



## **Wind as the main driver of ecosystem carbon exchange in a semi-arid alpha grass steppe in the South East of Spain**

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Despite the great advance in our understanding of the carbon, energy and water exchange between terrestrial ecosystem and the atmosphere, arid and semi-arid ecosystems have received much less attention. We used eddy covariance measurements to determine the exchange of CO<sub>2</sub> and H<sub>2</sub>O between a semi-arid grassland ecosystem and the atmosphere over three years in the South East of Spain. The years had contrasting distribution and total amount of rainfall. The vegetation is perennial grassland of *Stipa tenacissima*, widely spread across the semi-arid region. The site is located on carbonate substrate over a geothermal active area. We examined the diurnal, seasonal and interannual variation in NEE in relation to biophysical variables. Cumulative NEE was 65.7, 136.8 and 90.7 g C m<sup>-2</sup> for the three years studied, respectively. The results revealed that wind speed was the main variable determining NEE. The ecosystem was always a net source of CO<sub>2</sub> to the atmosphere, particularly during the dry period when large CO<sub>2</sub> positive fluxes were observed. The analyses of the diurnal and seasonal data allow us to understand that the CO<sub>2</sub> released was not the result of biological activity but of the geological origin as a result of geothermic activity in the area. Therefore, these results highlight the importance of considering these sources as well as the need to carefully interpret the results of eddy covariance partitioning techniques when applied to these areas.