राष्ट्रीय पृथ्वी विज्ञान अध्ययन केंद्र

NATIONAL CENTRE FOR EARTH SCIENCE STUDIES

(An Institution under the Ministry of Earth Sciences, Govt. of India)

P.B. No. 7250, Akkulam, Thiruvananthapuram-695 011, Kerala.

क्रय विभाग/PURCHASE DIVISION

हमारा संदर्भ/Our Ref : PUR-PROC/231a/2026-PUR-NCESS **दिनांक/ Dt. 20-11-2026**

(To be quoted in all correspondence)

फोन/Phone : (0471) 2511531

ईमेल /E-mail : ncesspurchase@gmail.com
purchase@ncess.gov.in

जालस्थल/website : www.ncess.gov.in

विषय/***Sub*: e-Procurement Tender**

Dear Sirs,

Please send your offer along with descriptive catalogue/ pamphlet for the following items not later than ***17/12/2026 at 06.00 PM (Tender Opening at 11.00 AM on 19/12/2026)***. The terms and conditions governing the tender are given at the bottom.

क्रम संख्या/ *Sl. No*	विवरण/ *DESCRIPTION*	आवश्यक मात्रा/ *QUANTITY REQUIRED*
I	**Eddy Covariance System**	**06 Nos**

(Detailed specification and conditions are given separately)

INSTRUCTIONS TO THE TENDERERS AND TERMS AND CONDITIONS

1. **The quotation should be submitted by e-procurement in PDF format by 'logging on' on the website eprocure.gov.in/eprocure/app.** The total file size of the documents submitted should not exceed 20 MB.
2. **The Technical and Financial Bids should be submitted separately (Two Bid System).**
3. **In place of a Bid security, the bidders must sign a Bid securing declaration along with the bid stating that "We accept that if we withdraw or modify our Bids during the period of validity, or if we are awarded the contract and we fail to sign the contract, or to submit a performance security before the deadline defined in the request for bids document, we will be suspended for the period of time decided by NCESS from being eligible to submit bids for contracts with NCESS". The bids without this declaration or Udyog Aadhar Memorandum /NSIC will be rejected**.
4. **Preference to Make In India:** Preference will be given to the eligible Make in India offered products, in accordance with the CVC letter No. 018/VGL/022-377353 dated 20.04.2018, pertaining to Department of Industrial Policy and Promotion (DIPP) in connection with Preference to Make in India, Order 2017'(PPP- MIIOrder) dated15.07.2017 pursuant to rule153(iii) of General Financial Rules 2017. (Declaration may be submitted).

5. **Startups:** To promote make in India and startups, the prior turnover and prior experience for all startups shall be relaxed subject to their meeting of quality, technical specifications and tender conditions as per tender. The bidder who intends to participate as "startup" company should enclose the certificate towards startup enterprise registration/recognition issued by Department of Industrial Policy and Promotion, Ministry of Commerce and the certificate should be certified by the Chartered Accountant or should be registered with GeM as startup. Applicable certificate should be enclosed.
6. Bidders from a country which shares a land border with India will not be eligible to participate in this tender, unless the bidder is registered with Department for Promotion of Industry and Internal Trade (DPIIT) under Order (Public procurement No. 1) issued by Ministry of Finance, Department of expenditure in line with OM No. F.No.6/18/2019-PPD dt 23rd July, 2020 and F.18/37/2020-PPD, dt. 08.02.2021inserting Rule 144 (xi) in GFR 2017.
7. **Fall Clause:** An undertaking has to be provided by the bidder that it has not supplied / is not supplying similar product / systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry / Department of the Government of India or PSU and if it is found at any stage that similar product / systems or sub systems was supplied by the bidder to any other Ministry/Department of the Government of India, or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the bidder to NCESS, if the contract has already been concluded.
8. **MAF:** The authorisation from the manufacturer should be tender specific, i.e., tender reference number and date should be mentioned in the certificate. A bidder shall not have conflict of interest with other bidders. In cases, where the manufacturer has submitted the bid, the bids of its authorised dealer will not be considered and in case of violations, both infringing bids will be rejected.
9. Bids are liable to be rejected as nonresponsive if a Bidder fails to provide and/ or comply with the required information, instructions etc., incorporated in the Tender document or gives evasive information/ reply against any such stipulations. Furnishes wrong and/ or misguiding data, statements(s) etc. In such a situation, besides rejection of the bid as nonresponsive, it is liable to attract other punitive actions under relevant provisions of the Tender Document for violation of the Code of Integrity.
10. During the evaluation of Techno-Commercial or Financial Bids, NCESS may at its discretion, but without any obligation to do so, seek any shortfall information/documents only in case of historical documents which pre-existed at the time of the tender opening and ask the Bidder to clarify its bid by a specified date. Bidder should answer the clarification with in that specified date (or, if not specified, 7 days from the date of receipt of such request). The request for clarification shall be submitted in writing or electronically. If discrepancies exist between the uploaded scanned copies and the Originals submitted by the bidder, the original copy's text, etc, shall prevail. Any substantive discrepancy shall be construed as a violation of the Code of Integrity, and the bid shall be liable to be rejected as nonresponsive in addition to other punitive actions under the Tender Document for violation of the Code of Conduct.
11. From the time of bid submission to awarding the contract, no Bidder shall contact NCESS on any matter relating to the submitted bid. If a Bidder needs to contact NCESS for any reason relating to this tender and/ or its bid, it should do so only in writing or electronically. Any effort by a Bidder to influence the Procuring Entity during the processing of bids, evaluation, bid comparison or award decisions shall be construed as a violation of the Code of Integrity, and bid shall be liable to be rejected as nonresponsive in addition to other punitive actions for violation of Code of Integrity as per the Tender Document.
12. After the award of contract, the supplier encounters conditions hindering timely delivery of the Goods, he/she shall promptly inform NCESS in writing about the same and its likely duration. NCESS shall examine the situations and, at its discretion, may agree to extend the delivery Schedule, with or without Liquidated Damages (LD). When the period of delivery is extended due to unexcused delay, the amendment extending the delivery period shall, inter alia, be subject LD to a maximum deduction of the 10% of the delayed Goods contract price (all inclusive) and with and without denial clause. Nevertheless, NCESS shall be entitled to the benefit of any decrease in price

