Growing topography due to contrasting rock types in a tectonically dead landscape

Daniel Peifer[1,2], Cristina Persano[1], Martin D. Hurst[1], Paul Bishop[1], Derek Fabel[3]

[1]School of Geographical and Earth Sciences, University of Glasgow, Glasgow, G12 8QQ, UK
[2]CAPES Foundation, Ministry of Education of Brazil, Brasilia - DF 70040-020, Brazil
[3]Scottish Universities Environmental Research Centre, East Kilbride, G75 0QF, UK

Correspondence to: Daniel Peifer (peiferdaniel@gmail.com)

1 Contents

Supplementary Figures:

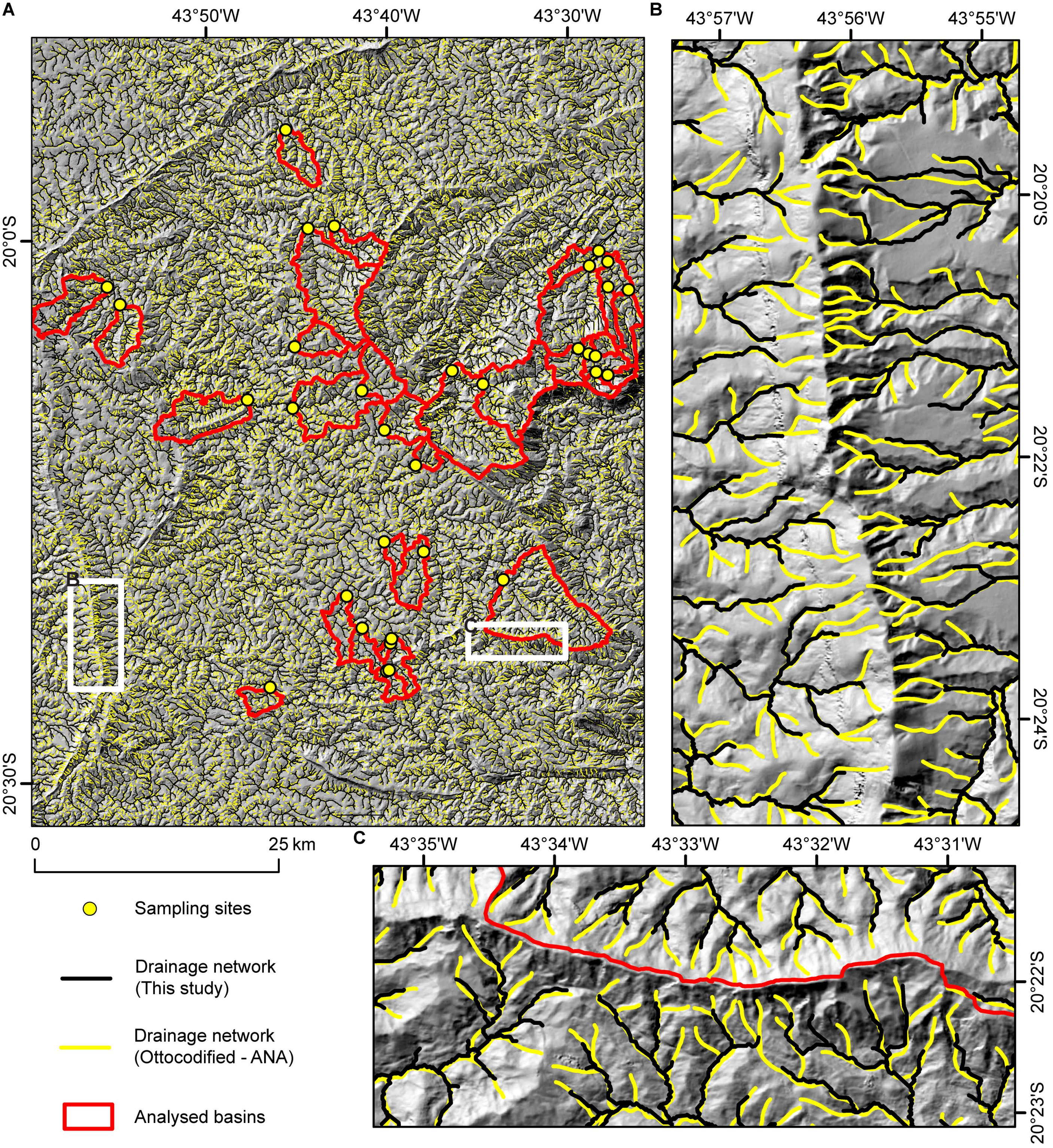

Figure S1: Comparison between the drainage network used in this study and Brazil´s National Water Agency (ANA) drainage network based on topographic maps developed using aerophotogrammetry. Note that channel heads in our drainage network, extracted using an area threshold of 0.5 km^2, are located, in all cases, downstream of where channel heads are situated in ANA´s drainage network. Therefore, we interpret that we used a reasonable contributing area for extracting the drainage in the study area. Panels B and C were developed using a numerical scale of 1:80,000. Data source for ANA´s drainage network: ANA (2017).

