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Pantropical tree growth resilience to drought

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An increasing incidence and intensity of droughts under anthropogenic climate change jeopardizes the potential of tropical forests and woodlands to capture carbon in woody biomass and act as CO₂ sink. A pantropical quantification of drought impacts on tree stem growth is needed to evaluate this risk.

We assessed drought impacts in a pantropical network of 477 tree-ring chronologies (>10,000 trees from >150 species and 35 plant families) and found modest stem growth declines (median: 2-4%) during drought years. Growth declines were larger for dry-season than wet-season droughts, specifically for Gymnosperms, and at hotter and more arid sites. Lagged growth reductions during post-drought years were rare. Over half of the growth reduction during drought years was mitigated during wet extreme years.

Thus, drought impacts on tropical forest carbon sequestration through stem growth have been small and short-lived. Yet, risks of increasing drought-induced carbon loss is expected to aggravate under climate change, in particular through elevated mortality associated with droughts.

Tropical Tree-ring Network: A. Joshua Leffler, Abrham ABIYU, Achim Bräuning, Alejandro Venegas-González, Amanda Köche Marcon, Anthony Guerra, Aster Gebrekirstos, Brendan M Buckley, Brian J Enquist, Bruna Hornink, Bruno B L Cintra, Christian Wehenkel, Claudia C. Astudillo-Sánchez, Cláudia Fontana, Claudio R. Anholetto Junior, Claudio Sergio Lisi, Cristina Nabais, Daigard Ricardo Ortega Rodriguez, Daniela Granato-Souza, Darwin Pucha-Cofrep, Diego A. David Flórez, Doris B. Crispin-DelaCruz, Eddy Moors, Edilson J. Requena-Rojas, Eduardo Adenisky Filho, Eladio Heriberto Cornejo-Oviedo, Erika Zavaleta, Ernesto Alonso Rubio-Camacho, Esther Fichtler, Eva T. Layme – Huaman, Francisco de Almeida Lobo, Francisco de Carvalho Nogueira Júnior, Franklin Galvão, Franziska Slotta, Gabriel Assis-Pereira, Gabriela Morais Olmedo, Gauthier Ligtot, Gerardo Esquivel Arriaga, Ginette Ticse-Otarola, Giovanna Battipaglia, Gonzalo Pérez-de-Lis, Grant L. Harley,

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