on account of reduction in or remission of GST, customs duty or foreign exchange rate variation or any other variation clause which takes place after the expiry of the original delivery date.

13. Force Majeure: On the occurrence of any unforeseen event, beyond the control of either Party, directly interfering with the delivery of Goods arising during the currency of the contract, such as war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes, lockouts, or acts of God, the affected Party shall, within a week from the commencement thereof, notify the same in writing to the other Party with reasonable evidence thereof. Unless otherwise directed by the NCESS in writing, the supplier shall continue to perfume its obligations under the contracts far as reasonably practicable and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event, If the force majeure condition(s)mentioned above be in force for 90 days or more at any time, either party shall have the option to terminate the contract on expiry of 90 days by giving 14 days' notice to the other party in writing. In case of such termination, no damage shall be claimed by either party against the other. None of the Party shall seek any such remedies or damages for the delay and/ or failure of the other party in fulfilling its obligations under the contract if it is the result of an event of Force Majeure.

14. ***The bidder should enclose all relevant documents in a sequential manner as per the tender format.*** **The bid should contain the Bid securing declaration, MII / Startup / Land Border declaration, Authorization from manufacturer, Fall Clause, Latest Price Proofs, Details of service Centre, Technical details with make, model and specification of each component, Technical Compliance statement, List of Customers, Brochures etc., wherever applicable.**

15. Catalogue/Brochure/Manual should be submitted along with the offer wherever necessary.

16. Warranty / Guarantee Clause needs to be mentioned necessarily wherever applicable.

17. The material should be delivered at NCESS or installed at the specified location and so the quotation should include all the charges for the delivery at NCESS/installation.

18. In INR orders, the Customs Duty Exemption Certificate will be given to the supplier upon request. But the entire responsibility of customs clearance and delivery at NCESS will rest with the supplier. High sea sale is not accepted and should not be quoted.

19. The offer should be valid for 180 days from the due date of opening of tender.

20. NCESS reserves the right to accept the tender in part or full without assigning any reasons. The enquiry is not a commitment, and the purchaser reserves the right to reject or cancel any or all offers.

21. Payment Terms (Other than CMC/AMC)*:*

(a) 90% upon delivery and acceptance of entire system by NCESS and submission of Invoice, applicable Test Certificate, Installation Certificate, Warranty Certificate.

(b) Balance10% will be paid against submission of performance bank guarantee from a nationalized bank for the applicable amount valid for the warranty period plus 60 days or after successful completion of warranty period.

22. Payment Terms for CMC/AMC:

a. Shall be paid in half yearly instalments on submission of original invoices

b. 50% advance payment at the commencement of each contract year and 50% after six months of the contract year

Net payment will be released after statutory deductions. No advance payment will be allowed, and no other payment terms will be considered.

23. In the event of placement of order, the successful bidder shall provide a Performance Bank Guarantee from a Nationalised Bank for 3% - 5% of the order value (DoE OM No. F.1/2/2023-PPD dated 01.01.2024) wherever applicable. The PBG shall stand valid for the warranty period + 60 days.

