



## **Using a laser C-13 - CO<sub>2</sub> isotope analyser for climate-smart agriculture**

Maria Heiling, Janet Chen, Christian Resch, Leopold Mayr, Roman Gruber, and Gerd Dercon

Soil and Water Management & Crop Nutrition Laboratory, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, Seibersdorf, Austria (m.heiling@iaea.org)

The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture has developed methods using a laser C-13 - CO<sub>2</sub> isotope analyser to measure CO<sub>2</sub> levels and delta C-13 of CO<sub>2</sub>. These methods, along with an example case study, are now being compiled into an IAEA publication that will guide users in the operation of the C-13 - CO<sub>2</sub> isotope analyser as well as in data analysis that can ultimately be used to evaluate soil management practices. Specifically, this publication will describe how to produce reference gases for gas isotope analysis, measure with the laser isotope analyser in continuous basic-free flow mode, measure with the laser isotope analyser in injection/batch mode, correct data collected with the laser isotope analyser, and finally also includes a case study measuring carbon loss of mulch applied in a soil incubation experiment. In contrast to existing information on the use of these analysers, this publication will provide step-by-step instructions on how to perform analyser measurements and data analysis with illustrations for guidance and identify accuracy and precision enhancing steps. The goal of this IAEA publication is to guide users in the use of laser C-13 - CO<sub>2</sub> isotope analysers to ultimately evaluate the potential of soil management practices to optimize soil organic carbon sequestration for climate-smart agriculture. At EGU the authors aim to show the major steps of an appropriate calibration and use of laser C-13 - CO<sub>2</sub> isotope analysers and will highlight future research outlooks.