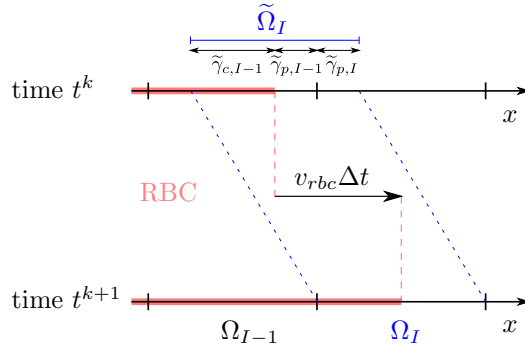Supplementary Figure 1: Mass transfer coefficient as a function of LD and RBC velocity. See legend of Figure 6.

Supplementary Figure 2: Schematic for the improved scheme for the advection term in Eq. (21). The RBC domain Ω_{rbc} in pale red is shifted by $v_{rbc}\Delta t$ between times t^k and t^{k+1}. The volume fractions $\widetilde{\gamma}_{c,I-1}, \widetilde{\gamma}_{p,I-1}$ and $\widetilde{\gamma}_{p,I}$ are defined in Appendix B.