24. Any further changes in the details, like the date of opening or specification, will be posted on our web site only.

Yours faithfully,
Sd/-
Deputy Manager (Purchase & Stores)

Detailed Specifications

SL. No	Required Specification	Qty
	Eddy Covariance System Setup:	
1	Open Path CO_2/H_2O gas analyzers and 3D Sonic Anemometer and Thermometer	07 Units
2	Four Component Net Radiometer	07 Units
3	Soil Heat Flux Sensor	12 Units
4	Soil Moisture and Temperature Profiler	06 Units
5	Atmospheric Pressure Sensor	06 Units
6	Temperature and Relative Humidity Sensor	12 Units
7	Wind Speed and Wind Direction Sensor	12 Units
8	Rainfall Sensor	06 Units
9	Quantum Sensor	12 Units
10	Data Logger and Telemetry	06 Units
11	External Data Acquisition System (Rugged Laptop)	03 Units
12	Power Supply Unit (Including battery and Solar power units)	06 Sets
13	10 m tower, Box Enclosures etc.	06 Sets
14	Accessories	06 Sets
General Conditions		
1	The vendor should have demonstrated installation and maintenance of Eddy Covariance systems in at least 3 sites in India and maintaining them for at least 1 year. Proof of the same needs to be provided along with the quote.	
2	All sensors and full eddy covariance system should be provided by a single party/company.	
3	Should provide on-site installation and demonstration and provide support in case of a re-location of sensors. User manuals of all sensors should be given	
4	Sensors should be calibrated before installations and calibration certificate (including details of calibration) should be provided.	
5	The quoted cost should also include the installation charges including tower erection, foundation works, hired labor charges etc.	
6	Sensor Operating temperature range: -10°C to +50°C or better; Operating Relative Humidity range: 0 to 100% and all sensors should work at mean sea level to 2 km above mean sea level.	
Technical Conditions		
a)	**Open Path CO_2/H_2O gas analyzers and 3D Sonic Anemometer and Thermometer (1 Set)**	
1	Gas analyzer type: Fast response sensors for measuring both CO2 -H2O concentrations (open path)	
2	Sampling rate: Minimum 20 Hz or better.	
3	Accuracy: Within 2% of measurement or better	
4	RMS error for CO_2: Less than 0.2 PPM at 20 Hz	
5	RMS error for H_2O: Less than 0.007 mmol mol^{-1} at 20 Hz	
6	H_2O Gas analyzer range: 0 to 50 mmol/mol or better.	
7	CO_2 Gas analyzer range: 0 to 1500 µmol/mol or better.	
8	Zero Drift values within ±0.05 PPM per degree Celsius for H_2O and ±0.3 PPM per degree Celsius for CO_2	
9	Gain drift within ±0.3% of reading per degree Celsius for H_2O ±0.1% of reading per degree Celsius for CO_2	

10	Should include the calibration kit for the open path gas analyzer
11	3D sonic anemometer wind speed measurement range: 0-30 m/s or better.
12	Wind Speed Range: 0 to 60 m/s, Resolution: 0.01 m/s, Accuracy: RMS less than 1.5 % or better
13	Wind Direction Range: 0 – 359 degrees, Resolution: 0.1°, Accuracy: 1°
14	Sonic Temperature: –35 °C to 60 °C, Resolution: 0.01 °C
15	Should have an internal measuring frequency of more than 25 Hz
16	Wind speed correction for crosswind and tilt.
17	The following outputs are required: (a) CO_2 and H_2O concentration and fluxes (b) Gas analyzer diagnostic parameters, (c) CO_2 and H_2O signal strength (d) Ux, Uv, Uz (3D wind components) (e) Sonic temperature and (f) Sonic diagnostics.
18	Software for the analysis of the Eddy Covariance data to derive the fluxes of CO_2 and H_2O, with appropriate corrections (including cross wind and tilt), should be provided.
b) Four Component Net Radiometer (1 Unit)	
1	Four component net radiometer with 25 m cable along with mounting kit. Should provide the all 4-component upwelling and downwelling shortwave and longwave fluxes.
2	The Net radiometer should have suitable mechanism (heating and /or ventilation) to prevent dew deposition on the pyrgeometer.
3	Shortwave (SW) Spectral response: 300-2500 nm or better
4	Longwave (SW) Spectral response: 4500 to 40,000 nm or better
5	Response time of Radiation Sensor: 20 s or better
c) Soil Heat Flux Sensor (2 Nos)	
1	Self-Calibrating Soil Heat Flux Plates
2	Measurement Range: -100 to + 300 W/m^2 or better
3	Accuracy: Maximum ±5 % of true value
d) Soil Moisture and Temperature Profiler (1 Set)	
1	TDR or FDR based soil moisture sensors either as a single encapsulated unit or individual units to measure soil moisture and soil temperature atleast 5 depths from surface to 1 m depth
2	Accuracy of soil moisture measurement: < ± 2% or better
3	Accuracy of temperature measurement: ±0.15 °C or better
e) Atmospheric Pressure Sensor (1 No)	
1	Measuring the atmospheric pressure near surface
2	Range: 700 – 1050 hPa or better
3	Accuracy: +/- 1 % or better
f) Temperature and Relative Humidity Sensor (2 Sets)	
1	Measurement of air temperature and relative humidity at 2 m and 10 m levels
2	Relative Humidity (RH) range: 0 to 100%
3	RH accuracy at 25 ° C: +/- 5 % or better
4	Temperature range: -10° to +50°C or better
5	Temperature accuracy at 25 ° C: ± 0.5 °C or better
6	With Solar radiation shield
g) Wind Speed and Wind Direction Sensor (2 Sets)	
1	Measurement of wind speed and direction at 2 m and 10 m levels
2	Wind speed measurement range: 0 to 50 m/s or wider
3	Wind speed sensor accuracy: 1 m/s or better
4	Wind speed resolution: 0.5 m/s or better
5	Wind direction measurement range: 0-360°
6	Wind direction accuracy: 5° or better
7	Wind direction resolution: 1° or better
h) Rainfall Sensor (1 No)	

