Reply on AC1
Xiao Hua Wang (Referee)

Referee comment on "River-enhanced non-linear overtide variations in long estuaries" by Leicheng Guo et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-75-RC2, 2021

The authors have not addressed my comment on $R2T=1$ for maximum $M4$ generation satisfactorily. The $R2T$ ratio close to unity for maximal $M4$ generation can be explained by explaining the optimum generation of quadratic frictional coefficient terms in the algebraic development discussed in Godin (1999) as we did in Table 5 in our paper. In lines 555-558, the authors mentioned that the quadratic bottom stress term leads to significant $M4$ generation. The authors can use their model results to analyze the relationship between the $R2T$ ratio and quadratic frictional terms for the generation of $M4$ tide to explain the unity of the $R2T$ ratio.

It also should be noted that $R2T=1$ is not applicable to different estuaries (or indeed at different locations in an estuary) for maximum $D4$ generation. Our paper has demonstrated that an optimum balance between residual velocity and tidal velocity components is also found at $R3$ and $R5$ for the Q20 and Q40 scenarios, respectively.