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Supplement of

Effects of spatial variability on the exposure of fish to hypoxia: a modeling analysis for the Gulf of Mexico

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Part I

Results for 3-D simulations

Vertical movement was added to the NS, CCRW, and CRW algorithms as described in LaBone et al. (2019). The 2-D horizontal NS (tactical avoidance) algorithm was expanded by adding triangles from 5 m above and below the fish's location to the neighborhood searched. There was no vertical aspect added to the other tactical avoidance algorithm of Sprint. A random movement up or down was added to the horizontal movement calculations for CRW (strategic avoidance) and a biased downward random vertical movement was added to CCRW (default movement).

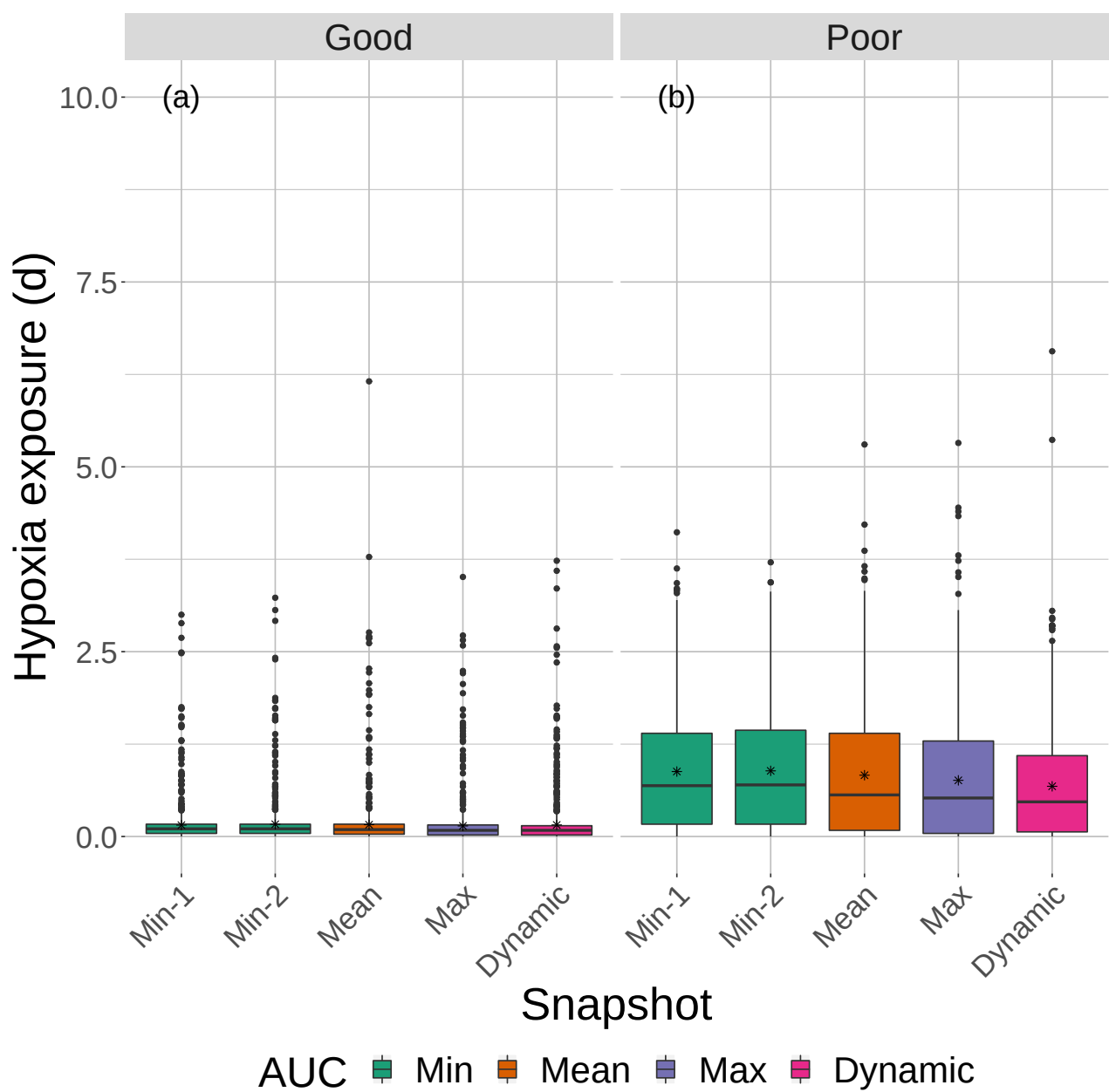


Figure S1.

