

EGU23-5466, updated on 08 Dec 2023

<https://doi.org/10.5194/egusphere-egu23-5466>

EGU General Assembly 2023

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New in situ soil bulk density sensor using gamma radiation

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Soil compaction and soil bulk density are gaining in importance as soil parameters. The standard measurement with rings is labour intensive and therefore expensive. Medusa Explorations developed a sensor for in situ density measurements, the RhoC. This sensor measures in situ a full soil profile of bulk density every 5 cm up to 1 m depth in 15 minutes, without the need to extract a soil core. The measurement uses gamma ray attenuation combined with a soil moisture sensor. A validation study was performed in two locations, on sandy clay loam and sand soil, both with large within field variation in subsoil compaction. The first results show a good correspondence between both methods. Statistical analysis shows a slightly lower precision for the RhoC measurements than for the rings measurements. The results of this validation study will be discussed.