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Decreased water availability reduces the CO2 sink of a semi-arid savanna in Sahel based on a thirteen-year eddy covariance measurement

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The Sahel is a semi-arid savanna region located as a transition zone between the dry Sahara Desert in the north and the humid Sudanian savanna in the south. It is one of the poorest and most understudied regions in the world and highly affected by climate change. Remote sensing studies found that the majority of Sahel is greening in the 21st century, with some areas experiencing browning, which is closely linked to the annual rainfall. Yet, there is a scarcity of in-situ data of the responses of ecosystem to the ongoing changes, which makes it hard to validate Earth Observation findings. In this study, we have quantified Net Ecosystem Exchange (NEE) and its components - Gross Primary Production (GPP) and Ecosystem Respiration (Reco) using 13-year long time series of Eddy Covariance data from Dahra, Senegal. We have found decreasing trends in the carbon sink over the period 2010-2022 and a link to the decreasing water availability.