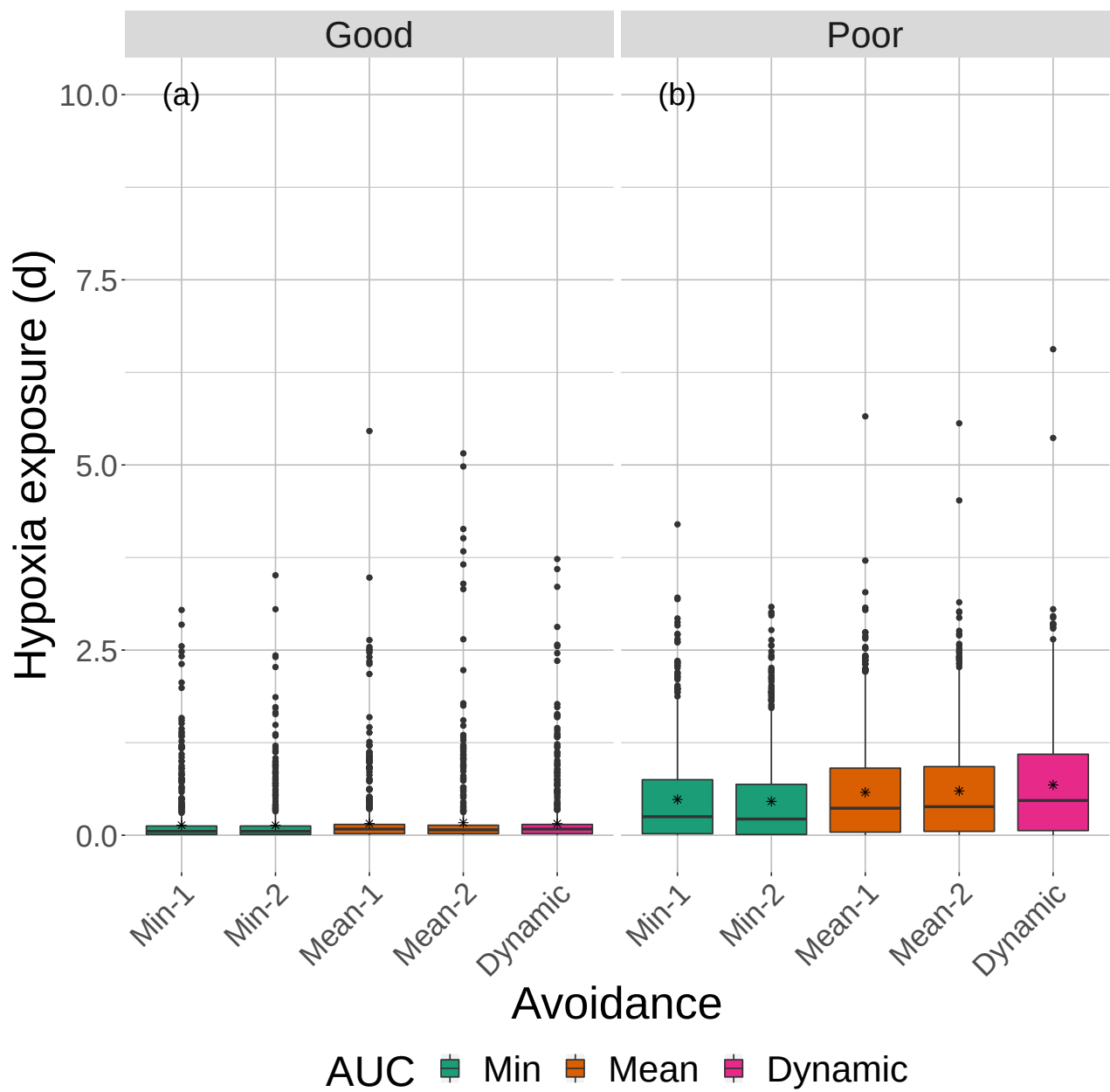


Figure S2.

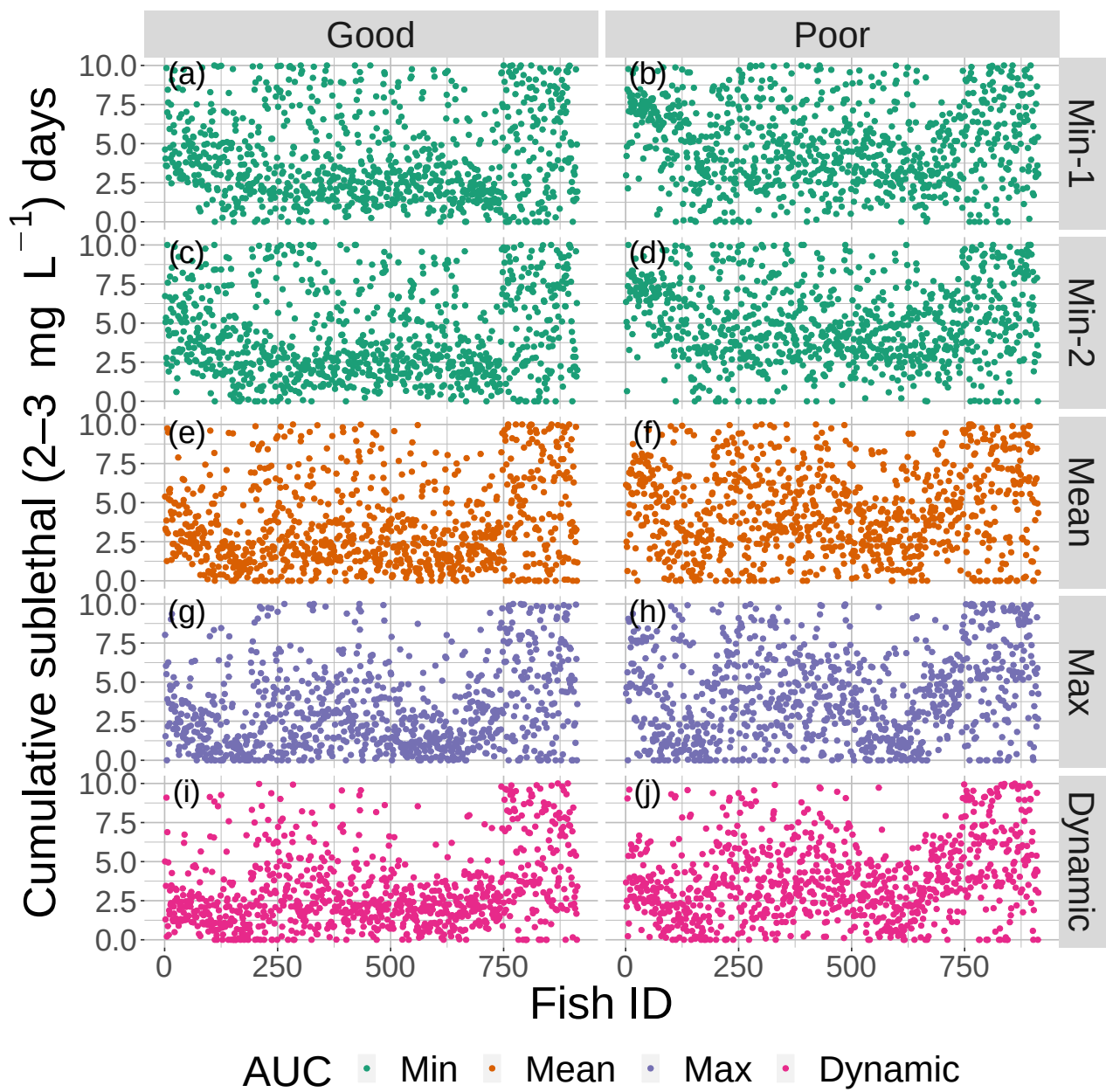


Figure S3.

