Supplement of

Geographical controls and anthropogenic impacts on dissolved organic carbon from mountainous rivers: Insights from optical properties and carbon isotopes

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Introduction

This document contains: Figure S1, Relationship between mean drainage slope, mean drainage elevation, and annual air temperature in the Yinjiang (Y), Shiqian (S), and Yuqing (Q) catchments; Figure S2, Land use pattern impacts on DOM character. (a) $SUVA_{254}$ (in L mg^{-1} m^{-1}) and (b) freshness index (β/α) decreased with increasing proportion of urban and agricultural land use area in the studied catchments. Outlier (site S3) was excluded from analyses in panel a as the sample was strongly influenced by the road construction, which was evidenced by high POC and TSM concentration (Chen et al., 2021). (c) Humification index (HIX) positively related to the increasing proportion of urban and agricultural land use area. Figure S3, Relationship between freshness index (β/α) and EEM-PARAFAC components (C2) in the Yinjiang (Y), Shiqian (S), and Yuqing (Q) catchments. Components are presented as % of the total components.

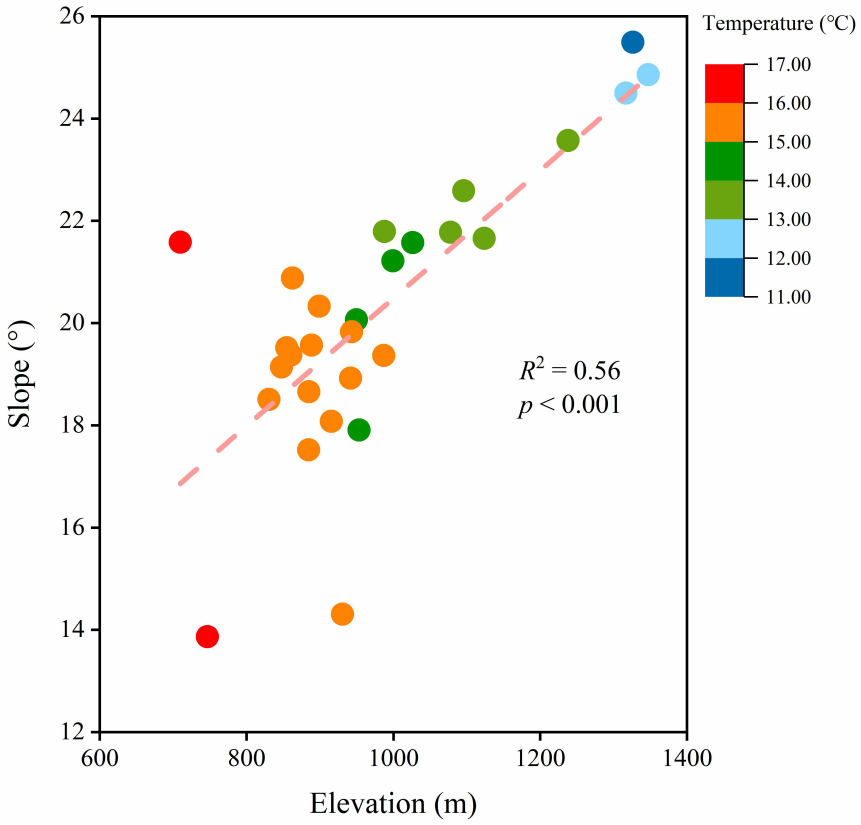

Figure S1 Relationship between mean drainage slope, mean drainage elevation, and annual air temperature in the Yinjiang (Y), Shiqian (S), and Yuqing (Q) catchments.

