

In this study, the vorticity flux system at the DZ observatory has been making near-surface flux observations since November 2009, covering a range from 1 m below ground to 50 m above the top of the observation tower. Table S1 shows the detailed measuring tools and their installation.

**Table S1.** Installation of measurement instruments of eddy flux observation system at DZ Experimental Station of Tropical Crop Science Observation, Ministry of Agriculture, DZ City, Hainan Province.

<b>Data type</b>	<b>Measuring instrument</b>	<b>Installation position</b>
Wind speed	Three-cup anemometer (Met 010C-1, Met One, Inc., USA)	1.5、 6、 10、 15、 33、 41、 50m
Temperature and humidity	Hygrometer (HMP45C; Inc., Vaisala, Finland)	1.5、 6、 10、 15、 33、 41、 50m
Wind direction	Anemometer (Met 020C-1, Met One, USA)	50m
Quantity of rainfall	Rain barrel (TE525MM, texas instruments, USA)	50m
Radiation	Radiation Observation Sensor (CNR-1, Kipp&Zonen, Inc., Holland)	25m
Canopy and surface temperature	Radiation observation sensor (CNR-1, Apogee, Inc., USA)	1.5、 30m
Soil temperature	Soil Temperature Observer (109, Campbell Scientific Inc., Logan, UT, USA)	2、 5、 20、 50、 100cm
Soil moisture	Soil Moisture Sensor (CS616-L, Campbell Scientific Inc., Logan, UT, USA)	5、 20、 50cm
Soil heat flux	Soil Heat Flux Plate (HFP01. Hukseflux, Inc., Holland)	5、 20、 50cm
CO <sub>2</sub> and water vapor fluxes	Open-circuit infrared CO <sub>2</sub> /H <sub>2</sub> O gas analyzer (LI-7500 Li-cor Inc. H <sub>2</sub> O gas analyzer, LI-7500, LiCor Inc., USA)	25m
Latent and sensible heat fluxes	Three-dimensional ultrasonic anemometer (CSAT3, Campbell Scientific Inc., Logan, UT, USA)	25m