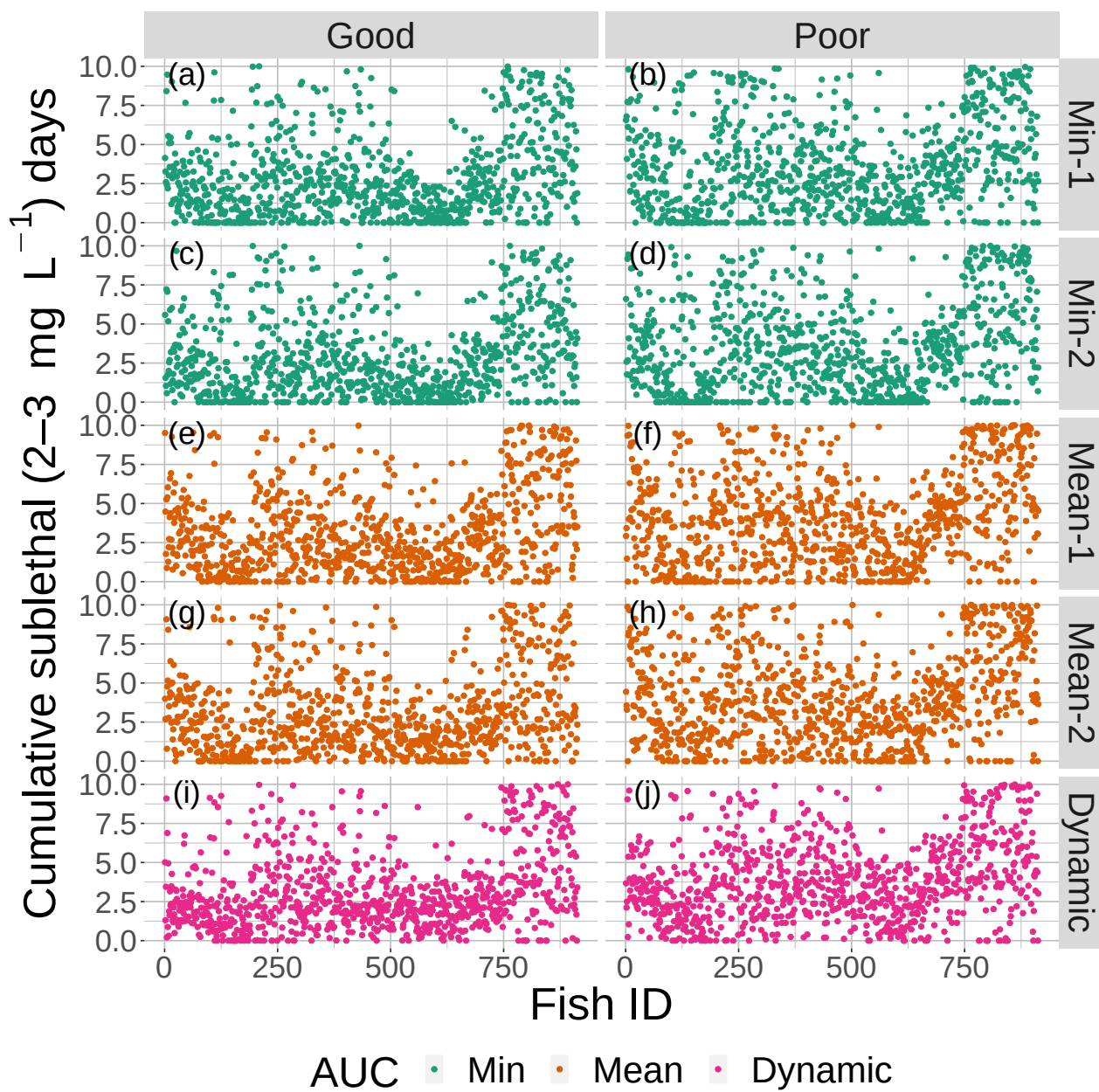


Figure S4.

