

43. Impact of dry-wet cycles on carbon mineralization of tropical soils

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In the context of climate change, the increase of dry-wet cycles could cause large losses of soil carbon stock. Located in the Sudano-Sahelian region, soils of North Cameroon experience dry periods followed by erratic rains at the beginning of the cropping season. This study was conducted during the dry season in North Cameroon and aimed to assess the impact of dry-wet cycles on carbon mineralization of soil. These soils were subjected to two differentiated managements of soil cover, mulch of straw residues and without mulch. For each soil, four water supply schemes were applied: permanently dry soil as a reference, permanently moist soil, soils subjected to five and to ten dry-wet cycles. Soil respiration, soil temperature and moisture were measured using four repetitions per plot during fifty days with an infrared gas analyzer and probes. The frequency of dry-wet cycles moderately increased the total soil carbon mineralization on a cultivated soil and mulched regularly. On this soil, ten dry-wet cycles caused a cumulated C mineralization of 1.32 tC.ha⁻¹ on 50 days against respectively 1.17 and 1.15 tC.ha⁻¹ on soils with five dry-wet cycles and permanently moist soils. In the absence of mulch, frequency of dry-wet cycles moderately decreased the total soil carbon mineralization. Ten dry-wet cycles caused a cumulated C mineralization of 0.74 tC.ha⁻¹ on 50 days against respectively 0.93 and 0.94 tC.ha⁻¹ on soils with five dry-wet cycles and permanently moist soils. Our results indicated that in tropical agro-ecosystems, the frequency of dry-wet cycles and management of soil might induce changes in the dynamics of soil carbon and should be considered into the simulation models of soil carbon.