



Eddy covariance measurements from a Southern Italian buffalo farm

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Agroecosystems play an important role in the anthropogenic influence on climate, through the variation of carbon storage potential of the ecosystems, and exchanges of greenhouse gases (GHGs) such as methane (CH₄), nitrous oxide (N₂O) and carbon dioxide (CO₂) between land and atmosphere. In this work we present eddy covariance measurements carried out at a commercial buffalo farm located in Southern Italy (Borgo Cioffi, Eboli, 40° 31' N, 14° 57' E), the European southernmost cropland observation candidate site of ICOS (Integrated Carbon Observation System) infrastructure. The experimental field has dimension of about 15 hectares and it is characterized by a six monthly crop rotation of sorghum vulgare and lolium perenne. Soil fertilization is performed using buffalo slurry from the adjacent livestock. From July 2017 an eddy covariance tower provided measurements of NEE (Net Ecosystem Exchange) using a close path CO₂ and water (H₂O) analyzer (Li7200, Licor Inc.); CH₄ and N₂O flux measurements were performed by a QCL (Quantum Cascade Laser) trace gas monitor (Aerodyne Inc.). Several other sensors placed in the proximity of the station provided meteorological and soil properties measurements. We here report the key factors affecting CO₂, N₂O and CH₄ emission such as soil temperature, soil water content and soil mineral nitrogen concentration due to fertilization. Flux measurements are correlated to management practices, like plowing or harvest of the culture. Accurate emissions estimates for different crops were then used for the determination of N₂O and CH₄ emission factors.