

Development of a Balloon-borne instrument for CO₂ measurement

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The number of carbon dioxide (CO₂) observation points are lacking, because previous estimations of CO₂ flux to the atmosphere have only been performed on the large scale as subcontinental and small scale as each observation point. To estimate details of areal and seasonal distributions of CO₂ flux, observations on the medium scale and vertical distributions are important. For these estimations, more observation points to measure vertical distribution are needed.

CO₂ balloon observation is one of the answers. Balloon observation can be performed under various conditions of the earth's surface and weather. This instrument must be low cost, compact, lightweight, and has high sensitivity at low pressure conditions.

There is currently no commercially available CO₂ sensor for balloon observations. When such a sensor is developed, in the future, it will be possible to perform CO₂ measurements like ozonesonde observations almost every day.

We are developing a compact and lightweight CO₂ sensor which fills the conditions of sensitivity and time resolution etc. for a balloon-borne instrument. We report evaluation of the potential of the sensor at low pressure conditions, including optimization of the light pass length, and evaluation of the data transmission system.