This subject remains confusing. And the comment on my paper once again shows that. Mr. Burton is confused, possibly by the definitions of the terms residence time and adjustment time. With the residence time the time molecules spend on average in a box, and the adjustment time defined as the exponential decay time to a new equilibrium after an abrupt stop of excitation signal (delta-Dirac, pulse, or Heaviside stimulus), the adjustment time is always shorter than the residence time in either of the two boxes, as can easily be shown mathematically by solving the ordinary differential equation. As was done in the paper: The adjustment time τ is given by $1/\tau = 1/\tau_{r1} + 1/\tau_{r2}$, and is always shorter than residence time τ_{r1}, as well as τ_{r2}. It is like two parallel resistances, R1 and R2, which have a total resistance smaller than each of the individual resistances. $1/R = 1/R1 + 1/R2$.

There is no way avoiding this.

All the rest of the comment of Mr. Burton then becomes irrelevant, as in not pertaining to my publication in Entropy. I will thus not further comment on it. For example, "long tails". If functions have long tails, they are not exponential but more power-law (read the books of Nassim Taleb, Black Swan and Antifragile where he describes such functions, as well as my own comment on scalable functions in DOI: 10.9734/BJMCS/2016/28107) and such functions do not have an adjustment time. Therefore such an analysis, while possibly correct, is not covered by my publication. I will not comment on the correctness of the ideas of Mr. Burton, apart from pointing out his misunderstanding of the concepts of 'residence time' and 'adjustment time'.
The onus is on Mr. Burton and others to explain how simple diffusion processes can have long tails, apart from coming in handy to explain away obfuscated models.

As to the mistake of reporting the decay time of 14 years: That was my own personal fit to some specific data, and not a "mistake". There is a wide range of values, and the value given by Burton (20 years) is not an odd one out and within the range of reported values, surely not absurd compared to 14 years. All based on modeling and thus can be discussed. My own value is not a "mistake", but a simple model (the simplest one can imagine, and thus pedagogically correct) to highlight how adjustment times in principle can be determined. My publication was not about the exact value of the residence times or adjustment times but rather twofold:
- The adjustment time is shorter than the residence time, as can be mathematically shown, and then
- Using the residence time supplied by the IPCC (4 years, which seems rather short, so 5 years is used to be safe), make a convolution of input signal ('emissions') and find the resulting signals, with conclusions.
Nothing else. And there are no "mistakes" made anywhere. The discussion of the determination of the values of the residence times is not the aim of the publication and is left to others. If Mr. Burton does not agree with the above two items, it means he rejects the core ideas of the report of the IPCC. Which is an important observation in itself.