1	Sensor type: Tipping bucket
2	Accuracy: 2% up to 50 mm/hour rain rate or better.
3	Rainfall per tip: 0.254 mm or better
i) Quantum Sensor (2 Sets)	
1	Quantum Sensor for measuring the photosynthetically active radiation (PAR)
2	Spectral range: 400 to 690nm (±4 nm)
2	Response time: < 1ms
4	The measurement should be stable with a change less than 2% per year.
j) Data Logger and Telemetry (1 Unit)	
1	Data logger(s) should support all sensors: fast response eddy covariance sensors (1 set) and all the slow response sensors including radiation sensor (1 no), soil heat flux sensor (2 nos), pressure sensor (1 no), temperature and humidity sensors (2 levels), wind speed and direction sensors (2 levels) and rain gauge (1 no). The system should have sufficient memory to store at least 6 months of data during continuous operation (20 Hz or more for EC system and 2 minute or lesser for slow response systems).
2	Data logger should support 100 Hz or better data storage and processing.
3	Data logger should support communication with PC/laptop through USB/ethernet.
4	Logger should have a Display for viewing real time data and data logger status.
5	Data values should be stored in tables with time-stamp and record number.
6	Real-Time clock drift : 5 minutes/year or lesser
7	Data logger should have an in-built storage facility to operate in remote locations without using PC/laptop or alternate Storage options.
8	Option to store 16 GB data or better through industrial grade memory cards
9	Adequate channels are required to augment all sensors.
10	Telemetry system should preferably be separate from the data logger
11	GPRS/3G/4G-modem for data transfer and remote access should be provided for real time data transmission to NCESS servers.
12	Mechanism should be in-build in data-logger for processing of the raw data and the processed data (at hourly time scale) should be transmitted through the telemetry system to NCESS servers.
13	Provision should be available for data access through vendor's dashboard/servers.
k) External Data Acquisition System (1 No)	
1	Suitable rugged laptop or similar devices of configuration (i7 processor, OS - windows 10 Pro pre-installed, 16 GB ram and atleast 1 TB SSD hard drive) for collecting data from data logger via connecting through USB cable should be provided.
l) Solar Power Supply Unit (1 Unit)	
1	Solar power setup for all sensors.
2	Solar panel, regulator should be compatible with data logger and all sensors.
3	Suitable battery to provide two week's power supply to the system without sun shine should be provided.
4	Sensors should be able to operate without solar power up to 72 hours or more.
m) 10 m tower with fixtures suitable for mounting the fast and slow response sensors (1 Unit)	
1	1 Level of fast response sensors (EC sensors)
2	2 Levels of slow response sensors (option to change sensor levels).
3	All necessary mounting fixtures should be provided.
4	The tower should be installed on an adequate foundation and the sensors should be mounted.
5	The tower should withstand severe weather conditions with wind speed up to 50 m/s or more
6	High sensitive lightning protection should be provided in the 10-meter tower with copper lightning rod set up, ground up to 3-meter depth.
n) Software	

1	All necessary software essential for viewing, processing and collecting data should be provided along with the system.
2	All software/algorithms should be provided for calculating surface fluxes (latent heat flux, sensible heat flux, evapotranspiration, etc.) using the fast sensor data.
3	Essential software/programs for correcting the influence of the sonic tilt and cross-wind for surface flux estimation should be provided.
o) Accessories	
1	All necessary cables of sufficient lengths to connect the sensors to the data logger, power supply unit and any other unit of the device should be provided, the length of cable should be atleast 15 m so as to enable to install the data logger and power supply unit at a location far (10 to 15 m) from the sensor unit setup.
2	All mounting hardware/sensor cables/accessories should be provided for continuous operation of all sensors.
3	The necessary and suitable field enclosure of stainless steel or any other non-corrosive material for protection of the sensor unit and the power supply unit from damage should be provided.
4	Essential tools/tool kits/utilities should be provided for the entire setup for regular operations and maintenance.
p) Warranty	
1	Minimum three-year comprehensive onsite warranty for the entire setup should be provided. In-addition to breakdown visits, preventive maintenance visits and necessary calibration should be conducted once in 6-months. OEM re-calibration should be carried out every 2-years.
2	Quote for Comprehensive Maintenance Contract (CMC) for three years after the warranty period should be quoted.

