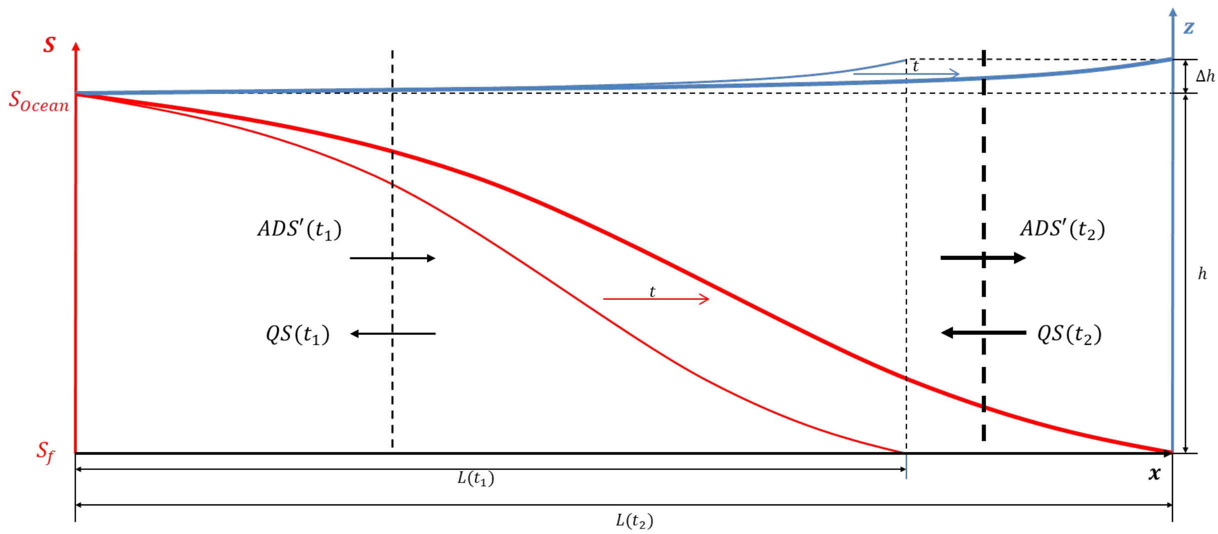
We would like to thank referee #2 for his insightful comments and the positive feedback, which we have received. Below we reply to the major comments in detail. The minor comments will all be addressed in the final version.

1) About how the trade-off would look like.

We agree that the system is different from some other thermodynamic systems.

Let's introduce two situations shown in the following figure. The water level (blue lines) has a slope as a result of the salinity distribution (red lines), with the seaside on the left and the riverside on the right.



The first situation is shown by the **thin lines** and the second (optimum) by the **thick lines**. For the tidal averaged case discussed in the research, within the salinity intrusion length (L) to where the salinity approaches freshwater salinity, the salinity difference between the seaside (S_{Ocean}) to the end (S_f) is invariant, so the increase of depth due to the salinity difference (Δh) is constant as well (also see the hydrostatic pressure distributions in Figure 1).

However, in the first situation where $\Delta h/L$ is large (salinity gradient S' is large), the salt flux from downstream $ADS'(t_1)$ at any location along the estuary is large as well, larger than the salt advection from upstream). As a consequence the salinity would increase. Hence, the salinity intrusion length increases, diminishing the salinity gradient, which would in return reduce the dispersive salt flux. Over time, the product of the salt flux and salinity gradient will attain its maximization. The tidal average salinity distribution will then not go further upstream (to the upper right quarter of the system).

The time needed to achieve the optimum situation is not sure (it could be larger or less than a tidal period). In a low flow situation (which is the critical circumstance for salt intrusion) the variation of the river discharge is slow (following an exponential decline). If the time scale of flow recession is large compared to the time scale of salinity intrusion then it is reasonable to assume that thermodynamic optimum is achieved based on the steady state assumption.

2) About the derivation in Line 150.

The comment of Referee #2 is very similar to the one made by Referee #1. We replied to it there in much detail.

For calculating the parameters along the estuary in optimum (equilibrium) situation, time derivatives are not relevant. Hence we obtain:

$$\frac{dS'}{dD} = \frac{dS'}{dx}\frac{dx}{dD} = \left(\frac{\partial S'}{\partial S}\frac{dS}{dx} + \frac{\partial S'}{\partial D}\frac{dD}{dx} + \frac{\partial S'}{\partial A}\frac{dA}{dx}\right)\frac{dx}{dD} = \left(\frac{Q}{AD}\frac{dS}{dx} - \frac{QS}{AD^2}\frac{dD}{dx} - \frac{QS}{A^2D}\frac{dA}{dx}\right)\frac{dx}{dD}$$
$$= \frac{Q}{AD}\left(\frac{dS/dx}{dD/dx} - \frac{S}{D} - \frac{S}{A}\frac{dA/dx}{dD/dx}\right) = \frac{Q}{AD}\left(\frac{S'}{D'} - \frac{S}{D} - \frac{S}{A}\frac{A'}{D'}\right) = 0$$

$(S - S_f)$ was simplified by S.

where: $A' = \frac{dA}{dx}$, $D' = \frac{dD}{dx}$ and $S' = \frac{dS}{dx}$.