

## Automatic open and closing chamber system for continuous measuring soil respiration under the field like condition

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It was suggested that there was a possibility of underestimation when using the closed methods for measuring soil respiration because soil CO<sub>2</sub> flux would be related to the soil-atmospheric CO<sub>2</sub> gradient. From this, we developed an automatic opening and closing chamber system (AOCC) based on an open-flow dynamic method (open-flow AOCC). The AOCC is composed of the chamber, pump and timer systems. The chamber has a long octagon shape and with attaching a cell between chamber and the base collar, the AOCC can be used during all four seasons, even at the surface of relatively deep snow. With available test in field, we compared our method with closed dynamic methods. As a result, closed dynamic method was lower about 21.0 % compare to the AOCC based on open-flow method. Also, in comparing to the LI-6400 chamber it was about 9.8 % lower than the results of the AOCC. The AOCC permitted accurate measurement for four seasons in various environmental conditions, especially in a highly fluctuating CO<sub>2</sub> and temperature, even in frozen soil surface, snowfall surface, and heavy rainy times. In the long measurement test, the AOCC showed that the marked seasonal and daily soil respiration variation was strongly related to soil temperature with the high correlations found with all depths ( $R^2=0.92$ ). The results of all test and datasets in field showed that the AOCC is an accurate and useful tool for measuring soil respiration based on short and long-term events related to various environmental factors.