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NATIONALCENTRE FOR EARTH SCIENCE STUDI

P.B. No. 7250, MEDICAL COLLEGE P.O., AKKULAM, THIRUVANANTHAPURAM-695 011, INDIA

Tel: 91-471-2511531 e-mail: purchase@ncess.gov.in

TENDER FORM

Tender No. & Date	:	**PUR-PROC/231a/2026-PUR-NCESS Dt.20/11/2026**
Due Date	:	***17.12.2026 (06.00 PM).***
Date of Opening	:	***19.12.2026 (11.00 AM).***
Venue of Opening	:	National Centre for Earth Science Studies, P.B.No.7250, Medical College P.O., Thiruvananthapuram – 695 011.
Description of stores	:	**Eddy Covariance System**
Quantity	:	**06 Nos.**

Sirs,

The Head, Administration (i/c) on behalf of the Director, National Centre for Earth Science Studies (NCESS), invites bids for the supply of stores mentioned above. The tender documents are classified as Annexure-A and Annexure-B. Annexure-A is a specimen tender form meant for suppliers and the bid should contain all the details specified therein. The instructions to the tenderers and the general terms and conditions applicable to the Purchase Orders placed by NCESS are given under Annexure-B. Those who are able to quote for the stores in accordance with the above requirements, may please furnish their offer through GeM, on or before the last date and time specified in the tender.

Any deviations from the terms and conditions of the Annexure-B must be clearly indicated in the offer.

Yours sincerely,
Sd/-
Head, Administration (i/c)

ANNEXURE A

The Head, Administration (i/c)
National Centre for Earth Science Studies,
P.B.No.7250, Akkulam, Medical College PO,
Thiruvananthapuram – 695 011.
Kerala, India

Sir,

Sub: Your Tender No ……Dated……

I/We hereby offer you to supply the stores detailed below at the price hereunder quoted and agree to hold this offer open till ……I/We shall bind to supply the stores hereby offered, upon the issue of the purchase order communicating the acceptance thereof on or before the expiry of the delivery date therein. You are at the liberty to accept any one or more of the items of such stores. I/We, notwithstanding that the offer in this tender has not been accepted in whole shall be bound to supply to you such items and such portion or portions of one or more of the items as may be specified in the purchase order communicating the acceptance.

1. Technical Compliance Statement.

Required Specification		Spec offered (with make and model)	Whether complied	Brochure Page No
SL. No	**Description**			
General Conditions				
1	The vendor should have demonstrated installation and maintenance of Eddy Covariance systems in at least 3 sites in India and maintaining them for at least 1 year. Proof of the same needs to be provided along with the quote.			
2	All sensors and full eddy covariance system should be provided by a single party/company.			
3	Should provide on-site installation and demonstration and provide support in case of a re-location of sensors. User manuals of all sensors should be given			
4	Sensors should be calibrated before installations and calibration certificate (including details of calibration) should be provided.			
5	The quoted cost should also include the installation charges including tower erection, foundation works, hired labor charges etc.			
6	Sensor Operating temperature range: -10°C to +50°C or better; Operating Relative Humidity range: 0 to 100% and all sensors should work at mean sea level to 2 km above mean sea level.			
Technical Conditions				
a)	**Open Path CO_2/H_2O gas analyzers and 3D Sonic Anemometer and Thermometer (1 Set)**			
1	Gas analyzer type: Fast response sensors for measuring both CO_2 - H_2O concentrations (open path)			
2	Sampling rate: Minimum 20 Hz or better.			
3	Accuracy: Within 2% of measurement or better			
4	RMS error for CO_2: Less than 0.2 PPM at 20 Hz			
5	RMS error for H_2O: Less than 0.007 mmol mol^{-1} at 20 Hz			
6	H_2O Gas analyzer range: 0 to 50 mmol/mol or better.			
7	CO_2 Gas analyzer range: 0 to 1500 µmol/mol or better.			
8	Zero Drift values within ±0.05 PPM per degree Celsius for H_2O and ±0.3 PPM per degree Celsius for CO_2			
9	Gain drift within ±0.3% of reading per degree Celsius for H_2O ±0.1% of reading per degree Celsius for CO_2			
10	Should include the calibration kit for the open path gas analyzer			
11	3D sonic anemometer wind speed measurement range: 0-30 m/s or better.			
12	Wind Speed Range: 0 to 60 m/s, Resolution: 0.01 m/s, Accuracy: RMS less than 1.5 % or better			
13	Wind Direction Range: 0 – 359 degrees, Resolution: 0.1°, Accuracy: 1°			

