General Comments:

The manuscript by Jeon et al. converted the existing AMS and ACSM mass spectral database in the web-based form into a searchable, filterable software library coupled with a comparison panel in Igor Pro. The comparison panel provides the functionality to compare the mass spectrum of interest with MS in the database statistically and visually by cosine similarity and several types of mass spectral plots such as UMR and stacked HR ion families. This work will help AMS/ACSM users frame their observations against a wealth of previous observations obtained globally. This manuscript is generally well written. Before its publication, the following comments need to be addressed.

Specific Comments:
1. The impact of the following factors on cosine score needs to be discussed in detail, since the scores in tables seem to be pretty close.
(1) Maximum m/z inconsistency
    The maximum m/z for HR-AMS varied from 120 to 200, and some studies fitted the discrete PAH signals. Such differences will impact the correlation coefficients when comparing with the global database. How would the authors take such influence into consideration when applying mass spectra with different m/z ranges?
(2) HR-AMS mode inconsistency
    The differences in MS between W mode and V mode for the same aerosol samples have been observed in previous field/laboratory campaigns, since more ions are identified in the W mode due to its high resolution. Hence, the correlation would change when the mass spectra of W mode or V mode are used as references.
(3) Particle size inconsistency
    The MS of same OA factors are different for particles smaller than 2.5 μm (PM2.5) and 1 μm (PM1). However, these differences differ between different factors due to their varied size distributions. For example, the authors used the HOA MS of PM2.5 samples in Xi'an and Beijing, while the HOA MS of PM1 samples in other cities in Fig. 5. Such difference in aerosol size would cause uncertainties in comparison. How would the authors address this issue?

2. Line 388, What is the difference in the cosine score between the SOA spectra caused by different precursors under the same conditions (i.e., RH,T and seed)? Are there any further support other than the mass spectra?

3. Consider using transparent marks in all diagrams.