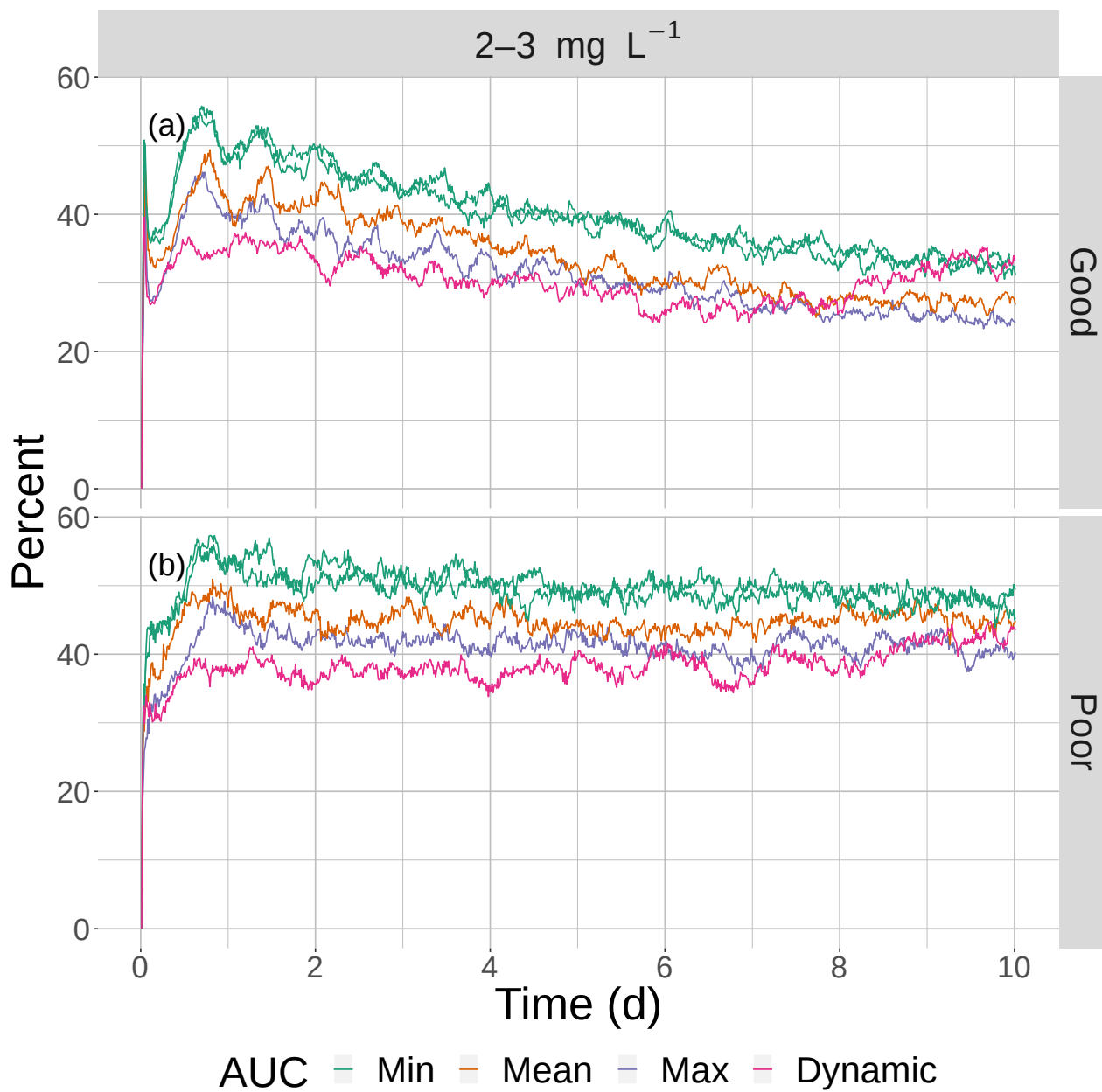


Figure S5.

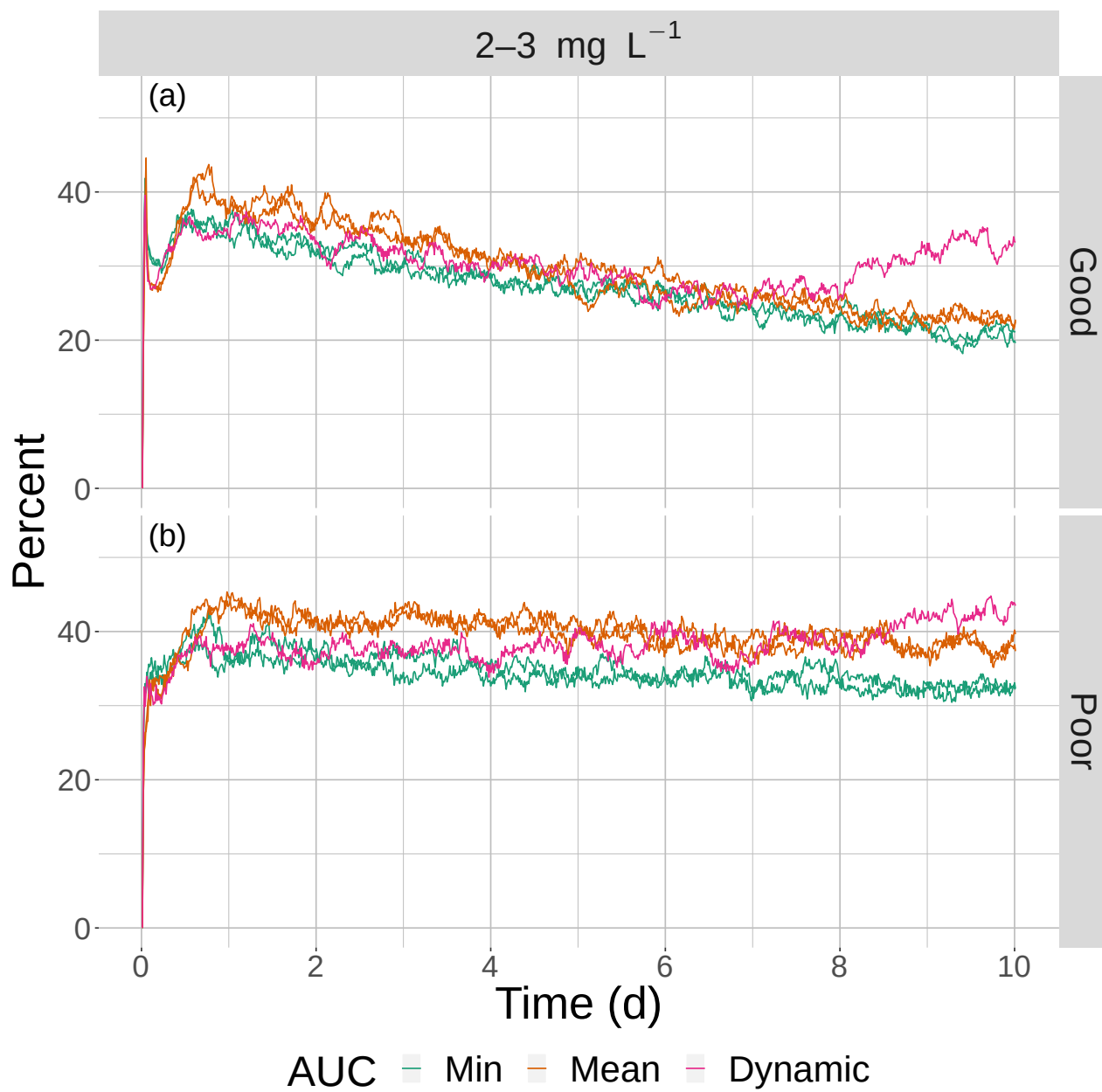


Figure S6.