	14	Sonic Temperature: –35 °C to 60 °C, Resolution: 0.01 °C			
	15	Should have an internal measuring frequency of more than 25 Hz			
	16	Wind speed correction for crosswind and tilt.			
	17	The following outputs are required: (a) CO_2 and H_2O concentration and fluxes (b) Gas analyzer diagnostic parameters, (c) CO_2 and H_2O signal strength (d) Ux, Uv, Uz (3D wind components) (e) Sonic temperature and (f) Sonic diagnostics.			
	18	Software for the analysis of the Eddy Covariance data to derive the fluxes of CO_2 and H_2O, with appropriate corrections (including cross wind and tilt), should be provided.			
	b)	**Four Component Net Radiometer (1 Unit)**			
	1	Four component net radiometer with 25 m cable along with mounting kit. Should provide the all 4-component upwelling and downwelling shortwave and longwave fluxes.			
	2	The Net radiometer should have suitable mechanism (heating and / or ventilation) to prevent dew deposition on the pyrgeometer.			
	3	Shortwave (SW) Spectral response: 300-2500 nm or better			
	4	Longwave (SW) Spectral response: 4500 to 40,000 nm or better			
	5	Response time of Radiation Sensor: 20 s or better			
	c)	**Soil Heat Flux Sensor (2 Nos)**			
	1	Self-Calibrating Soil Heat Flux Plates			
	2	Measurement Range: -100 to + 300 W/m^2 or better			
	3	Accuracy: Maximum ±5 % of true value			
	d)	**Soil Moisture and Temperature Profiler (1 Set)**			
	1	TDR or FDR based soil moisture sensors either as a single encapsulated unit or individual units to measure soil moisture and soil temperature atleast 5 depths from surface to 1 m depth			
	2	Accuracy of soil moisture measurement: < ± 2% or better			
	3	Accuracy of temperature measurement: ±0.15 °C or better			
	e)	**Atmospheric Pressure Sensor (1 No)**			
	1	Measuring the atmospheric pressure near surface			
	2	Range: 700 – 1050 hPa or better			
	3	Accuracy: +/- 1 % or better			
	f)	**Temperature and Relative Humidity Sensor (2 Sets)**			
	1	Measurement of air temperature and relative humidity at 2 m and 10 m levels			
	2	Relative Humidity (RH) range: 0 to 100%			
	3	RH accuracy at 25 o C: +/- 5 % or better			
	4	Temperature range: -10° to +50°C or better			
	5	Temperature accuracy at 25 o C: ± 0.5 °C or better			
	6	With Solar radiation shield			
	g)	**Wind Speed and Wind Direction Sensor (2 Sets)**			
	1	Measurement of wind speed and direction at 2 m and 10 m levels			
	2	Wind speed measurement range: 0 to 50 m/s or wider			

3	Wind speed sensor accuracy: 1 m/s or better				
4	Wind speed resolution: 0.5 m/s or better				
5	Wind direction measurement range: 0-360°				
6	Wind direction accuracy: 5° or better				
7	Wind direction resolution: 1° or better				
h)	**Rainfall Sensor (1 No)**				
1	Sensor type: Tipping bucket				
2	Accuracy: 2% up to 50 mm/hour rain rate or better.				
3	Rainfall per tip: 0.254 mm or better				
i)	**Quantum Sensor (2 Sets)**				
1	Quantum Sensor for measuring the photosynthetically active radiation (PAR)				
2	Spectral range: 400 to 690nm (±4 nm)				
3	Response time: < 1ms				
4	The measurement should be stable with a change less than 2% per year.				
j)	**Data Logger and Telemetry (1 Unit)**				
1	Data logger(s) should support all sensors: fast response eddy covariance sensors (1 set) and all the slow response sensors including radiation sensor (1 no), soil heat flux sensor (2 nos), pressure sensor (1 no), temperature and humidity sensors (2 levels), wind speed and direction sensors (2 levels) and rain gauge (1 no). The system should have sufficient memory to store at least 6 months of data during continuous operation (20 Hz or more for EC system and 2 minute or lesser for slow response systems).				
2	Data logger should support 100 Hz or better data storage and processing.				
3	Data logger should support communication with PC/laptop through USB/ethernet.				
4	Logger should have a Display for viewing real time data and data logger status.				
5	Data values should be stored in tables with time-stamp and record number.				
6	Real-Time clock drift : 5 minutes/year or lesser				
7	Data logger should have an in-built storage facility to operate in remote locations without using PC/laptop or alternate Storage options.				
8	Option to store 16 GB data or better through industrial grade memory cards				
9	Adequate channels are required to augment all sensors.				
10	Telemetry system should preferably be separate from the data logger				
11	GPRS/3G/4G-modem for data transfer and remote access should be provided for real time data transmission to NCESS servers.				