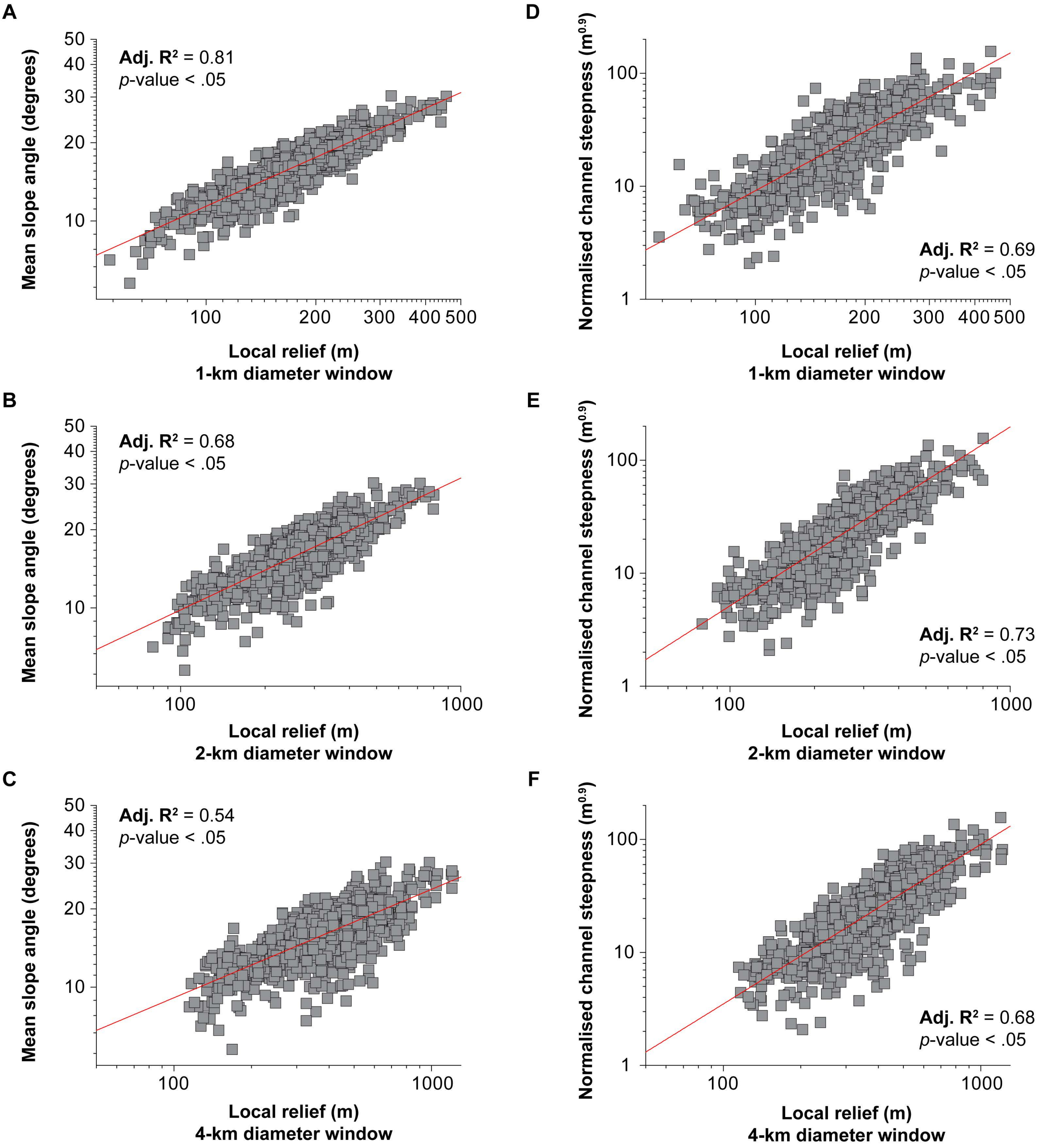

Figure S2: Bivariate regressions between catchment-averaged mean slope angle and local relief (A, C, E), and catchment-averaged normalised channel steepness and local relief (B, D, F). The diameter of the circular window used for the calculation of local relief is: (A, D) 1 km, (B, E) 2 km, (C, F) 4 km. Increasing the window diameter decreases the R^2 of local relief against mean slope angle. In contrast, the 2-km diameter window local relief dataset exhibits the highest R^2 with the normalised channel steepness (D); this is thus the window we used in the study. Grey circles represent every basin with order higher than 2nd-order for the QF (n = 3,155).