Part II

10 **Cumulative exposure to hypoxia (box plots, individual fish) and cumulative exposure to 2–3 mg L⁻¹ (box plots) for days 3 through 10 in 2–D simulations of minimum, mean, and maximum AUC values in high sublethal area and in moderate sublethal areas.**

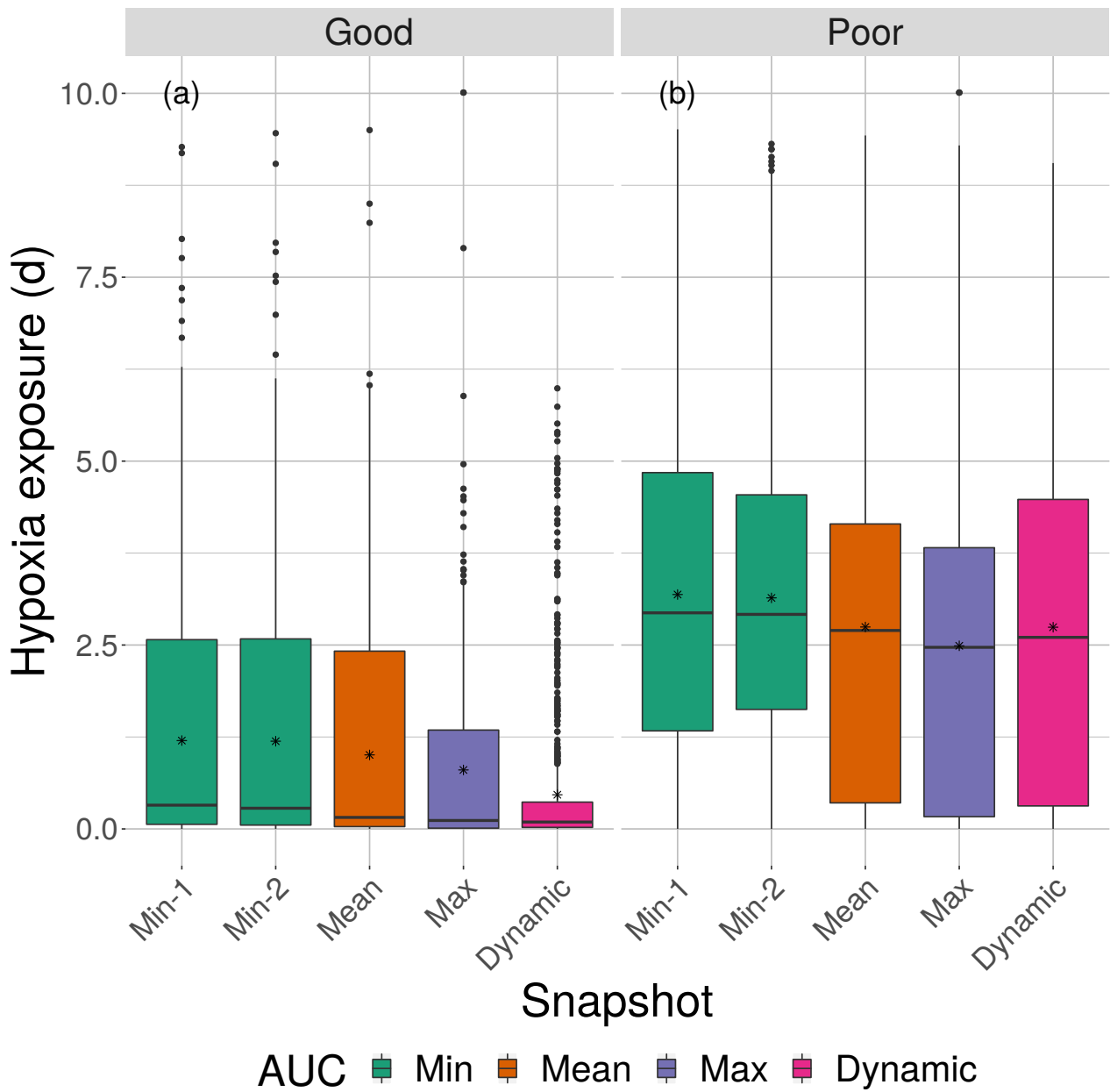


Figure S7.