12	Mechanism should be in-build in data-logger for processing of the raw data and the processed data (at hourly time scale) should be transmitted through the telemetry system to NCESS servers.			
13	Provision should be available for data access through vendor's dashboard/servers.			
k)	**External Data Acquisition System (1 No)**			
1	Suitable rugged laptop or similar devices of configuration (i7 processor, OS - windows 10 Pro pre-installed, 16 GB ram and atleast 1 TB SSD hard drive) for collecting data from data logger via connecting through USB cable should be provided.			
l)	**Solar Power Supply Unit (1 Unit)**			
1	Solar power setup for all sensors.			
2	Solar panel, regulator should be compatible with data logger and all sensors.			
3	Suitable battery to provide two week's power supply to the system without sun shine should be provided.			
4	Sensors should be able to operate without solar power up to 72 hours or more.			
m)	**10 m tower with fixtures suitable for mounting the fast and slow response sensors (1 Unit)**			
1	1 Level of fast response sensors (EC sensors)			
2	2 Levels of slow response sensors (option to change sensor levels).			
3	All necessary mounting fixtures should be provided.			
4	The tower should be installed on an adequate foundation and the sensors should be mounted.			
5	The tower should withstand severe weather conditions with wind speed up to 50 m/s or more			
6	High sensitive lightning protection should be provided in the 10-meter tower with copper lightning rod set up, ground up to 3-meter depth.			
n)	**Software**			
1	All necessary software essential for viewing, processing and collecting data should be provided along with the system.			
2	All software/algorithms should be provided for calculating surface fluxes (latent heat flux, sensible heat flux, evapotranspiration, etc.) using the fast sensor data.			
3	Essential software/programs for correcting the influence of the sonic tilt and cross-wind for surface flux estimation should be provided.			
o)	**Accessories**			
1	All necessary cables of sufficient lengths to connect the sensors to the data logger, power supply unit and any other unit of the device should be provided, the length of cable should be atleast 15 m so as to enable to install the data logger and power supply unit at a location far (10 to 15 m) from the sensor unit setup.			
2	All mounting hardware/sensor cables/accessories should be provided for continuous operation of all sensors.			

3	The necessary and suitable field enclosure of stainless steel or any other non-corrosive material for protection of the sensor unit and the power supply unit from damage should be provided.			
4	Essential tools/tool kits/utilities should be provided for the entire setup for regular operations and maintenance.			
p)	**Warranty**			
1	Minimum three-year comprehensive onsite warranty for the entire setup should be provided. In-addition to breakdown visits, preventive maintenance visits and necessary calibration should be conducted once in 6-months. OEM re-calibration should be carried out every 2-years.			
2	Quote for Comprehensive Maintenance Contract (CMC) for three years after the warranty period should be quoted.			

2. **The list of Indian Customers who have bought the same/similar instrument within the last two years, with contact details:**

3. **Details of Service centre: (In case of dealers, also please state whether Authorised Dealership Certificate is enclosed)**

Place of Delivery: Stores, National Centre for Earth Science Studies, P.B.No.7250, Medical College P.O., Thiruvananthapuram – 695 011, Kerala, India.

I / We understand the instructions to the tenderers and General Terms and Conditions of the Contract governing supplies detailed in Annexure-B. I/We have thoroughly examined the specifications of the stores referred above and my/our offer is to supply stores strictly in accordance with and subject to the terms and conditions stipulated in Annexure-B.

Stamp and Signature of the Tenderer

ANNEXURE B

INSTRUCTIONS TO THE TENDERERS AND GENERAL TERMS AND CONDITIONS OF THE CONTRACT

1. **PRICES:** Tenders shall be made in ENGLISH and submitted with price for delivery at National Centre for Earth Science Studies, Akkulam, Medical College PO, Thiruvananthapuram-11, Kerala. The quoted amount should be inclusive of all charges like packing & forwarding charges, inland freight & other related charges, freight, statutory levies, unloading, installation etc.

2. **RIGHTS OF THE PURCHASER:** The Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reason whatsoever.

3. **VALIDITY OF OFFER:** The prices quoted should be firm and quotation has to be valid for a period of 180 days from the date of opening of tender.

4. **CATALOGUE:** Tenderers shall furnish Leaflet/Technical Literature of the Stores offered by him along with the offer.

5. **TRANSPORTATION:** Stores shall be supplied under supplier's risk.
6. **MODE AND TERMS OF PAYMENT:** Full payment after successful installation/commissioning and acceptance of stores at Purchaser's Site.

7. **WARRANTY:** The supply made by the supplier shall be of best quality and workmanship shall be in accordance with the specifications stipulated in the Purchase Order. Defects/deficiencies shall be made good by the supplier free of cost, notified within the applicable warranty period.

8. **SUBMISSION OF TENDERS: The quotation should be submitted by e-procurement in PDF format by 'logging on' in the website eprocure.gov.in/eprocure/app**

9. **ENGINEER'S SERVICE MANUAL AND INSTRUCTION MANUAL:** The Engineer's Service Manual including Circuit Diagram and Instruction Manual (Original Copies) of the equipment shall be supplied along with the delivery/shipment by the supplier in the event of a purchase order. This aspect should be clearly indicated in the offer.

10. **DELIVERY/SHIPMENT**:

a) The time for delivery of the stores stipulated in the purchase order shall be deemed to be the essence of the contract and delivery must be completed not later than the period specified therein.
b) Failure and termination: If the contractor fails to deliver the stores or any part thereof within the period prescribed for such delivery, the purchaser shall be entitled at his option either;
    i. to recover from the contractor as agreed liquidated damages and not by way of penalty, a sum of 2% of the price of any stores which the supplier has failed to deliver as aforesaid, for each month or part of a month, during which the delivery of

such stores may be in arrears or

ii. to purchase elsewhere, without notice to the contractor on the account and at the risk of the contractor, the stores not delivered or there of a similar description (where others exactly complying with the particulars are not in the opinion of the purchaser readily procurable, such opinion being final) without cancelling the contract in respect of the portion of stores not yet due for delivery.

iii. to cancel the contract or a portion thereof and if so desired, to purchase or authorize to purchase of stores not so delivered or others of similar description (where others exactly complying with the particulars are not in the opinion of the purchaser readily procurable, such opinion being final) at the risk and cost of the contractor.