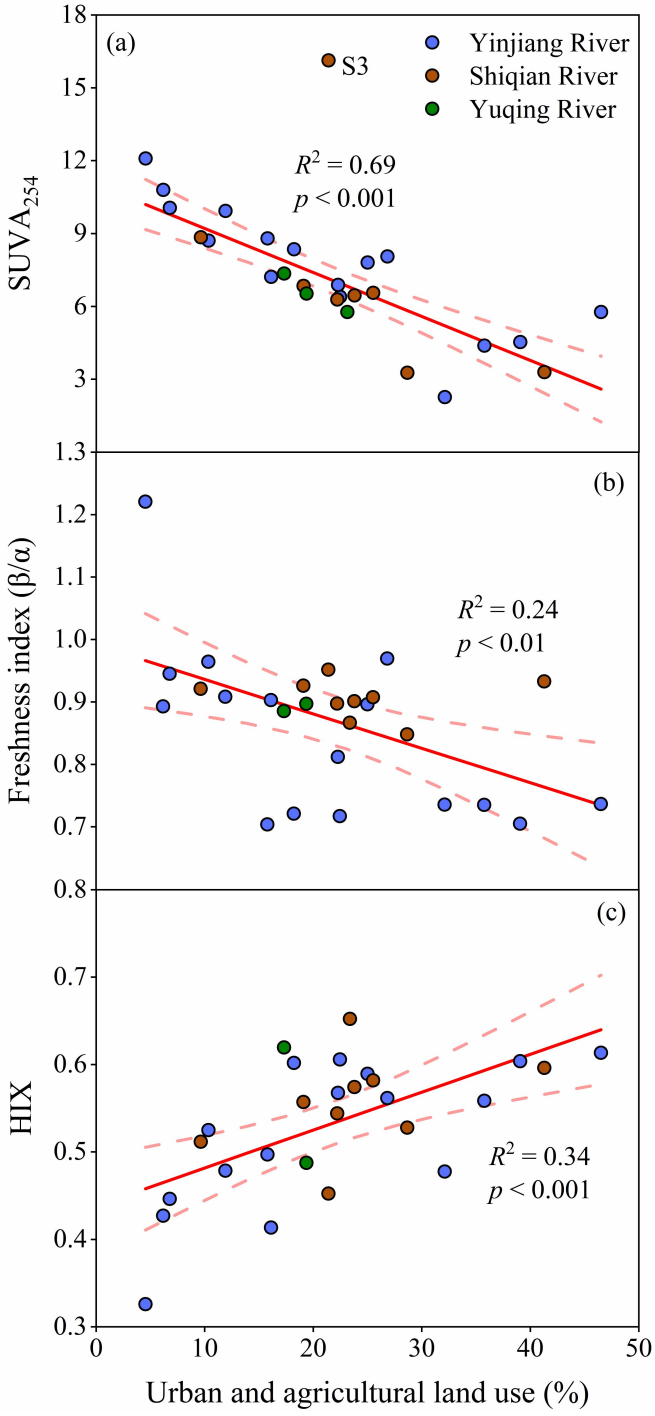

Figure S2 Land use pattern impacts on DOM character. (a) $SUVA_{254}$ (in L mg^{-1} m^{-1}) and (b) freshness index (β/α) decreased with increasing proportion of urban and agricultural land use area in the studied catchments. Outlier (site S3) was excluded from analyses in panel a as the sample was strongly influenced by the road construction, which was evidenced by high POC and TSM concentration (Chen et al., 2021). (c) Humification index (HIX) positively related to the increasing proportion of urban and agricultural land use area.

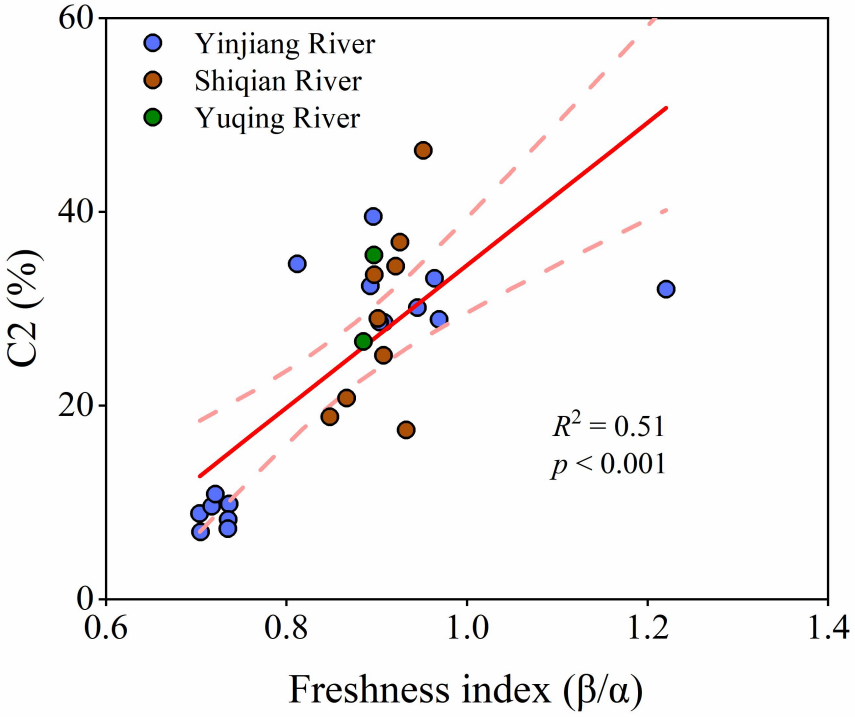

Figure S3 Relationship between freshness index (β/α) and EEM-PARAFAC components (C2) in the Yinjiang (Y), Shiqian (S), and Yuqing (Q) catchments. Components are presented as % of the total components.

30 **Reference**

Chen S., Zhong, J., Li, S., Ran, L., Wang, W., Xu, S., Yan, Z. and Xu, S.: Multiple controls on carbon dynamics in mixed karst and non-karst mountainous rivers, Southwest China, revealed by carbon isotopes (delta(13)C and Delta(14)C), Sci. Total Environ., 791, 148347, doi:10.1016/j.scitotenv.2021.148347, 2021.