We thank the referee for the useful comments. We have attempted to address each below.

SPECIFIC COMMENTS

1. P.6454. As mentioned in this section, SR is derived from the Rayleigh-Mie and nitrogen Raman signal; however the nitrogen signal is too noisy for a good optical depth measurement that is why we decide to use the described methodology in this section. In many measurement cases, the direct calculation was not appropriate in our case. To be able to retrieve with the same confidence all cases including thin or thick clouds, we choose to use a lidar ratio of 18.2sr (Platt and Dilley, 1984) which is in quite good agreement based on Raman lidar measurements yield LR values (Reichardt et al., 2002; Cadet et al., 2005). Furthermore, it permits directly to compare our results to some cirrus clouds analysis obtained by Cadet et al. (2003) in which analysis were performed using a LR value of 18.2sr.
2. P6455. The term α-ε or ω have been removed. Indeed this expression perhaps is not very useful information. In fact, the first term α is the nomenclature used for Alpha Technology and the second term designs the slope factor which is a measure by which the sharpness of transition between attenuation and transmission is achieved. Also we use alpha-epsilon which is a superior filter for Raman spectroscopy.
3. P6455. The text regarding the use of optical fiber has been incorporated in the discussion; the figure 2 has been introduced earlier in the description of the instrument.
4. P6456. More explanations about background noise have been included in the text and some values regarding the noise have been also added. Please refer to the revised manuscript. In fact, as sky background is low during nighttime; the amount of noise from this source is quasi-similar to the detector noise. With a FOV used in the old system (1mrad) and the wide bandpass filter of 1nm, the value indicated for sky background is around 5.6 photons for 30min integration and of 5.4 photons for dark noise detector considering a dark count rate of 100cps.s^{-1}. When PMT is cooled, the background noise is ~5.9 and ~11 when it is not cooled. So the background noise is reduced by a factor ~2.
5. P6458. The calibration coefficient is determinate by adjusting the water vapor lidar profile to the ECMWF one by the median of both profiles ratio at pressure levels of ECMWF data.
6. P6459. Effectively, it is a misprint. The sentence “The reason for this is duration of nighttime acquisitions that were longer during these periods” has been changed to “… is duration of measurements acquisitions that were longer…”
7. P6460-6461. In fact, the figure 9 has been removed (diurnal cycle) because it can appear understandable for readers.Relating to this figure, we have concluded that the atmospheric variability show larger variability than diurnal cycle due to the absence of diurnal cycle variation expected in the long acquisitions. If these variations could have been present and meaningful, following the beginning time for the acquisition, a bias could have been introduced in measurements analysis. However as no diurnal cycle variation is visible, it suggests that the atmospheric variability seems greater than diurnal cycle which allows to keep a measurement protocol during nighttime

independently of time. Nevertheless, we decide to remove these explanations and the related figure because more important and long acquisitions have to be performed over the year to ensure this affirmation.

8. P6463. Statistics analysis, which have been done concerning the Meteosat images linking observed cirrus classes, have been performed using the satellite images animation. No more statistics can be added but in ~80% of the observed images, the origin of cirrus trajectory was well defined visually.
9. P6465. The sentence "…constant illumination conditions at the optical fiber output" is not correct. The term constant has been replaced by "quasi-constant". Indeed, in the case of the old lidar system, fibers as long as 20m were used. In same way, a word of caution has been included in the discussion about fluorescence that is not limited to optical fibers in agreement with Sherlock et al. (1999). When the light is well mixed, then the impact of inhomogeneities of the photocathode of the PMT is reduced.
10. P6466. In fact, no more tests are need concerning the PMTs, however we will need to check which one between both PMTs give better performance with different emitted energy per pulse. This section has been modified accordingly.
11. P6466. Done. The square root has been added in the equation.
12. P6467. In fact, no gated tubes will be used for Raman channels; this information has been mixed with the information relating to the Rayleigh-Mie channel. However, we will use the TR20-16 as specified in the text; this transient permits both analog (lower altitude) and photon-counting (upper altitude) combination increasing the dynamical range of acquired signal compared to conventional system. The PR10-160-P transient recorder is a photon counting system used in the old lidar system and will be available if need.
13. P6467. This section which described the calibration aspect was not very clear and has been modified. To just give an explanation here, it has been decided to use a H_2O total column measurement to calibrate the water vapor profile from lidar. The use of the radiosonde data will be compared to the lidar profile but as an independent and systematic measurement. The GPS and lidar will be collocated, only the radiosonde will be not. However, to compare both calibration methods, as specified by the referee, the method described in Dionisi et al. (2009) could be used to calibrate the water vapor profile measured by lidar.
14. P6468. Regarding the different equations in the manuscript, symbols not previously defined have been described in the text and units are indicated.
15. P6469. Effectively, here we are just comparing the water vapor signal strength between old and new system. However as the old and new station are not located at the same altitude (2100m difference), the altitude-square dependence is not the same which imply a difference even if both systems are the same.
16. Figure 13. Done – Each cirrus class have been identified on the respective plot.
17. Figure 14 has been removed because it shows similar indications than Figure 15.

MINOR REMARKS – These remarks have been considered. Please refer to the revised manuscript.