REPLY TO REFEREE #2'S COMMENTS

We greatly appreciate the referee's comments on our manuscript entitled **"Tropospheric photooxidation of CF_3CH_2CHO and $CF_3(CH_2)_2CHO$ initiated by Cl atoms and OH radicals"**, by M. Antiñolo, E. Jiménez, A. Notario, E. Martínez, and J. Albaladejo.

1) More experimental details

As suggested by Referee #2, all the experimental details, such as the initial concentration of Cl atoms ($(2.6–4.8) \times 10^{11}$ radical cm^{-3}), laser repetition rate (10 Hz), and flow rates (180-470 sccm) will be included in the revised manuscript. In this work fluences ranged from 6.1 to 9.5 mJ cm^{-2} $pulse^{-1}$. In previous experiments the photolysis laser was typically operated at repetition rates of 5 or 10 Hz and the laser fluences ranged from 1.4 to 9.5 mJ cm^{-2} $pulse^{-1}$. No difference was observed when the laser rate was varied. Also, no difference on the rate coefficient was observed when the total flow rate was varied from 180 to 470 sccm, which confirms that the accumulation of photolysis or reaction products is not an issue, as mentioned in the manuscript.

2) Aqueous removal of fluorinated aldehydes

An estimation of the wet deposition lifetimes (τ_{wet}) of the fluorinated aldehydes was employed to evaluate the uptake of these species to cloudwater and rain in the atmosphere. The Henry's law constant is defined in the paper under discussion as the ratio of the aqueous-phase concentration of the fluorinated aldehyde (*C)* to its equilibrium partial pressure in the gas phase (*p*). Gases that are only slightly soluble in water will remain predominantly in the gas phase. Solubility of C_3 and C_4 fluorinated aldehydes is expected to be lower than that of fluorinated alcohols. So, statement on page 24798 is referred to a soluble gas not to the fluorinated aldehydes. This sentence will be rephrased in order to avoid any confusion to the reader.

The wet deposition lifetimes of fluorinated aldehydes considering a $k_{H,cp}$ value ranging from 3 to 160 M atm^{-1} and an annual rainfall rate of 580 mm yr^{-1} will vary from 3 months at 0.5 km and up to 300 years at 10 km (see Table 1).

Table 1. Wet deposition lifetimes calculated from $k_{H,cp}$.

H_{atm} (km)	T(K)	W(T)	τ_T(years)	W(T)	τ_T(years)
		$k_{H,cp}$ = 3 atm M^{-1}		$k_{H,cp}$ = 160 atm M^{-1}	
0.5	298.15	73.3449	11.8	3911.73	0.2
1	291.65	71.7459	24.0	3826.45	0.45
2	285.15	70.1469	49.16	3741.17	0.92
3	278.65	68.5479	75.46	3655.89	1.41
4	272.15	66.9489	103.01	3570.61	1.93
5	265.65	65.3499	131.91	3485.33	2.47
6	259.15	63.7509	162.27	3400.05	3.04
7	252.65	62.1519	194.18	3314.77	3.64
8	246.15	60.5529	227.79	3229.49	4.27
9	239.65	58.9539	263.21	3144.21	4.94
10	233.15	57.3549	**300.61**	3058.93	5.64

τ(years)= H_{atm}/J W(T), where W(T)=RT$k_{H,cp}$ and J =580 mm/yr

Sentence on page 24798 of the discussion manuscript will be changed according to data on Table 1.

3) *Impact of fluoroaldehyde chemistry on air quality*

We agree with Referee#2 that the atmospheric abundance of fluorinated aldehydes is currently low. However, the possible widespread use of fluorinated alcohols as substitutes of HFCs will inevitably lead to an increase in fluoroaldehyde concentrations, since they are the major oxidation products. Thus, further studies on the degradation products of their homogeneous oxidation and UV photodissociation will be needed in order to evaluate the environmental impact of these fluoroaldehydes, especially if they are a source of fluorinated acids in the troposphere. So, the statements on Page 24798-24799 will be changed and abbreviated, highlighting the impact of the chemistry of fluorinated aldehydes in terms of carboxylic acid formation. Taking into account the lifetimes calculated in this work and following the referee's recommendation, the discussion regarding the impact of Cl chemistry and the weekend effect will be (modified or) eliminated in the revised manuscript.

4) Grammatical/ Typographical corrections

All grammatical and typographical errors found by the reviewer have been corrected and will be included in the revised manuscript.