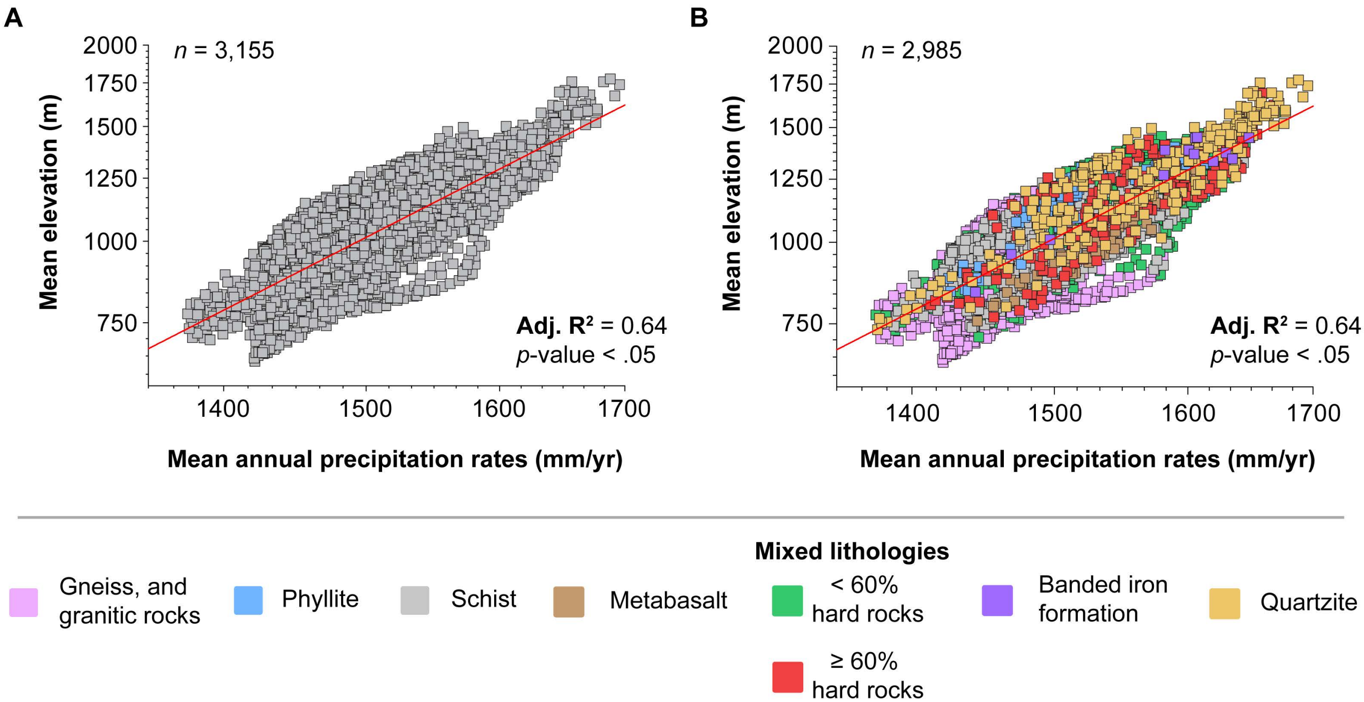

Figure S3: Bivariate regressions between catchment-averaged elevation and mean annual precipitation rates. Panel (A) represents all catchments in the study area with stream-order higher than second-order while panel (C) shows catchments underlain by main lithologies exposed in the study area. Mixed lithologies refer to catchments where a single rock-type does not account for ≥75% of the catchment area.