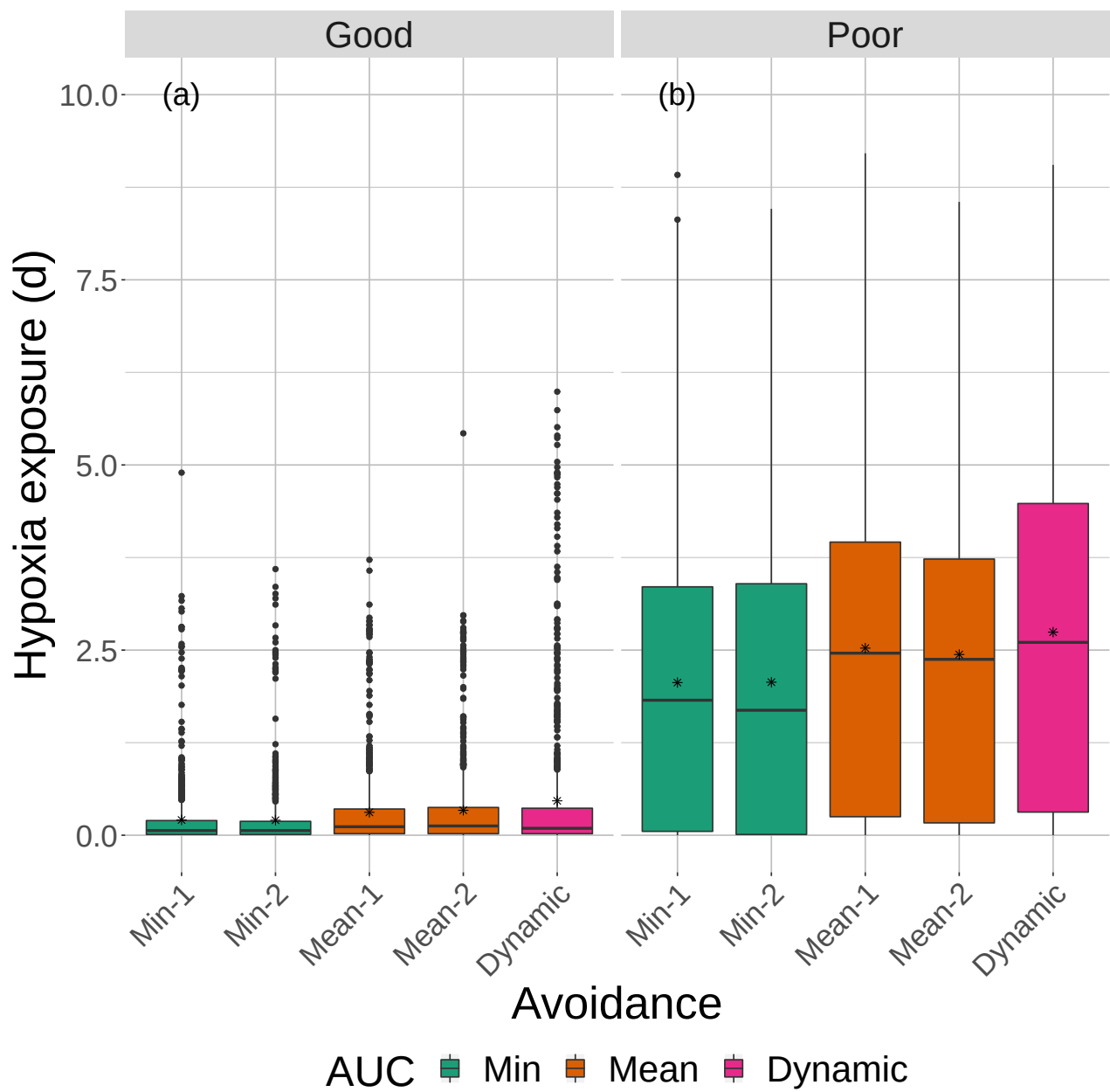


Figure S8.

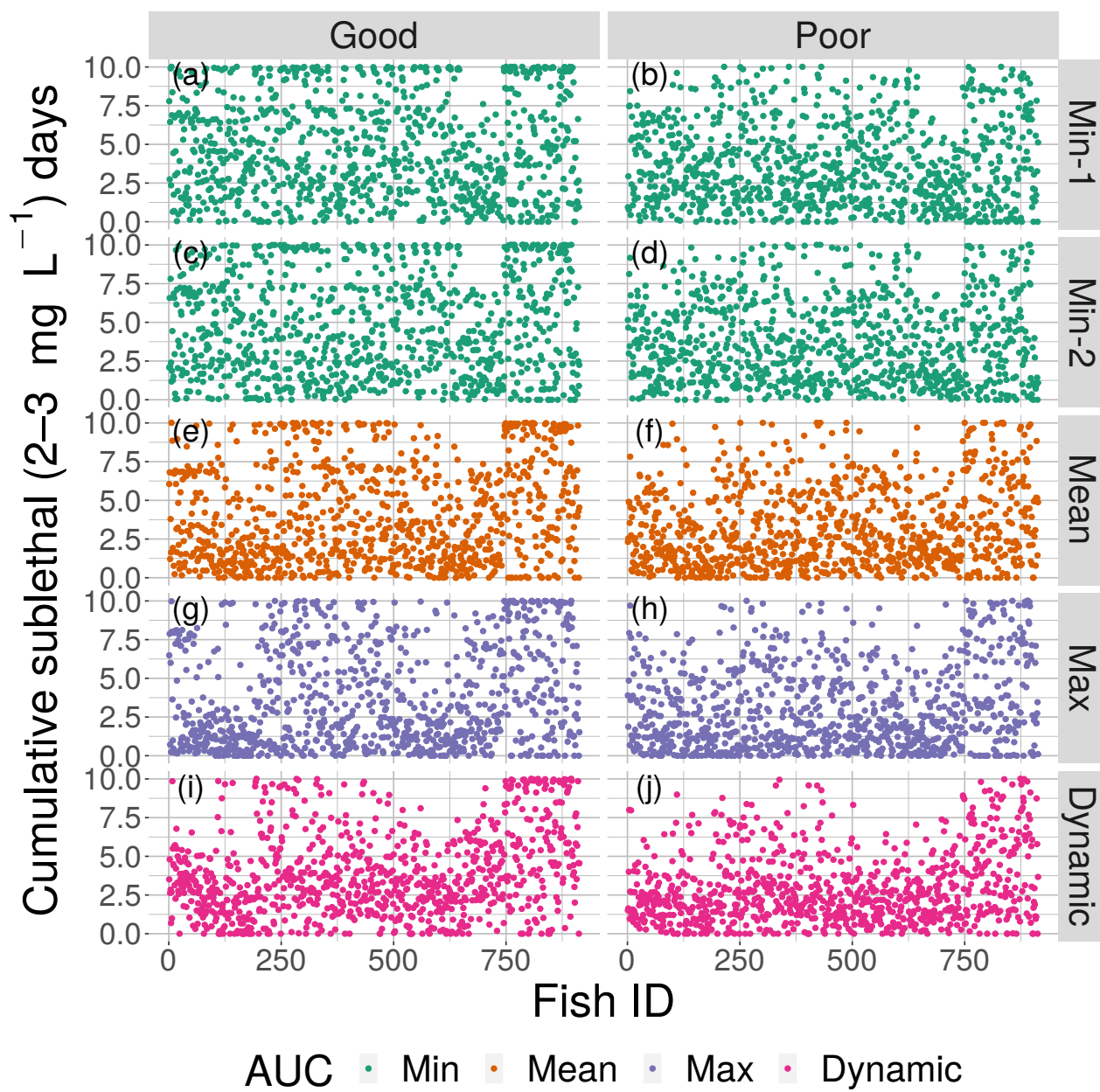


Figure S9.

