 95%.*
   Missing reply.

   In Fig. 3 they show the 80% c.l. for the REDFIT spectrum (as in the previous version) and 90% c.l., but for MTM.

4. *It is not clear if the variances of the components in Fig. 4 are a percentage of the two raw series total variance. If the case, the corresponding components of the two series may contain different noise levels, thus distorting the comparison.*
   Reply: Yes, the variances are calculated on the raw time series. Noises of these two records were from the analytical errors, which are about 2% and 0.1% for the loess mean grain size and speleothem $\delta_{18}O$, respectively. However, the variances of orbital-to-millennial components are significantly higher than the analytical errors, and thus can be used for proxy-to-proxy comparison and further addressing different sensitivity of loess and speleothem proxies to orbital and glacial forcing.

   For the variance associated to the components, see comment 2.

In conclusion, the results presented in this manuscript would be potentially interesting, but their robustness was not not evaluated in a reliable and convincing way.