11. LAW GOVERNING THE CONTRACT: The contract shall be governed by the laws of India for the time being in force. The marking of all stores supplied must comply with the requirements of Indian Acts relating to Merchandise Marks and all the rules made under such Acts.

12. JURISDICTION: The courts within the local limits of Thiruvananthapuram, the place from the purchase order is issued, will be the jurisdiction to deal with and decide any matter arising out of the contract subject to the clause 18 hereof.

13. INDEMNITY: The contractor shall at all, times indemnify the purchaser against all claims which may be made in respect of stores for infringement of any right protected by patent, registration of design or trade mark and shall take all risk of accidents or damage which may cause a failure of the supply from whatever cause arising and the entire responsibility for the sufficiency of all the means used by him for the fulfilment of the contract.

14. ARBITRATION: Not withstanding anything contained in clause 16 above, in the event of any question, dispute or difference arising under these conditions or any condition contained in the purchase order or in connection with this contract (except as to any matters the decision of which is specially provided for by these conditions) the same may be referred to the sole arbitration of the Director, National Centre for Earth Science Studies, Thiruvananthapuram or some other person appointed by him, there will be no objection that the arbitrator is a Govt. servant, who has to deal with matters to which the contract relates or that in the course of his duties as a Government servant he has expressed views on all or any of the matters in the disputes or difference. The award of the arbitrator shall be final and binding on the parties to this contract.

Terms of this contract: -

a) If the arbitrator be the Director, NCESS, (i) in the event of his being transferred or vacating his office by resignation or otherwise, it shall be lawful for his successor in the office either to proceed with the reference himself, or to appoint another person as arbitrator to (ii) in the event of his being unwilling or unable to act for any reason, it shall be lawful for the Director, NCESS to appoint another person as arbitrator;

Or

b) If the arbitrator be a person appointed by the Director, NCESS, in the event of his dying, neglecting or refusing to act, or resigning or being unable to act for any reason, it shall be lawful

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for the Director, NCESS, to proceed with the reference himself or to appoint another person as arbitrator in place of the outgoing arbitrator.

Subject as aforesaid, the Arbitration Act, 1940 and the rule there under and any statutory modifications thereof for the time being in force shall be deemed to apply to the arbitration proceeding under this clause. The arbitrator shall have the power to extend with the consent of the purchaser and the contractor the time for making and publishing the award. The venue of arbitration shall be the place as the purchaser in the absolute discretion may determine.

15. **EXERCISING THE RIGHTS & POWERS OF THE PURCHASER:** All the rights, discretions and power of the purchaser under the contract shall be exercisable by and all notices on behalf of the purchaser shall be given by the Director or the Senior Manager of Centre for Earth Science Studies and any reference to 'the opinion of the purchasers' in the terms and conditions contained in this general conditions of the contract shall mean and be construed as reference to the opinion of any of the persons mentioned in this clause.

16. **EXEMPTION FROM PAYMENT OF DUTIES:** The purchaser is eligible for availing customs duty at concessional rate under the relevant rules.

17. **SPARES & ACCESSORIES:** Offers for plant/machinery/equipment/instrument shall also state prices or essential accessories, optional accessories and spares necessary for 5 years of satisfactory operation of the machinery/equipment/instrument offered. Prices for accessories and spares shall be itemised, offers where only lump sum prices are indicated are liable to be ignored. Particular care must be taken to list out each item of spare and quantity recommended and also individual price for these items.

18. **QUANTITY:** The purchaser reserves the right to accept or reject lowest or any offers in whole or in part without assigning any reason. It would therefore be in the interest of the tenderers to clearly understand that the purchaser may accept offers for any quantity of his choice and hence, the percentage of reduction, if any in the price quoted in case of acceptance of tender in whole or part shall be clearly stated.

19. **TRAINING:** The contractor shall, in special cases, if required by the Purchaser provide facilities for the practical training of the purchaser's engineers and technical personnel in respect of repair, maintenance or operation of the plant/machinery/ equipment/ instrument offered at their manufacturing plant in India or abroad. The cost for such training (including travelling, boarding and other related expenses) and the number of trainees and duration of training and any other terms if any, should be indicated separately in the offer.

20. **INSTALLATION & COMMISSIONING:** In the event of an order, the supplier shall arrange satisfactory installation and commissioning of the plant/machinery equipment/ instrument at purchaser's site, free of cost.

21. **SERVICE SOFTWARE/TOOLS:** The service software, tools required if any for the repair/maintenance of the plant/machinery/equipment/instrument shall be quoted separately.

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Digitally signed by Lavanya G
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