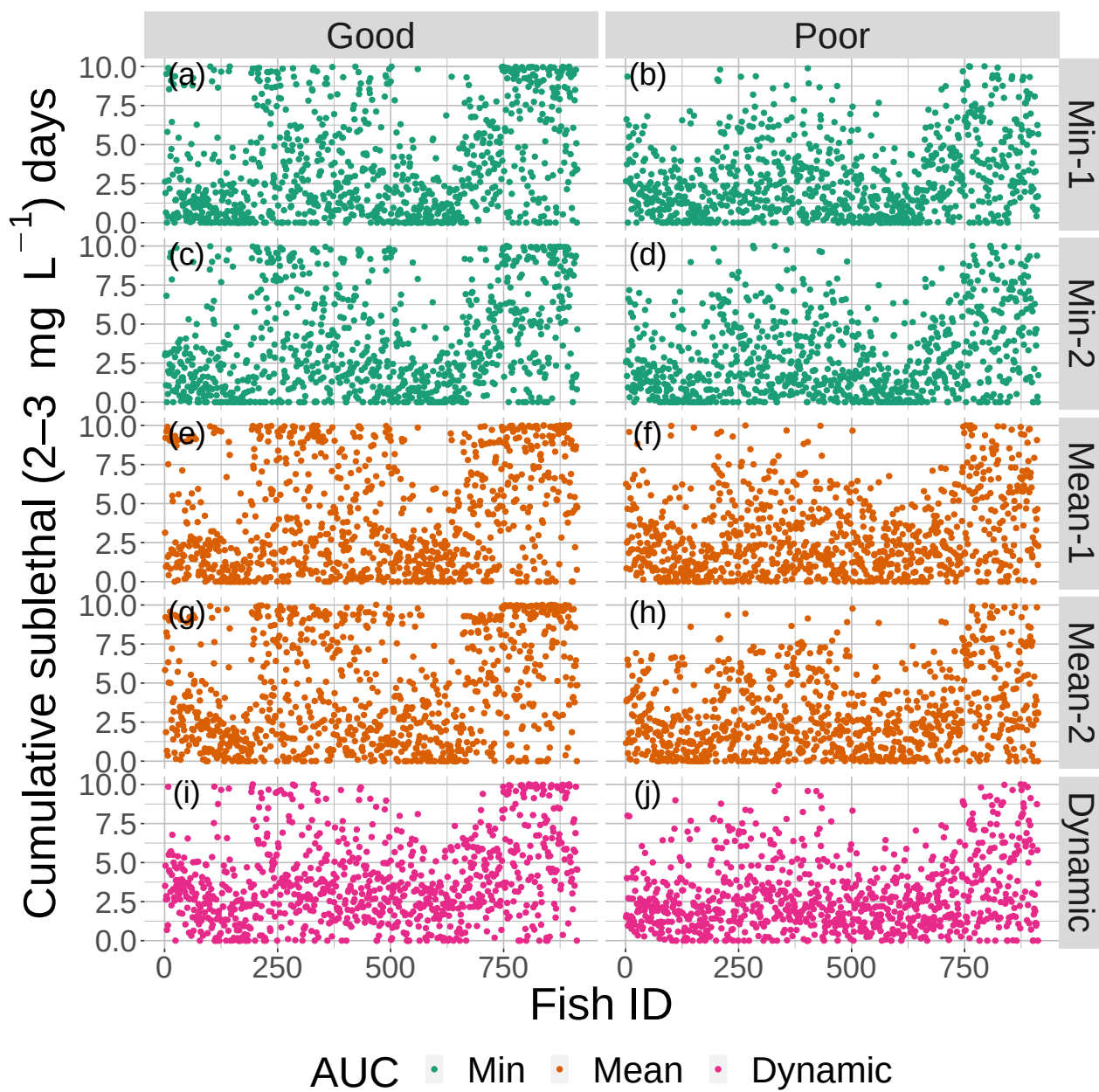


Figure S10.