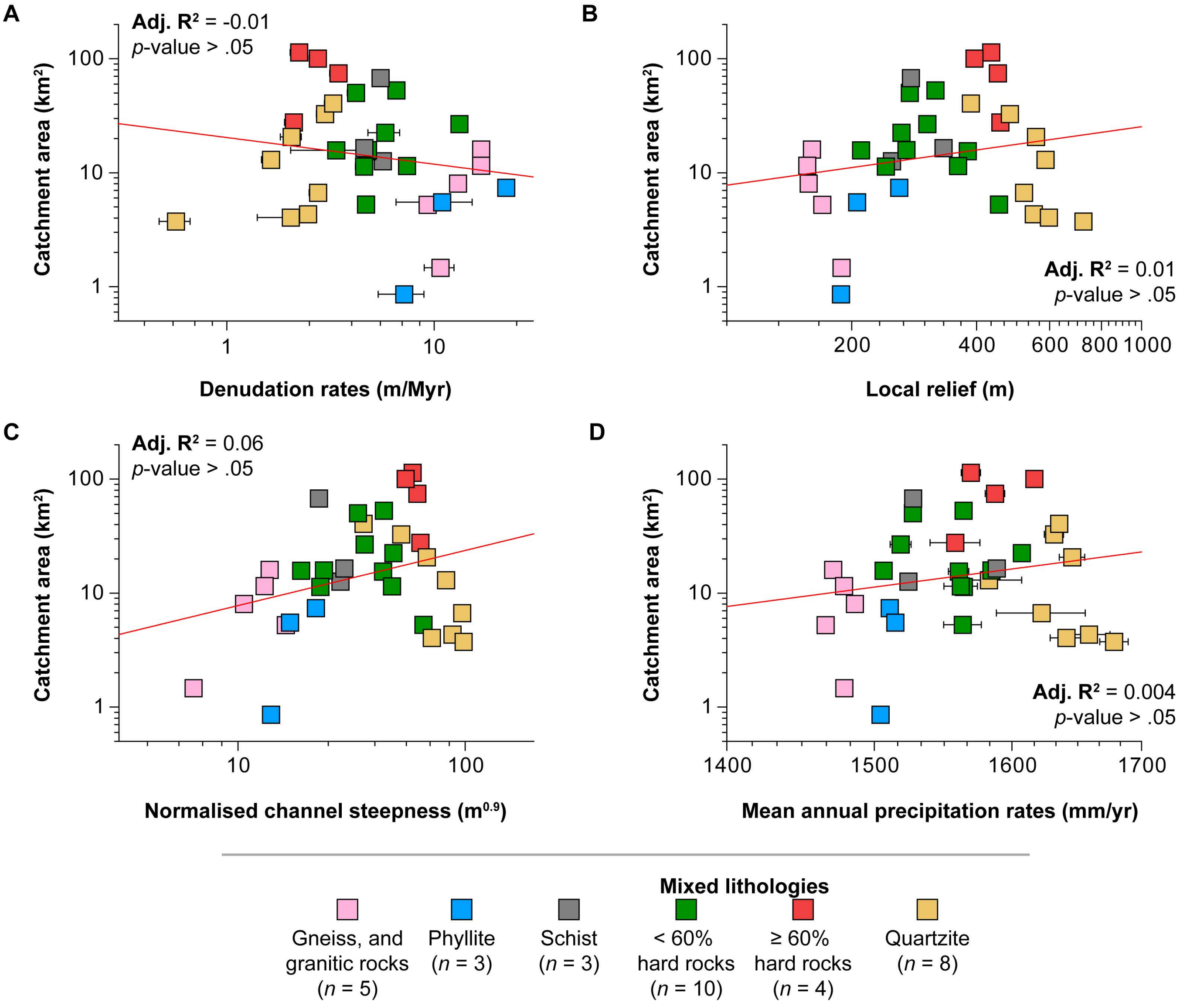

Fig. S4: Log-linear correlations between basin area and denudation rates (panel A), and basin area and geomorphic parameters (panels B-D). Note that none of the relationships between catchment area and geomorphic parameters is statistically significant at a .05 level. X-error bars represent external uncertainty in denudation rates in panel (A), and the standard error of the mean in panels (B), (C), and (D).

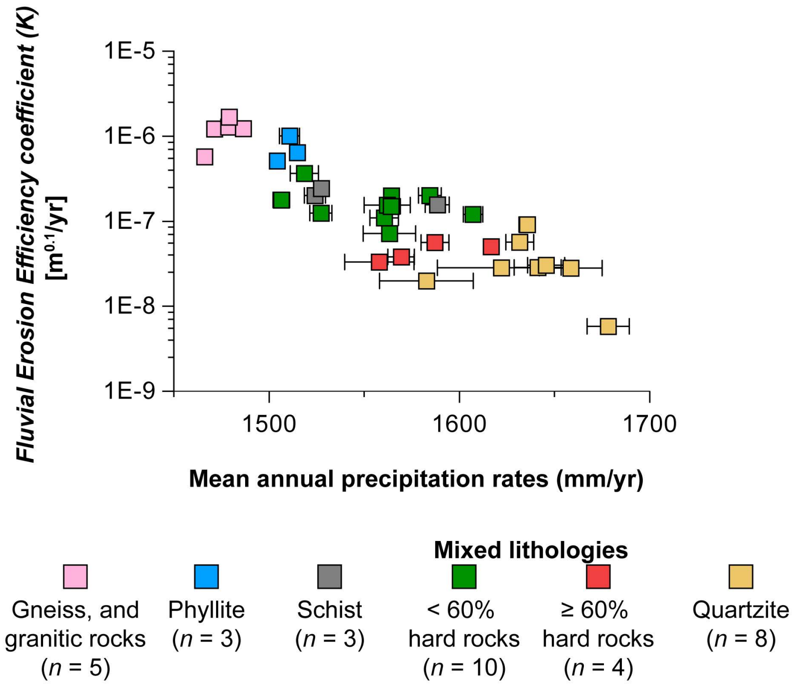

Figure S5: Scatter plot between catchment-averaged fluvial erosion efficiency coefficient (*K*) against mean annual precipitation rates. Note that we assumed $n = 1$. X-error bars represent the standard error of the mean.

References

Agência Nacional de Águas (Brasil): Base Hidrográfica Ottocodificada da Bacia do Rio São Francisco, https://metadados.ana.gov.br/geonetwork/srv/pt/metadata.show?id=438&currTab=distribution, last access: 22 July 2020, 2017.