Calibration and Verification of the RothC Carbon Turnover Model for Australian Agricultural Soils. (S05-skjemstad220233-Poster)

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Abstract:

A fractionation scheme which provided the measurement of a labile pool (particulate organic carbon), a charcoal-carbon pool and a humic pool by difference, was tested as a means of initializing the Rothamsted model version 26.3. Equating these three fractions with the resistant plant material, inert organic matter and humic pools of the model respectively, gave good agreement between measured and modelled data for two long-term rotation trials in Australia using a soil depth of 30 cm. One site, Brigalow Station in Queensland, was on three distinct soil types, two clays and a duplex soil, in a semi-arid, subtropical climate. At this site, continuous wheat with some sorghum was established after clearing land under brigalow (Acacia harpophylla) and continued for 18 years. The second site was from near Tarlee South Australia and was established on existing agricultural land. Only one soil type (red brown earth) but two rotations (continuous wheat and wheat / fallow) were available over a period of eight years. The modelled and measured data were in good agreement for both sites but this was substantially improved when the RPM rate was reduced from 0.3 to 0.15 y-1. No other modifications were required and the resulting data provided excellent agreement between the modelled and measured data not only for the total soil organic carbon but also for the individual pools. The model was verified using a further 26 long-term field trials and paired sites covering the major agricultural regions of Australia. Again, the model performed very well. Using this fractionation scheme therefore, provides an excellent means of initializing and testing the Rothamsted model not only in Australia but also in countries with similar soil types and climate.

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