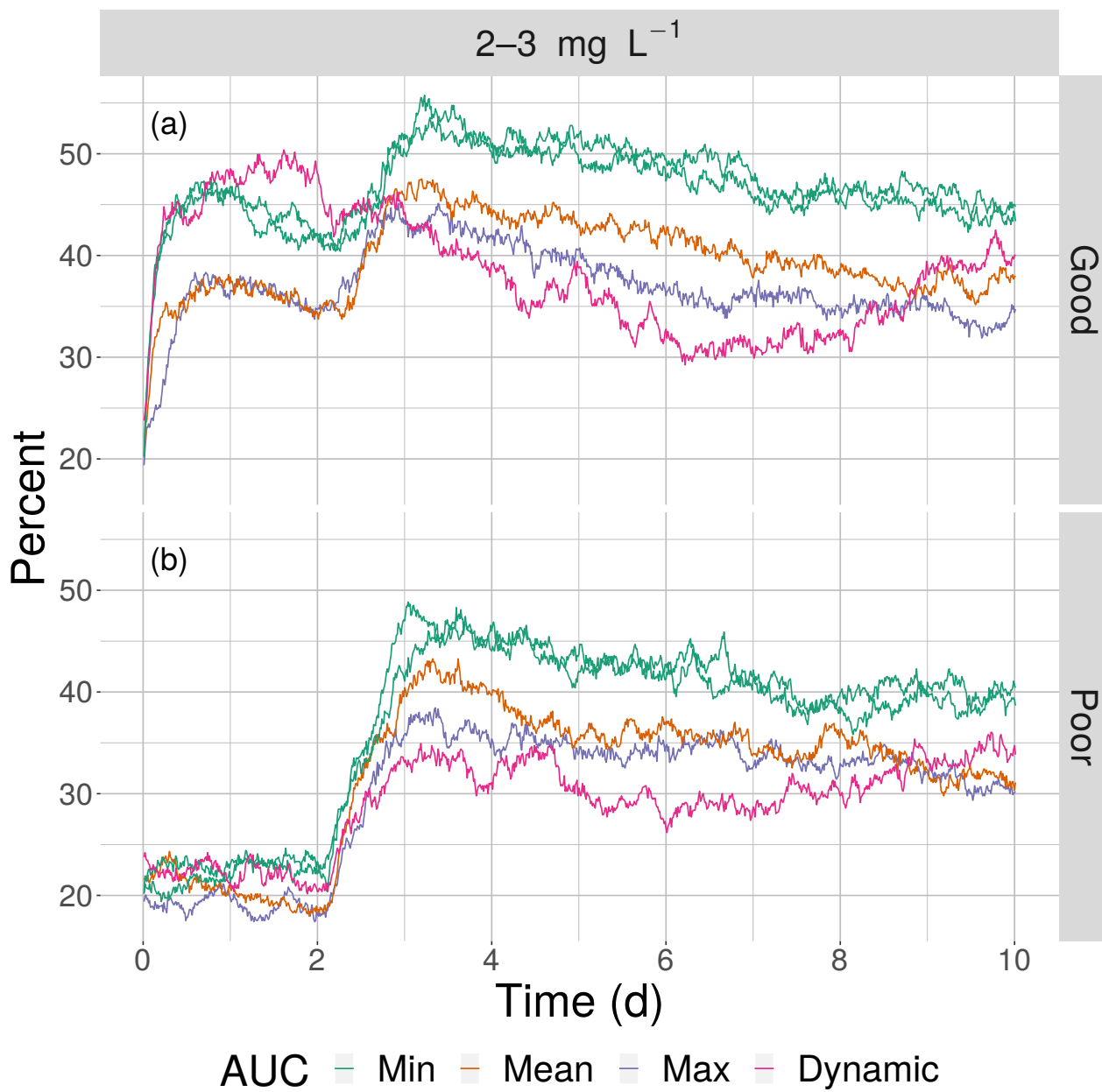


Figure S11.

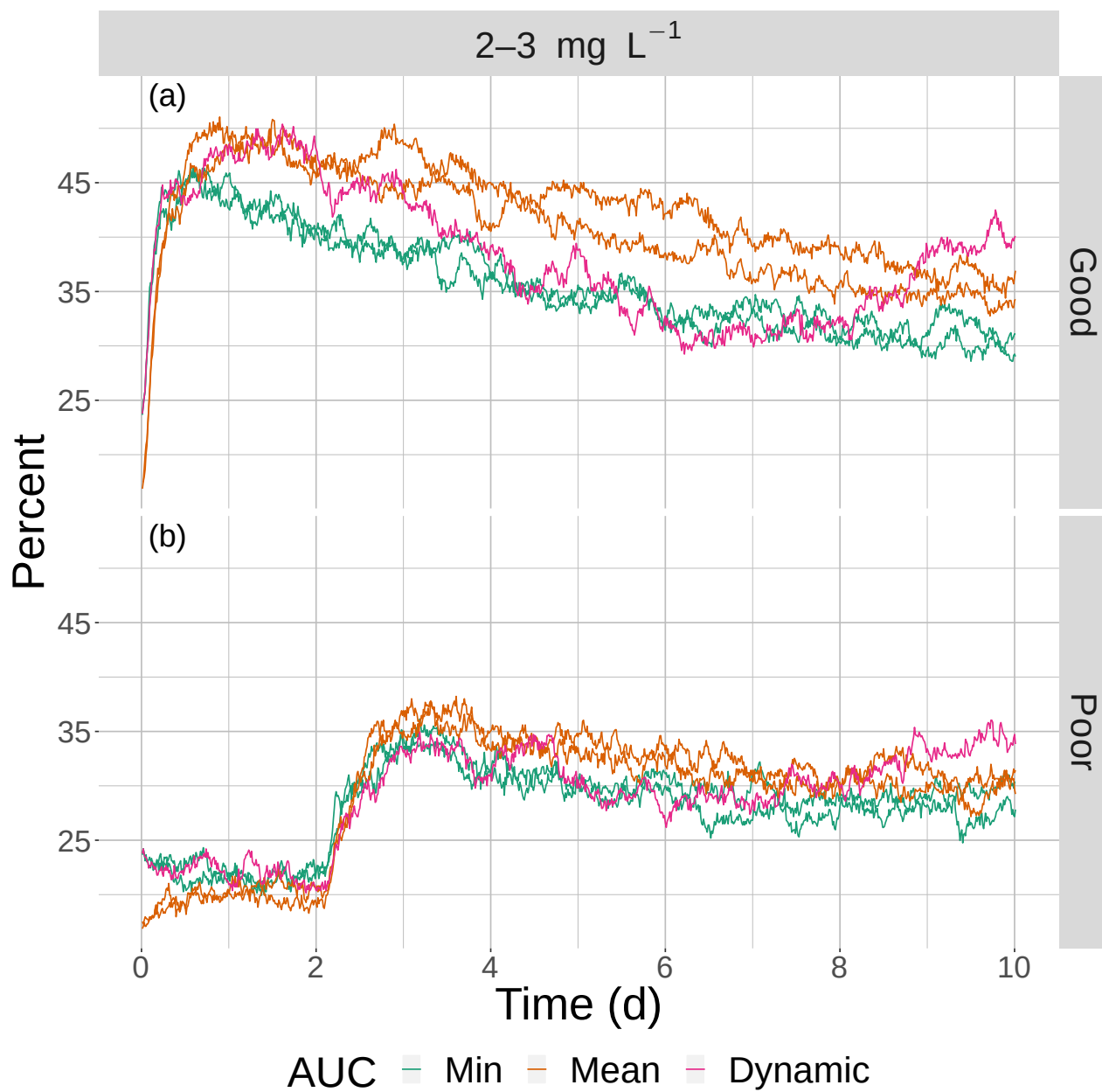


Figure S12.

References

- 15 LaBone, E., Justic, D., Rose, K., Wang, L., and Huang, H.: Modeling Fish Movement in 3-D in the Gulf of Mexico Hypoxic Zone, *Estuaries and Coasts*, 42, 1662–1685, <https://doi.org/10.1007/s12237-019-00601-6>, 2019.