Editorial: Special issue on meteorological instruments

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The earth we live in is a wonderful and complicated system, meteorology is a science of researching the earth and serving the public, so every country in the world is putting its attention on meteorological observation, and World Meteorological Organization always putting its emphasis on weather, climate and water[1-2]. Correspondingly, meteorological instruments are highlighted in earth research, serving people, preventing disasters and reducing damages. Luckily, with the development of science and technology, great improvements and innovations in this field spring up constantly[3-5]. In this issue we recommend you some last researches on lightning monitoring, solar radiation measurement, rainfall characteristics analysis and temperature effect on the reference frequency of FDR soil moisture sensor. Additionally, a series of works refer to calibration, optical measurement, sensing, numerical analysis and instrument design are introduced.

The key point to understand the characteristics of lightning is to know the charge structure of thunder cloud, which is focused on by many scholars, some of them use the method of numerical simulation to analyze the charge structure[6-8], and now applying the multi-station atmospheric electric field data for inversion is more practical, due to the data collected from the atmospheric electric field instruments, the advantages of real time and large range can provide a great help to the lightning research[9]. At present, there are two methods to measuring diffuse radiation in the meteorological field, one is outfitting a pyranometer with a shadow ring, which prevent the beam radiation from striking on the pyranometer sensor, then the output of the pyranometer is diffuse radiation, but the factor for correcting the shadow ring is very complex; the other method is to block the beam radiation on the pyranometer using an occulting disk or ball and obtain the diffuse radiation, this method need a precise full-automatic solar tracker, benefited from the micromanipulation and optical sensor, the second method is more accuracy for diffuse radiation measurement[10]. FDR automatic soil moisture observation instrument has been widely used in meteorological field, but with the variation of the medium (soil) temperature, the permittivity is changing, the effect of temperature on FDR soil moisture sensor is reported here[11]. Some calibration method and implementation of infrared remote sensing techniques are also included in this special issue.

Currently, meteorological instruments are becoming more automatic, intelligent, high-accuracy and the application of these instruments will give us a better understanding of our planet and lead us a better life.

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