We thank the reviewer for very thorough and constructive comments. The quality of the manuscript has been improved by these comments and suggestions. Below are our responses to the comments. The response (in *blue*) follows each comment.

Reviewer #2 (amtd-7-C153-2014):

It is well known that the oxygen A-band absorption can be used to retrieval photon path length and is a powerful tool to study the cloud/aerosol properties. This work demonstrates the development of a high-resolution oxygen A-band spectrometer (HABS) with feature of polarization. The excellent performance is shown with stable spectral response ratio, high signal-to-noise ratio, etc.. I therefore recommend publishing this manuscript. Followings are some suggestions which might help readers to understand the work better.

1. P1031, L25, it is not very clear to me what is the open mode. It is mentioned the diffuser mode is used to measure the direct beam. How does it work to prevent the diffuse photon coming in? Authors are better to provide some explanation or reference.

Answer: The open mode means that there is no optical component mounted in that channel of filterwheel, and the incident light can pass through it directly. Under the diffuser mode, both sun direct beam and diffuse photon in the field of view (FOV) of 2.71° can come in. But under clear sky condition, the direct beam is dominant, and the intensity of diffuse photon is in the FOV (2.71°) is ignorable. We have added some explanation in the revised paper.

2. P1033, L14, it suddenly appears that 1.55 pixels = 0.016nm, better to show the definition of pixel here.

Answer: We have added some explanation about CCD array into the revised paper as follow: *"…The CCD array can work at two modes: (1) image mode, used for grating spectrometer assembling, including measuring the tilting of incident slit; (2) spectrum mode, used for the instrument performance testing (section 2.2) and solar radiation measurements (section 2.3), in which every column of pixels are combined to one pixel and the CCD array works as a linear CCD (1024*1)."* When CCD array works at spectrum mode, the whole O2 A-band spectrum (759~769 nm) is quasi-linearly distributed in these 1024 pixels, thus 1.55 pixels correspond to about 0.016 nm. We have added some explanation in the revised paper.

3. P1036, Eqs. (6-7), to my understand, T_{mean} is a pre-determined reference temperature, like 273K, not a previously calculated parameter. Please check.

Answer: Here the T_{mean} can be seen as a pre-determined reference temperature, but this reference temperature is varying with the air pressure. Thus how to determine this reference temperature and make sure it works for different region and different pressure is the issue. In this study, we use the mean values to determine the reference temperature, which is due to the following reasons: (1) this setting is consistent with the related reference; (2) we use six typical geographic-seasonal model atmospheres as references to determine the reference temperature for different pressure levels, which can minimize the fitting error.

4. P1037, L15, rephrase this sentence. In this doubt-k approach, there are two integrated ...

Answer: We have revised this sentence as follows:

"In this double-k approach, there are two integrated absorption optical depths: (1) the total absorption optical depth (k); (2) absorption optical depth from the top of the atmosphere to the scattering layer (k_0). They are used together to account for the vertical distribution of gaseous absorption in multiple-scattering media."

5. Finally, I suggest the authors adding a few sentences for their plan to use HABS for study cloud/aerosol property in the near future.

Answer: Yes, we have added another section (Section 5 in the revised paper) into the paper to explain our plan to use HABS for study cloud/aerosol property in the near future.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 1027, 2014.